A FOREWORD ABOUT VOLUME NUMBER TWO—ENGINEERING FEATURES TO BE ENLARGED UPON—MUNICIPAL DEPARTMENT TO BE ADDED. - -

"CONSTRUCTION" has entered upon its second year. The first number of our second volume, we believe, shows unparalleled progress in the development of a technical journal. This progress is demonstrative of three things: First, that there was a field for such a journal in Canada; secondly, that it is possible to successfully produce high class journals in Canada; and thirdly, that the trade has fully appreciated our efforts.

During the coming year, we shall develop the engineering features of our paper. A municipal department will be established, in which illustrated articles, dealing with municipal engineering, will be dealt with by the best experts in the country. A series of articles dealing with attractive, economically planned and constructed, moderate priced houses, has been arranged for, and will be illustrated with floor plans, elevations and details, together with complete data of proposed specifications.

A number of other very exceptional features have been arranged for and the second volume of "CONSTRUCTION" will, we believe, be found to be of wider interest and greater value to our readers than the first one has been.

BUILDING STATISTICS FOR OCTOBER —AVERAGE GAIN OVER SAME MONTH OF 1907—REPORTS FROM DIFFERENT POINTS ENCOURAGING. - - - -

BUILDING OPERATIONS for the month of October, as indicated by statistics compiled from the larger cities throughout the Dominion, continue to show very gratifying increases over the same period of 1907.

Of the ten cities, for which comparative figures were supplied "CONSTRUCTION," only three show decreases, viz.: Calgary, Montreal, and Regina.

In the case of Calgary, this comparison is hardly a fair criterion of the conditions in that city, in so far as October of 1907 was an abnormally large month, owing to permits having been taken out for some very big work During October of 1908, forty-four permits were issued for buildings to cost $88,400; during the same month of 1907, forty-nine permits were issued for buildings, the aggregate cost of which was $491,000. For the first ten months of last year, the aggregate cost of buildings for which permits were issued was $1,574,820, so that it may be seen that, while there were only five more permits issued for October of 1907, as compared with 1908, the aggregate cost of the buildings represented about one-third of the value of buildings erected during the first ten months of 1907.

In Montreal, with a decrease of 61.32 per cent., very much the same conditions prevailed, for there were exactly the same number of permits (172) issued during October of 1908 as in 1907. The reason for the decrease is purely due to the fact that permits for two or three very large structures were taken out during the month of October, 1907, which month was an abnormally heavy one, as is demonstrated by the fact that the aggregate cost of buildings during this month was just about one-seventh of the total cost of buildings erected for the first ten months of 1907.

In the case of Regina, it should be noted that twenty-five permits were issued for the month of October of 1908, as against twenty for the corresponding month of 1907, although there is a decrease in the aggregate value of buildings for which permits were issued of 43.64 per cent

In the face of these decreases, which can readily be accounted for by the fact that permits were not issued for any large buildings during October of 1908, there are a number of extraordinary increases in several of the cities. Winnipeg leads with an increase of 219.43 per cent.; Fort William has an increase of 163.55 per cent.; St. John, N.B., 176.50 per cent.; Toronto an increase of 31.02 per cent.; Edmonton, Vancouver, Victoria and Halifax also show substantial increases, while building in St. Thomas is 50 per cent ahead of what it was for the corresponding period of 1907.

Reports from the various cities show that future prospects for the remainder of the year are exceedingly bright. Winnipeg reports "fair"; Regina, "the outlook for the future is fairly good"; St. John, "fair"; Fort William, "quite bright"; Edmonton, "active, providing we have an open season"; Calgary, "no change for better this season. Everything looks bright for next spring"; Vancouver, B.C., "bright, even better than last year at this time"; Montreal, "fairly good"; and Toronto, "exceedingly bright."

Statistics from Brandon, while not giving figures for

	Total Cost of Buildings for October, 1907	Total Cost of Buildings for October, 1908	Increase per cent.	Decrease per cent.
Calgary	$ 491,100	$ 88,400		81.99
Edmonton	77,125	98,735	28.	
Fort William	33,465	88,200	163.55	
Halifax	28,490	36,155	26.90	
London		59,700		
Montreal	1,091,344	422,080		61.32
Regina	103,390	58,270		43.64
St. John	26,600	73,550	176.50	
St. Thomas		13,200		
Toronto	776,555	1,019,492	31.02	
Winnipeg	134,300	429,000	219.43	
Vancouver	325,570	414,810	27.34	
Victoria	83,875	99,750	17.73	

the month of October, show that for the first ten months of 1908, 116 permits have been issued for buildings, the aggregate cost of which is $252,149, as compared with 240 permits with an aggregate value of $536,911 for the corresponding period of 1907. The amount given for 1908 does not include the permit to be issued shortly for the proposed $10,000 gas plant.

ARCHITECTURAL REGISTRATION THE PUBLIC'S ONLY POSSIBLE PROTECTION AGAINST THE INCOMPETENT OR DISHONEST PRACTITIONER—PROVINCIAL REGULATION REQUIRED. - -

THERE IS NO ELEMENT in our social and industrial development that is more important than building construction, and there is none about which the lay public knows less.

The average prospective builder who has money to invest, knows absolutely nothing of the "ware" he proposes to buy. He wants a building for a certain purpose, to be about so deep, so wide, and so high. He has a faint picture in his mind's eye as to how he would like the structure to appear when completed. He wants it to cost him about so much money, and in a vague way he has figured out *about* the interior arrangement he wants, to meet the demands of his purpose or his tastes.

But beyond these few ideas, that have been prompted and created by his knowledge of the purpose for which his building is to be constructed, he knows absolutely nothing of the essential details of design, plan or construction. He is not supposed to know—he leaves such matters to his architect, upon whose competency, judgment, ability and honesty he is forced to depend solely and absolutely.

What happens, if his confidence has been misplaced and in his selection he has employed an architect who is not an *"architect"?* What happens if he has placed the plan and erection of his building in the hands of a man entirely unequal to the task imposed upon him? What happens if he has commissioned a dishonest practitioner to spend his money in the erection of his building; one who operates and succeeds by the aid of *"sharp practice,"* rather than through his competency?

The answer is simple and all too apparent, in object lessons that come before us every day. The inevitable results of the unfortunate plight of the client who has misplaced confidence in the man with whom he has intrusted the planning and erecting of his building, are evident by the so-called buildings—veritable shacks, fire traps, unsightly heaps of brick and stone, often erected in our smaller towns and cities and rural districts, for which owners have paid their good money.

The owner is to some extent protected in the larger cities, such as Toronto, Hamilton and London, in Ontario, where a building department exists that passes upon all plans before the erection of the building can be proceeded with, but even this protection is entirely inadequate, insofar as the building inspector demands only that the plans shall provide for a structure that will comply with the requirements of a law designed solely for the protection of the community at large, and in no way contemplates protection of the client against the incompetency, dishonesty or negligence of his architect. But in the smaller cities and towns, where there is no building department and no method of building inspection exists, neither the public nor the owner is protected and it is in these rural sections that the shrewd incompetent finds it easiest to operate.

It may be argued that if the owner is foolish enough to employ an incompetent, he must expect the inevitable. But how is the owner to judge in his selection of an architect? How can he, with his lack of knowledge of the essentials in the fitness of a capable architect, be able to choose between the capable and incapable man? What acknowledged standard of competency has he to guide him? To him the difference between one architect and another is confined simply to the individual tastes displayed in their work. He does not realize the importance of what appears to him minor details, such as the strength and adaptibility of materials, the suitability of appliances, mathematical details of plan and construction, merit of investment or supervision of erection. He does not look for a college diploma, for it is commonly known that there are possibly as many highly capable architects who have never had the advantage of a college course as there are among those who have had academic training.

The prospective builder in the Province of Ontario has absolutely no means whereby he may distinguish between the incapable imposter and the competent designer. His own knowledge of the "ware" he purposes to buy is so limited that his own better judgment often leads him astray, and there is no acknowledged standard of competence whereby he may measure the man whom he proposes to employ as his architect. He must trust to good fortune.

The conditions that have obtained under this rule of things certainly warrant a demand for a government standard of competence in the profession of architecture.

The practice of architecture in the Province of Ontario, and in fact throughout several provinces of the Dominion, has degenerated to a very low point, for the sole reason that anyone is free to declare himself an architect and start to practice without any previous training or proof of ability being required. For this reason, a great percentage of the practitioners are entirely unfitted to do the work which they have held themselves out to the public as being able to execute.

Important commissions in many cases are daily being entrusted to persons entirely unfitted to execute them, and the inevitable result is that many of the buildings erected throughout the Dominion are poorly designed and constructed, and, from a commercial standpoint, represent absolute failures.

The public does not stop to consider the basic reasons responsible for the low standard of building prevalent more or less in almost every section of the Dominion; the layman does not apprehend that much training and experience is necessary, in order to produce good buildings. He does not realize that the architect must be a thoroughly trained man. It therefore appears to us that a parental government should determine who should term himself an architect, and who should not be permitted to use the title. It has been declared that the Provincial Governments have complete and absolute jurisdiction over matters of this nature. It then rests with the progressive Ontario Government to work out this problem, for the benefit of the citizens of this province.

There is only one solution of this problem and that is "Architectural Registration."

By "Architectural Registration" we mean a system whereby the architect who desires to practice in the Province of Ontario is required by law to qualify before a government board of examiners, who shall determine his fitness to practice the profession and shall either deny him the privilege of the use of the title architect, or issue to him a certificate to practice architecture in the province.

PROVINCIAL BOARD OF EXAMINERS RESPONSIBLE ONLY TO THE GOVERNMENT THE CORRECT SOLUTION—PUBLIC PROTECTION COMES FIRST. - -

THE NEED FOR A LAW designed to create a government standard of competence in the practice of architecture has been officially recognized by the Ontario Association of Architects, which body has, for the past eight years, been endeavoring to secure legislation from the provincial government to provide some method or means whereby a man who desires to practice the profession in the Province of Ontario shall qualify before a competent board of examiners.

The unfortunate feature of the laws, as proposed by the O. A. A. was the fact that they would tend to make

this organization the officially recognized body of architects in the province, and placed with it certain powers in connection with the proposed examination. The bill presented at last year's legislature provided that the examination as conducted by the Government could be placed in the hands of the Toronto University, or some other independent body the Government might see fit to choose. But, unfortunately, after the examination was passed by the applicant the government ceased to have any direct connection with the officially qualified architect, who was obliged by the proposed law to pay his annual dues into the Ontario Association of Architects.

This law was strongly opposed by those architects who were not members of the O. A. A. They declared that they were perfectly willing to qualify before a government board of examiners, but did not see why they should be required by law to join and annually pay dues into any architectural association to be permitted to practice their profession in the Province of Ontario.

The result was that the bill was abandoned, in view of the strenuous opposition to it. While we might say that we are strongly opposed to any such bill favoring any private association in the matter of such legislation and granting powers such as will tend to place the control of the practice of so important a profession as architecture in the hands of any private organization, we have every reason to believe that the Ontario Association of Architects did not petition for such legislation with the view of obtaining arbitrary powers in the matter of controlling the practice of architecture within their association. It was purely a means to an end and the bill was drawn up by the association purely with a view of providing some means whereby some official standard of qualification could be established in this province, and we have every reason to believe that the O. A. A. would gladly endorse any other legislation (that would be satisfactory to the profession in the province generally, and that would conserve the interests of the public at large) designed to establish a government standard of qualification, and thus promote generally a better standard of building throughout the province.

The provinces of Quebec and Alberta have a law of the same nature as that proposed by the Ontario Association of Architects, but it is quite beyond all possibility to have such legislation passed by the Ontario Legislature. What is wanted in Ontario is an Architects' License law of the same type as that which has been in force in the State of Illinois and has operated so successfully during the past ten years. The states of California and New Jersey have adopted laws modelled after the Illinois law, and in each case they have worked out most satisfactorily, raising to a very appreciable extent as they have the standard of architecture and buliding. These laws have proven to be a great protection to the building public generally and have had a tendency of more clearly defining the responsibilities of the architect and the contractor, which fact has operated for the benefit of both the legitimate architect and contractor.

There is a bill now before the British Parliament known as the "Architects' Act," which provides for a very elaborate system of governmental examination and which, in general principles, is almost identical with the Illinois law, although somewhat more complicated and thorough. Indications are that the bill will be passed.

It is rapidly becoming a pretty generally recognized fact, the world over, that public safety and welfare demands that the practice of architecture should be under government control, and in a rapidly growing country like Canada, where there is such a vast amount of building, it appears to us that now is the time to solve this question, in so far as it will take thirty or forty years to reap the full benefit of such a law. The Province of Ontario, the largest in the Dominion, should, we believe, take the lead in this matter, and set an example for the rest of the Dominion.

The position of the architect in relation to the question of government control of the practice of the profession is stated very clearly in the report of the Committee on Registration of Architects made to the last convention of the American Institute of Architects.

"An architect's license law must necessarily be enacted under the police powers given to the legislatures of the several states by their constitutions, to regulate the acts of incompetent persons or even prevent incompetent persons from performing acts which might result in danger to the community. It is very clear that such laws should be enacted rather on the demand of those who need such protection than of those who are to be regulated by it. * * * No law which regulates the practice of architecture in the interests of architects should be or ever will be enacted. It is the people only who should be interested in their enactment."

It, therefore, may be seen that the interest manifested by architects in the passage of a law providing for the "Registration of Architects," is simply prompted by purely unselfish motives and they have become active in their support of such legislation only because of the fact that their knowledge of the importance of allowing only properly qualified men to become eligible for the practice of the profession. They ask the public to protect itself against the incompetent by forcing the architect to submit to a government examination only because they realize much more fully than does the layman the importance of the essential requirements of the architect.

SUMMARY OF BUSINESS CONDITIONS —REPORTS FROM MANUFACTURING INTERESTS OF U.S.A. SHOW BIG IMPROVEMENT. - - - - - - -

EARLY LAST MONTH a circular letter was sent to every member of the National Association of Manufacturers of the United States, requesting definite information concerning present trade conditions and the percentage of increase or decrease in business during the last ten months. The association has 3,000 members, so that the correspondence and compilation of the reports have been onerous tasks. The information is summarized by Mr. Henry Harrison Lewis in "American Industries" of October 15, and shows clearly that the leading industries are slowly but surely recovering from the effect of the panic of a year ago and that immediate prospects of new business are gratifying as a rule.

The steel trade and the movement of pig iron are usually believed to form our most accurate barometer of trade conditions. It is distinctly encouraging, therefore, to read that 70 per cent. of the iron and steel plants in the Association's membership report conditions good, 78 per cent. have had an increase of business during the past ten months, and 85 per cent. have reason to believe that prospects for the immediate future are reassuring.

Machinery, by which is meant all classes of machinery in all parts of the country, shows present conditions 68 per cent. good, and that 76 per cent. of members dealing in machinery have had an increase in their trade since January 1, and 86 per cent. believing in future improvement.

The agricultural implement trade has the proud distinction of first place in prosperity. Every member of the Association interested in the manufacture of agricultural implements who replied to the circular letter reported present conditions good, and an increase of trade during the past ten months, and only one sounded a pessimistic note in connection with future possibilities.

The remaining sub-division in the metal trades, tools and hardware, shows 77 per cent. trade conditions good, 87 per cent. increase during the past ten months and 92 per cent. believing that possibilities for continued increase are good.—ENGINEERING RECORD.

THE BUSINESS OF ARCHITECTURE.---As a Profession It is Misunderstood.---As a Business It Begets Contempt.---Controlling Circumstances Are Created by Architects Themselves.---Less Commercialism and More Professionalism Required.

By F. W. FITZPATRICK

STRANGE it is, indeed, how lowly a place the grandest, the mother of all arts, holds in public esteem, and how blessed little is known about it by even the better class of the masses. Why, little children today prattle learnedly about literature and its shining lights. The average man is surprisingly well read upon most subjects. He will entertain you with detailed accounts of the deeds of ancient and modern heroes, even to the Spartan and the Gaul; he knows all about the great discoverers and historians; he does not balk overmuch at the names of famous painters, musicians, astronomers and travellers. Wonderfully erudite is he, our average man.

But most wonderfully ignorant is he of the names of the men who have contributed most to his and his ancestors' comfort, education, refinement—yes, his very civilization—the architects.

A beautiful poem always recalls the name of its author, a masterly oration, a grand literary success is never referred to without mentioning him who gave it to us; great battles glorify the contending generals, scant value is attached to a painting unsigned or unattributed to a master, but we see, we admire, we read of and think about and live in our great buildings, the beautiful structures of antiquity and of our own times, and never waste a thought about their designers, the men who created them and placed them as the most conspicuous and unerring milestones in the progress of our civilization.

DESIGNERS' DISREGARDED AND UNKNOWN.

People go into ecstasies about the Parthenon. The very wise will tell you, perhaps, that Phidias designed it; that is, if any should deign to ask whose work it is; but that shows how little *is* known about it. Phidias did but the sculptural work, the embellishment. Ictinus was the architect. Not one out of a hundred thousand of you know it, either.

How many of you know that the Coliseum at Rome was designed by Rabirus and completed by Mustius?

Michael Angelo Buonarroti did manage to get himself handed down to posterity, the one man of them all who was saved from darkest oblivion. I wonder how he managed it. I believe that about one person out of every twenty thousand who visit St. Peter's at Rome learns that he had something to do with its design. But then, this spasm of knowledge is counterbalanced by the supreme indifference—concerning architects—with which we visit an equally imposing domed structure, the magnificent capitol at Washington. We praise its splendid outlines and step reverently through its sacred halls, but not one out of two hundred thousand who visit it give a snap of the finger for the men from whose brains it sprang. Who cares a rap about Hallet, or Hadfield, or Hohan, or Latrobe, or Walter?

For our indifference to the genius of past generations our text-books, schools and histories are to blame. It has become the fashion with those guides to public opinion to ignore our profession, while they rapturously extol the warriors, the poets, the travellers, the monks of old.

As a matter of fact, I am not quite sure whether it is that that public indifference has influenced those authorities to thus neglect the practitioners of the finest of fine arts, or that those authorities are really to blame primarily for that state of public opinion. Perhaps the fault may lie with the architects themselves.

Then, too, familiarity certainly does breed contempt, you know. Achievements in other lines are more noticed, talked about, because less is seen of them and their actual accomplishments, the mode of procedure. A great bridge is finished, it is something people do not see every day, its engineer is feasted and dined and glorified. You see his picture in the papers, much is made over him. A new opera is played, the composer is loudly called for, bouquets and speeches are thrown at him; he, too, is a great man, if only for a day. But do you ever hear of any fuss being made over an architect?

A great building is completed; we are accustomed to great buildings, be it ever so grand, however splendid an achievement of engineering skill and artistic perfection; the only thing you will hear about is a lot of grumbling because it was not finished in thirty days instead of the year it did take to build it. It is occupied in unseemly haste, while men are still working in it; everything is tumbled into it in undignified confusion; there may be an opening banquet given to the directors of the institution, who will pat each other on the back and swell up in righteous pride over *their* great accomplishment; a poor "half-tone" of the building, with all the names and pedigrees of the aforesaid directors, will appear in the next morning's papers. But who is the architect? Who designed the building, guided its infant steps, as it were, foresaw all the difficulties that would beset it, and finally completed it, ready for that opening banquet? Who knows, and, furthermore, who cares a continental?

I have seen of late an article or two in some magazine or other throwing wordy bouquets at the profession, describing in glowing terms the enormous fees we get, and the wondrous things we do. These articles were great surprises to me, for they actually indicated some public interest in us—or the editors would not have published them. But that sort of thing is on the milk-and-water order. More heroic treatment is necessary if we really desire to attain the place in public esteem that the accomplishments of some of our number would seem to entitle the profession to.

LACKS DIGNITY OF OTHER PROFESSIONS.

We should rank with the lawyers, the doctors, the ministers. That we do not is, I think, entirely our own fault. We have cheapened ourselves and brought the whole profession down to a low level of consideration indeed.

Let us glance at things as they really are.

Few doctors go about soliciting practice. You call those who do charlatans. A lawyer who would beg you to give him a case, or offer to prepare briefs until you found one to please you, you would put down as a small fry—a pettifogger of the lowest type. Now, we solicit business actually, or, at least, indirectly, by our everlasting willingness—the best of us, too—to compete for it.

Of course, there are those among us who are dignified, who have made enough of a name to insure some people coming to them direct anyway, or who have married well and cultivated their brothers-in-law and other relatives so assiduously that they have an assured practice; yet these, also, itch to get into competition occasionally. The others will sit about a man's doorstep whom they suspect of even dreaming of building a house, and they will plead and beg for that commission; they will turn the whole broadside of friends and politics and other "pulls" upon a committee in charge of a church or

other important work—not, mark you, to secure the "job," but merely to get a chance to compete for it against Tom, Dick and Harry.

We are too blessedly cheap; that is all there is about it.

Many doctors and lawyers make their reputations, and then people with important cases wait around with their hats in their hands, pay exorbitant fees for mighty small services, and go away proclaiming the greatness of their advisors, who may have recommended but a drink of plain water to the sick and advised the litigiously inclined to go pay their bills.

How many architects dare charge a penny over the so-called legal five per cent., however difficult or responsible the work, and how many have prospective clients respectfully waiting around? Fewer still are they whose clients proclaim them great after passing through their hands.

A lot of men who will spend $60,000 in competitive plans for a building committee that did not even take the trouble to look at those plans before "ordering" a new competition, involving a further outlay of $40,000 to the competitors, and then decided not to build at all —those men, I say, need not wonder why the aforesaid committee did not even thank them for their trouble. This is not an isolated case, but one of many high-handed actions common to people who have buildings to erect. Are you surprised that such things occur? Is it not more to be wondered at, rather, that such a lowly and meek profession is not oftener made to serve the general purposes of a door-mat?

THE SCRAMBLE FOR PATRONAGE.

In our anxiety for business, for preferment, we have spoiled the public, made beggars, yes, often public nuisances of ourselves. There is more violent, cantankerous competition among us than there is in the dry goods or grocery business; fewer ethics observed, though we are long on cant about some alleged ethics, and occasionally hold brotherly pow-wows and feedings. But it is all sputter. We show it plainly, too; people know our ways pretty well; they are fully aware that nearly everyone of us carries a long knife—figuratively speaking—ever ready for our dear brother's back. We have gotten people so that they feel they are doing us a favor in permitting us to scramble for their "patronage." It amuses them. You have seen a lot of little darkies fighting and diving for nickels thrown them by some festive passenger at a boat landing? Well, as a profession we occupy about the same position in the esteem of the public as do those urchins.

If a doctor goes wrong, or if a lawyer should play both sides of the game, his client's and the other fellow's too, not only his confreres cut him out, but the public generally fight shy of him; he is unsavory and considered apart from the rest of the flock; the flock itself has not suffered; its whiteness is still unblemished. Not so with us. Some of us have sinned grievously. Architects have played double, they have taken fees from clients and "rake-offs" from contractors and material men; they have swelled the cost of buildings and divided the results with the builders; some have done all sorts of things they ought not to have done. But they are not set aside by the public as black sheep. Oh, no! Their sins are visited upon the profession as a whole. We are all under suspicion. People actually figure upon so much per cent. to be added to the cost of building to cover architectural "fleecings." Some are surprised when told that co-partnerships between architects and builders are frowned upon by the profession, and others smile incredulously when we assure them it is *not* usual for us to get commissions from every contractor about a building.

That is really the meanest part about the whole thing. People do not discriminate. To them an architect is an architect. The individual's experience, ability, integrity and everything else matter not; he is no better, no worse, than Jim Jones, who may have been a horse doctor yesterday, but who styles himself "architect" to-day. We are all in the same class, a sort of unnecessary evil anyway, to be tolerated at times, but to be dispensed with whenever possible. And, as a matter of fact, the man, who does not feel perfectly confident he can be his own architect and deal directly with a builder, can be found, but one has to hunt for him.

PROFESSION WIDE OPEN.

And, after all, I repeat, can you be surprised at all this? The profession is wide open; there is no hedge about it as there is about the law or the medical practitioners; no examinations to pass, no license from State or school to be gotten. Any man who can afford a sign saying so *is* an architect legally, actually and beyond any question, whatever his training, his fitness, or however lacking he may be in both.

Supposing I have studied and travelled and delved for thirty years and built great structures and believe myself fully equipped to meet any demand; supposing, in fact, I should have gotten well up toward the top notch of my so-called profession. And, supposing a fellow takes an office next mine and also hangs out the magic word, "architect," even though last week he was a plumber or a candlestick-maker. Well, what happens? People are as apt to employ him as me. He probably will skirmish around and talk big, and if he is shrewd enough to employ a clever draughtsman he will turn out some pretty catchy sketches; he will cut his rates, and the chances are he will have twice the business I have next year. Supposing he does get things all tangled up, and buildings cost more than they should, etc., his clients may congratulate themselves things are no worse; they feel sure there would have been as much trouble with any other architect. They are all the same, you know.

And why should he not be employed? True, he bears no brand, the State has not licensed him—it does its plumbers—there has been no imposition of hands or other ceremony; he just says he's an architect, and there you are! But neither has the State licensed me. I have come in by the same road as he. We have all come in that way. That I have fasted and prayed and done a long novitiate, and am really thoroughly prepared for the work I am willing to undertake, seems to be no concern of the public's. As a matter of fact, from the public's standpoint, was I not a great dunce to go to so much trouble; am I not lacking in business shrewdness for not having taken as short a cut as he did?

ARCHITECTS MUST CULTIVATE SELF RESPECT.

That is not a lamentation, mark you. I am finding no fault with the dear public. I am simply telling you how things are. Perhaps you have given scant thought to the subject before. I know, indeed, that you have not thought about it at all. What good, then, can I hope for, what result do I aim at, in these few notes jotted down haphazard? What is their purpose?

Well, if you have a sore, a really bad sore, you do not slap a plaster over it and let it go—refuse to look at it, do you? That would be a good way to infect the entire system. You open it and dress it frequently. You look all about for pus, you inject disinfectants; you do not try to hide, but to get rid of it, and it is only by fussing with it that you will succeed, however unpleasant the operation may be. So it is with this question. I want to show it to you in all its phases, in its worst aspect, however unsightly that may be. Architects themselves realize how bad it is, and are at work with disinfectants, so to speak. They are trying to purify their ranks, to have the State place some bar to the indiscriminate practice of all the riff-raff that invades those ranks; they are cultivating self-respect before demanding your respect;

(*Concluded on Page 36.*)

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ADVERTISEMENTS.—Changes of, or new, advertisements must reach the Head Office not later than the first of each month to ensure insertion. Advertising rates on application.

CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 November, 1908 No. 1

Current Topics

ARCHITECT W. A. LANGTON, Toronto, has removed his offices from 43 Victoria street to the Reliance Building, 82-88 King street west.

* * *

THE LEVIATHAN, the largest dredge in the world, was recently launched on the Mersey at Liverpool. It is capable of lifting 10,000 tons in fifty minutes.

* * *

IN ORDER TO PLACE READY FUNDS at the disposal of Three Rivers, with which to bring about the complete rehabilitation of the burned district, the Quebec Cabinet has decided to recommend a loan of $400,000.

* * *

THE BUILDING CODE REVISION COMMITTEE, of New York, recently adopted a resolution restricting all buildings to 300 feet in height unless they face a park, square or plaza, when they may be built 350 feet high.

* * *

A PIECE OF ENGINEERING which is exciting general interest at Vancouver, is the sinking of the 16-foot caissons in connection with the construction of the substructure for the new bascule bridge which is to cross False creek at Westminster avenue. The piers will rest at a point about 26 feet below the water mark, and the men are at present working beneath the surface at depth which requires only about from 12 to 15 pounds pressure.

* * *

AN ACTION BROUGHT by Architect J. Erb, of Port Huron, against the Dresden Public School Board for $700 as commission on a $23,000 school building, for which the plaintiff had furnished plans, was recently dismissed by Mr. Justice MacMahon, following a decision by Mr. Justice Street, who ruled that a Public School Board has not authority to purchase grounds or to build a school without obtaining the sanction of the municipal council, or of the electors.

A MEETING OF THE COUNCIL of the Architectural Institute of Canada will be held at the Engineers' Club, 9 Beaver Hall Square, Montreal, on Tuesday, 8th December, 1908, at 2 o'clock p.m., for the consideration of applications for membership into the Institute and the transaction of any business that may arise.

* * *

BRIQUETTING IRON ORE, in order to increase the blast furnace output, is practised to some extent in England according to ENGINEERING. The briquettes are placed in a kiln for calcining or burning, the heat generally used being from the waste gases of the blast furnaces. After the moisture and volatile gases have been driven off in this kiln, the briquettes are fed into the blast furnace.

* * *

AN INTERESTING ENGINEERING TASK is now under way in London (Eng.), where the Imperial Theatre is being transplanted from its present site to a location twelve miles distant. The building is being taken down and removed in sections, and it is to be seen in about seven months' time, rebuilt along the exact lines as it stood at Westminster. It is said by the contractors that even in the United States a similar undertaking has never been attempted.

* * *

FIRE LIMIT "A" IN TORONTO, has been extended to take in the entire district from the waterfront north to College street, between Jarvis street on the east and Bathurst street on the west. This is a timely move on the part of the city to prevent the further ingress of dangerous structures in this section. Hereafter, all buildings erected within this territory must be of brick or similar constructino. In the past this limit only comprised the district lying south of Queen street, between Jarvis and Bathurst streets.

* * *

WOODEN SHACKS and tar-papered domiciles have been tabooed by the City Council of West Toronto. In the future only brick, brick veneer, or like structures, will be permitted in residential districts. This action is taken preliminary to the enactment of a general building by-law now pending, which is designed to bring the construction of all classes of buildings up to a much higher standard.

* * *

A PETITION HAS BEEN PRESENTED to the Federal Government by the Montreal Board of Trade, asking that in the rebuilding of the Quebec bridge the height of the structure be made at least 190 feet, so as to permit of an unobstructed passage for modern high-masted liners in event of any of them desiring to come up to that port. While many of the new types of vessels dispense with masts altogether, nevertheless the question of height should be thoroughly gone into, so that no restriction will be placed on the importance of Montreal as a shipping point.

* * *

EXCLUSIVE RIGHTS TO INDIVIDUALITY in architectural design is denied owners of buildings in California, according to a recent ruling made by Judge Lennon, of the State Supreme Court. In an injunction suit instituted by F. V. Madison, an attorney of San Francisco, to restrain Architect Edgar Mathew, of that city, from executing a replica of an English domestic residence, which the latter had designed for him, for Armond de Courtieux, a local butcher, the court denied the application, on the ground that the architect has a certain personality which he expresses in the houses he builds, and to restrain this personality would mean to deprive him of his means of livelihood and stifle art.

THAT ROME WASN'T BUILT IN A DAY is a fact that has strongly impressed itself on the residents of Kingston. Following the destruction of the original dome on the city hall a somewhat protracted time was consumed in securing plans for a new one. One set of drawings was prepared and rejected; another set prepared and accepted. Then a further lapse occurred. Finally tenders were invited; some contractors were unable to get plans and friction arose. After estimates were submitted the figures were published, and then the tenders were thrown out. The contract has finally been let, and the city in general is rejoicing.

* * *

MICROSCOPIC EXAMINATION OF WOOD after it breaks in a testing apparatus has just been started by the office of wood utilizaiton in the Forest Service of the United States. Every species of wood has several different kinds of cells, each of which has its own size and form. There is also a wide variation in the number and arrangement of the cells in different species. These differences in structure have their bearing on the strength of the wood. The application of microscopic work to tests recently conducted by the U. S. Forest Service is expected to give a better knowledge of the conditions on which the strength, stiffness and elasticity of wood depends, and how it may be used to best advantage in construction. Other problems connected with the structure of wood, such as the preparation of wood pulp and the treatment of wood with preservatives, will probably be aided by this new study.

* * *

REINFORCED CONCRETE BARGES and pontoons of considerable size have been in use for some time in Italy and have proved so satisfactory that the Italian Government has contracted for several large barges for use in harbor work. The first of these boats is of sufficient size and has been in use long enough to furnish a test of their utility. It is a double pontoon, built in 1897, 67 feet long and 27 feet out-to-out of the two parts on which is built a boat-house for the Rome Rowing Club. In 1905 the Italian Navy Department built the "Liguria," a reinforced concrete barge of 150 tons burden, 57 feet long and of 18 feet beam. This was first put upon the harbor work near Rome, but has since been towed to and from many of the ports of Italy. The Liguria was so successful that the Government built another 100-ton barge, on the model of which four others are now under contract. In several other places in the kingdom, notably across the River Po, near Pavia, pontoons of reinforced concrete are used to carry small or light bridges. Most of these constructions have been carried on by Messrs. Gabellini of Rome.

* * *

PAINTING CONCRETE can only be done successfully, according to an eminent concrete engineer, after the concrete has stood at least one summer. When the surface is thoroughly dry it must be washed with a 7 or 8 per cent. solution of muriatic acid, which should afterward be washed off with plenty of clean water. After the surface has been thoroughly dried, it should be given a priming coat containing so much turpentine that it is almost flat. It is considered best to use more turpentine and much less drier, as compared with ordinary painting, increasing the amount of oil for succeeding coats. Boiled linseed oil is considered preferable to raw oil. Each coat must be given time to dry thoroughly before the next is applied. For painting with water color or calcimine, the surface of the concrete should be washed with muriatic acid and clean water, as before stated. After it has dried thoroughly, it should be given a coat of alum size, or, still better, a coat of flat paint. When this is dry, the surface is ready for calcimining. One formula for size is one pound of acetic acid, one pound of alum and two gallons of water.

AN INTERESTING SERIES of experiments, says Engineering, an English publication, has been carried out at the National Physical Laboratory, at the instance of Sir John Brunner, to test the protective effect of cement concrete or steel; 8-inch specimens of mild steel bar, both turned and with scale left on, were embedded in blocks of good Portland cement concrete measuring 12 inches by 7½ inches by 7½ inches. The blocks were covered with water several times a week for a year, and for three months afterward were left in the open exposed to the weather. After 16 months one of the blocks has been broken up and the embedded specimens examined. No trace of any action of the cement could be detected, the scale on the rough specimen was undisturbed and the bright specimens showed no alteration on examination under the microscope. Further tests are to be carried out with the remaining blocks.

* * *

A SINGLE RAIL STREET CAR SERVICE is shortly to be introduced in New York City. Application has been made to the Public Service Commission by a syndicate who has recently acquired the Pelham Park and City Island Railroad, asking authority to change the motive power from horse to electricity, and to sanction the installation of the American monorail system. As soon as the legal formalities have been complied with, the construction work will be started by the Monoroad Construction Company, capitalized at $1,500,000, which is to build and equip the road. It is expected that the road will be in operation three months after the work has been under way, and that it will be the first step in revolutionizing surface transportation throughout the city. The type of car to be used is fifty feet long and pointed at one end, running on four wheels placed under the car as in ordinary practice, but in tandem, two at each end, each wheel having double flanges, and being driven by two separate alternating motors. These wheels run on a single rail spiked to ties. Above the car at each end is a flexible arm, connected with an X-shaped truck, each truck containing four guide wheels, which run in two L-shaped overhead rails so arranged that the guide wheels cannot leave the rails without taking something apart. These guide rails, which are kept a uniform distance of thirty inches a part, conduct the electricity.

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AN ELECTRO-MAGNETIC STREET CAR BRAKE, the invention of Mr. A. W. Maley, formerly assistant engineer of the Leeds Corporation Tramways, has recently been subjected to a series of important trials at Birmingham, England. It is generally believed that the problem of braking a runaway car on dangerous gradients has been solved. The contrivance is more elaborate than the present types of brakes, and adds about half a ton to the weight of the car. It is a combination of the principle of mechanical and electro-magnetic brakes, and among the many advantages claimed is the elimination of the danger of skidding, due to the fact that no braking is done on the wheels other than to drive the motors as generators, when descending a hill or making a stop. The current so generated is utilized for the track magnets, which in turn are attracted to the rail, and by their backward movement as the car goes forward throw into action mechanical rail shoes. There are three blocks on each rail, namely, a magnet and two slippers. While the brake action is thus extremely powerful, the blocks have a tendency to keep the rails clean. In addition to the electro-magnetic function the brake may be applied by hand from the driving platform, and for this purpose suitable levers and links are introduced. The magnets are excited either by the current taken from the motors acting as generators, or, by the operation of a special canopy switch, they may be energized direct from the trolley wire. The trials at Birmingham have been regarded as satisfactory.

WORK ON AN HYDRO-ELECTRIC SCHEME is about to be commenced in Simla. Nearly all of the details of this elaborate undertaking have been worked out, and great expectations are entertained by the inhabitants of the summer capital of India of comfort and convenience that will be derived from this new improvement.

* * *

HOT AIR HEATING by utilizing the waste heat of a gas engine is now practiced at a manufacturing establishment in Pennsylvania. The air heater for this purpose is novel in that both the exhaust gases and the jacket cooling water are utilized, the fresh air passing to the fan through large thin-walled metal tubes, around which the exhaust gases, and within which pass radiator tubes carrying the hot jacket water. While the jacket water ranges from but 120 to 150 deg. Fahr., as compared with the 600 to 800 deg. of the exhaust gases, it serves to compensate for the varying volume, and consequently heat, contained in the exhaust, and the installation is claimed to have proved successful.

* * *

THE NEW BUILDING BY-LAW which is projected in Ottawa, is to be a collaboration of the civic authorities, local architects and the Ottawa Builders' Exchange. It seems that their combined efforts should result in building regulations that would be ideal and consummate in every respect, that is, providing personal interest is made subservient to public welfare. Both the architects and the Exchange, it is said, are lending their earnest co-operation. The architects in particular are credited with having worked on the measure for the past several months, during which time they have carefully studied the building by-laws of Toronto, Buffalo, Vancouver, Montreal and Winnipeg.

* * *

MONTREAL'S MASTER BUILDERS are to have a new home. Owing to the rapidly increasing membership the association has outgrown its present quarters to such an extent that it was decided at a recent meeting of the Executive Board to lease the entire top floor of the Eastern Townships Bank building, which is now under construction at the corner of Victoria square and St. James street. Every provision will be made to insure the new Exchange being an ideal one, both in comfort and arrangement. In addition to a board room and general offices, there will be offices for the affiliated associations, a room for displaying samples of building materials and private rooms for members. The building is to be ready for occupancy next spring.

* * *

SLAG BRICK ARE MADE IN ENGLAND from blast furnace slag, according to ENGINEERING, by first running the slag in a molten condition into water, which granulates it. It is then passed between rolls, which remove the excess of water and crush any large particles. White, unslaked lime ground to an 8,000 mesh is stated to have proved most satisfactory for mixing with the slag. This lime must not contain more than half per cent. of magnesia. From 93 to 95 per cent. of slag and 7 to 5 per cent. of lime are placed in a steam-jacketed mixing machine, where the heat and the moisture of the slag start the reaction of the lime. The mixture is then put in presses which form the brick, and the latter are taken to steaming chambers. These bricks are stated to have a crushing strength of 2,500 to 3,000 lb. per square inch, and to withstand boiling and freezing tests fairly well. The labor cost of producing them is stated to be about $1 per thousand, and their total cost at the work is given as about $4.35 per thousand.

ACCORDING TO THE ANNUAL REPORT of the United States Geological Survey, there was a marked decrease in the production of asbestos in the United States in 1907, the output amounting to but 653 net tons (of 2,000 lbs.) valued at $11,899, as compared with 1,695 net tons, valued at $28,565, in 1906. The cause of this decline is found in the better quality and greater abundance and accessibility of the Canadian asbestos, which completely dominates the industry of the United States. The largest output in the history of the industry in the United States was in 1905, when the product amounted to 3,100 tons.

* * *

THE COMPARATIVE COST of "mill construction" and "reinforced concrete" is declared by a prominent New England contractor to favor the latter. This contractor, who has had much experience in concrete construction and who has carefully noted the cost of his building operations, has compiled some most interesting figures relative to the cost of these two types of construction.

In the case of six buildings on which he figured last year, both in mill construction and in reinforced concrete, there was a showing in every case in favor of reinforced concrete, varying from 4 to 11 per cent.

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THE FIRST AND SECOND PRIZE in the competition for plans for the proposed provincial asylum, to be erected in Coquilam, B. C., were awarded to J. C. M. Keith, of Victoria, and Edwin G. W. Sait, of New Westminster, respectively, while the plans of H. T. Griffith, of Victoria, received honorable mention. The competition was limited to artchitects of the province, and some twelve prominent members of the profession participated. A selection is to be made shortly from the three designs, as to the one which is best adapted to the special purposes for which the building is to be used. It is estimated that the completed structure will cost over a million dollars.

* * *

BETTER BUILDING LAWS are seemingly one of the immediate needs with which Winnipeg should deal. A deputation, including the city health officer, who recently held a conference with the fire, water and light committee, anent tenement house construction, declared that this class of buildings in Winnipeg was not only unsanitary, but that the conditions there were worse than in New York City. Apropos to this declaration is the observations of F. W. P. Rutter, of Toronto, general manager and secretary of the London and Lancashire Fire Insurance Company, who, in looking over the field, stated that the number of fireproof or fire-resisting structure there was by no means as large as it should be, adding that Toronto had been much more substantially built in that portion which was burned a few years ago, than Winnipeg is now. Winnipeg should profit from the experiences of other cities, and grapple, without delay, with the problem of improving the situation, both constructively and hygienically, by the enactment and enforcement of an effective building code.

BUSINESS OF ARCHITECTURE.—Continued from Page 33.

they insist upon competitions being justly and decently managed—many refuse to go into them at all; young men study more than they did a few years ago; our schools offer better training in that line; our work is of a higher order than it was a while ago; note even our Government buildings are vastly superior to what they were ten, yes, five years ago. The outlook is brightening well above the horizon.

I have shown you the sore, perhaps I have offended in making its unsightliness conspicuously apparent. Will you not aid in healing it? Give the devil his due; show some appreciation when it seems to be merited. Do not go out of your way to cast slurs upon us. At least do not place obstacles in the way of those who are doing the dressing.

PLATE I. PARLIAMENT BUILDINGS, OTTAWA, AS SEEN FROM NEPEAN POINT.

CANADA'S NATIONAL BUILDINGS.---Notable Group of Gothic Edifices that Form the Crowning Glory of a Magnificent Natural Site.---A Review of Their Construction, Arrangement, Relative Positions and Architectural Detail.

By W. A. LANGTON, O.A.A.

In the Parliament Buildings at Ottawa, Canada as a British Colony, has much of which to be justly proud. While many Canadians have had the pleasure of viewing these buildings, there are few, even among architects, who are acquainted with their beauty of detail and architectural significance.

The article published herewith, dealing with these buildings, as written by W. A. Langton, O.A.A., should prove highly interesting and instructive to both architect and layman, as Mr. Langton is undoubtedly one of the best architectural critics in Canada.

In securing the necessary data and information for this subject, it was necessary to draw upon many sources, and among those to whom especial credit should be given for their collaboration, we wish to especially mention Mr. C. P. Meredith, of Ottawa, who provided a large amount of data relative to the history and construction of the buildings.—Editor.

IN planning public buildings, the first consideration is how to make the most of them. Legislative buildings, in particular, which stand as a representation of the national importance, must stand well apart from, and above the rank of private building. It is something, in this direction, to free the national building by giving it plenty of space, and to build it large and dignified, but the result is finest and most impressive when the advantage of site is a natural advantage, and the majesty of nature is contributory to the impression.

The site of the Parliament Buildings at Ottawa is a rare opportunity of this kind, and there is no doubt that the existence of such a site contributed much towards the choice of Ottawa for a Capital. "Having the world of Canada whence to choose," said Anthony Trollope, of Ottawa, in 1861, "the choosers have certainly chosen well." The expression "the world of Canada" has a larger sound now than it did then, when Canada consisted only of the united provinces of Upper and Lower Canada—now Ontario and Quebec. It was the difficulty of fixing a capital for these united provinces—disagreeing, as they did, profoundly, about their relative importance—which made necessary the establishment of a new capital which would be neither Kingston, Montreal, Toronto or Quebec. Each of these places had been tried; the two latter in an alternating system, under which each became the seat of Government for four years at a time. No arrangement proving satisfactory, Parliament, in 1857, voted an address, praying that the Queen would select a seat of Government. This brought into action Sir Edmund Head, who, as Governor-General, guided the Queen's choice. He, no doubt heartily sick of sectional jealousies, favored a new departure, turning his back on the four big cities in which no peace had yet been found.

The choice of a new place was not such a wide speculation as it at first may seem. Ottawa had already become recognized as a place of some military significance. A military work was its origin—the Rideau Canal, which was constructed to enable gunboats to pass from Montreal to Kingston by an inland route not exposed, as the St. Lawrence would be, to an enemy's fire. There is a legend that the Duke of Wellington, with a view to selecting a defensible place for the seat of Government, had placed his finger upon the map at Bytown, as Ottawa was called in his time, and said, "*That* is the place." If this tale is true, the Duke's utterance must have been concerned with an earlier stage of the question of the Capital—which was always a live one—for the Duke had been dead for five years when the Queen was asked to intervene.

However, much previous suggestions, and the natural suggestiveness of the situation of Ottawa—straddling the boundary between the rival provinces—may have pressed the place upon the attention of Sir Edmund Head; it is likely that he, a man of cultivated taste, the author of an encyclopædia article on painting, and of two handbooks to the art galleries of Europe, perceived well the beauty of this promontory as a site for Government Buildings, and was influenced partly by this perception in advising the Queen as he did.

It is likely also that his influence was behind the really wonderful scheme of building that was soon put before architects for a competition of designs.

It must be remembered that the buildings, as we see

PLATE II. VIEW FROM EAST, SHOWING THE RELATION OF THE BUILDINGS TO ONE ANOTHER—HOW THEY FIT THEIR SITE—HOW THEY CROWN THE SURROUNDING LANDSCAPE.

PLATE III. VIEW ALONG THE FRONT OF THE SITE, SHOWING HOW IT IS ENCLOSED BY A FENCE IN CHARACTER WITH THE BUILDINGS.

PLATE IV. MR. FULLER'S ORIGINAL PERSPECTIVE FOR THE CENTRAL BUILDING, AS REPRODUCED IN THE ILLUSTRATED LONDON NEWS, IN THEIR ISSUE OF NOVEMBER 15, 1859.

PLATE V. OTTAWA IN 1857, SHOWING THE ORIGINAL SITE OF THE PARLIAMENT BUILDINGS.

them now, were intended, not for the present Dominion of Canada, but for the old Province, which consisted only of Upper and Lower Canada, and had no high thoughts of its place among the nations.

The Legislative Assembly was disposed at first to reject the Queen's choice, when it was published in the summer of 1858, but in the session of 1859, her decision was affirmed by a small majority.

This was in February. In May the competition for the Government buildings was announced. The drawings were sent in on August the first. There were eighteen competitors in all, and seventeen of them were Canadians —so there *were* some architects in those days. Messrs. Fuller and (Chilian) Jones were awarded first prize for the Parliament Buildings. Their drawing, as engraved for the Illustrated London News, is reproduced in Plate IV. The prize was $1,000. They got also the second prize for each of the Departmental Buildings. The first prize for these buildings (also $1,000) was won by Messrs. Stent & Laver. There appears to have been included, in the competition scheme, a Governor-General's residence, the prize for which was taken by Messrs. Cumberland & Storm.

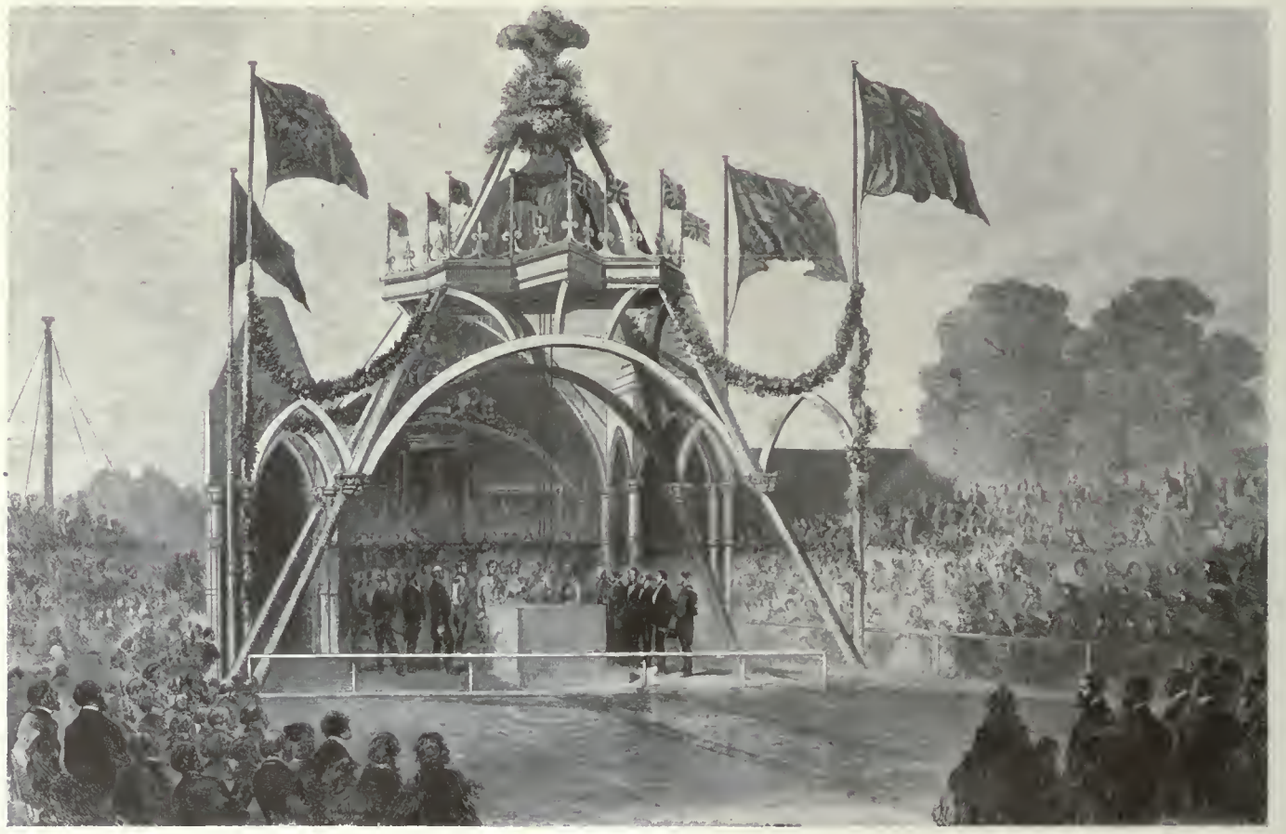
It did not take long to get to work. Plans and specifications were ready by the 15th of October, and tendering occupied another month. Thomas McGreevy's tender for $348,500 was accepted for the Parliament Building, and that of Messrs. Haycock & Clark for $278,810 for the other two.

McGreevy's work was to have been completed on the 1st of July, 1862, and Haycock & Clark were given till the first of February in the same year. Operations were begun at once on all the buildings, and on the 1st of September in the following year, 1860, the corner stone of the Parliament Building was laid by King Edward, then the Prince of Wales.

The usual delay in finishing the work occurred, and also the usual increase in the cost. The original appropriation of $900,000 became $5,000,000 before the work was done, and the time was extended by four years for the Parliament Building and four and a half for the Departments. The Civil Service was moved to Ottawa in the fall of 1865, and took possession of the offices a year before the buildings were completed. The Legislative Chambers and their offices in the Parliament Building were so far completed in the spring of 1866 as to suffice for the last session of the Parliament of the old Province of Canada, which met on June the 8th.

The extra time taken requires, perhaps, no explanation. It is a law of nature that large buildings take longer to complete than their estimated time. But the addition to the cost is not so easily accounted for. The fact that, between the beginning and the completion of the work, Confederation had been conceived and established, may have something to do with it. The buildings intended for two provinces had now to do for four—with the prospect of further increase. But we should expect any expansion in the buildings, consequent upon a wider ownership, to be an expansion of area; which does not seem to have taken place. It may have been a case of solidification, rather than of expansion. The interior construction is fireproof, in the best manner then known—the interior partitions are all of brick or stone, and the floors are of concrete on rolled iron beams—and, if this was not part of the original plans, it would account for a good deal of the extra cost. It is hard to understand how construction of this kind could have been included in the original contract prices. Indeed, it is hard to understand how the buildings, as we see them, terraced moreover and fenced, could be built for less than $5,000,000 then, or for anything like it now. The people of Canada have got a bargain.

The dimensions of the buildings are considerable. The Central Block, as the Parliament Building is called, has a front 472 feet long; and a depth which must be 200 feet or more, to contain the Chambers with their appendages of lobby, with telegraph and other public offices in the front, and, corridor with the reading, smoking and other



THE LAYING OF THE CORNER STONE OF THE CENTRAL BUILDING IN 1860, BY HIS MAJESTY, KING EDWARD VII., THEN THE PRINCE OF WALES. REPRODUCED FROM THE ILLUSTRATED LONDON NEWS.

PLATE VI. THE CENTRAL OR PARLIAMENT BUILDING ON A WIDE TERRACE, SHOWING THE NUMEROUS, AND PARTLY CONTINUOUS, WINDOWS, WITH DEEP MOULDED JAMBS, AND EFFECT OF SOLID WALL WITH RICH HORIZONTAL DECORATION.

PLATE VII. BASE OF VICTORIA TOWER; GIVING ALSO A NEARER VIEW OF THE WINDOW FORMS AND DETAILS, AND OF THE RICH UPPER STOREY OF THE PAVILIONS WHICH BOUND THE END BLOCKS.

PLATE VIII. BASE OF VICTORIA TOWER, WITH THE EASTERN BLOCK SEEN THROUGH THE PORTE COCHERE UNDER IT. PATENT OFFICE IN THE DISTANCE; AN OUTSIDER TO THE SCHEME, AND, FORTUNATELY, OUTSIDE THE GROUNDS.

PLATE IX. EASTERN BLOCK ENTRANCE UNDER TOWER. DISCORDANT ARCH LINES HELP THE EXPRESSION OF STRENGTH AT THE BASE OF A LARGE FEATURED DESIGN. MEDLEY OF COLORED STONES IN THE SPANDREL.

PLATE X. THE LIBRARY. THE VENTILATING TOWERS MARK THE CHAMBERS OF THE COMMONS (NEAR), AND THE SENATE (FAR). RESIDENCE OF SPEAKER OF COMMONS AT END OF WING ON THE RIGHT.

PLATE XI. THE EASTERN BLOCK, FROM NEAR THE CENTRAL GATE. THE BOTTOM OF THE FLIGHT OF STEPS AT THE EAST END OF THE CENTRAL BLOCK TERRACE IS JUST SEEN ON THE LEFT.

PLATE XII. EASTERN BLOCK, WINDOWS OF VESTIBULE UNDER TOWER. ANOTHER EXAMPLE OF FORCIBLE ARCHING INTRODUCED TO EXPRESS STRENGTH. THE SPRINGING FROM THE SLOPING LINES OF THE BUTTRESSES IS NECESSARY FOR THE EFFECT.

PLATE XIII. EASTERN BLOCK; UPPER FEATURES OF TOWER. STILL LARGE AND VIGOROUS BUT MORE FLOWING AND VERTICAL IN LINE. GREAT VALUE TO GENERAL EFFECT FROM LARGE SCALE OF STOPS TO PEDIMENT LABEL.

PLATE XIV. EASTERN BLOCK, GOVERNOR-GENERAL'S ENTRANCE. THE VIEW OF THE BLOCK SHOWS THAT THE RESTLESS LINES OF THIS COMPOSITION COMBINE REFINEMENT WITH STRENGTH SUFFICIENT TO FORM A BASE FOR ITS PAVILION.

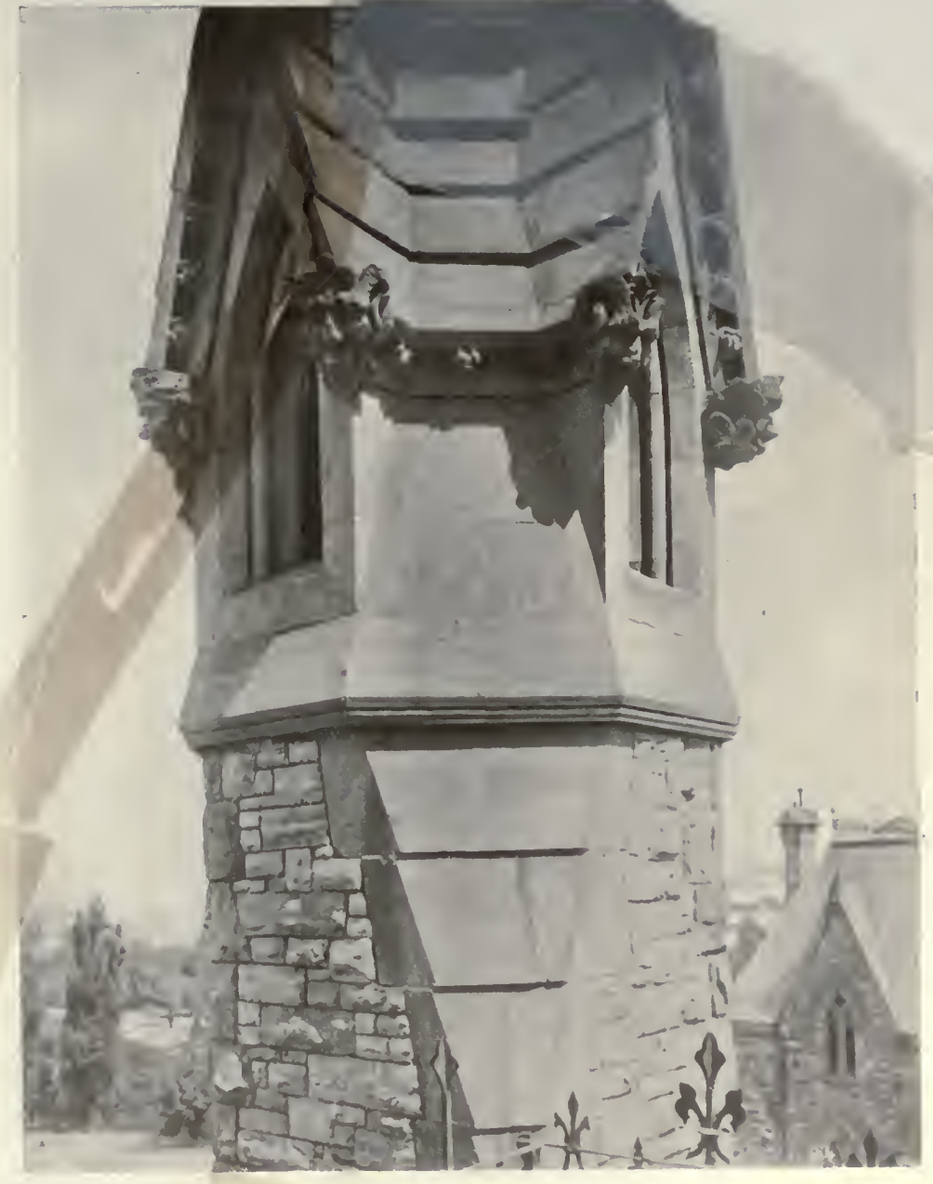


PLATE XV. EASTERN BLOCK, TOP OF A VENTILATING TOWER. A FINE PIECE OF STONEWORK AND CARVING, WHICH MIGHT FORM PART OF A BUILDING IN THE BEST PERIODS OF GOTHIC ARCHITECTURE.

PLATE XVI. WESTERN BLOCK WITH ADDITION BY THE MACKENZIE GOVERNMENT. BETTER LIGHTED THAN OLD PART; BUT ROW OF SMALL WINDOWS IN ATTIC NOT SCALED SUCCESSFULLY WITH STOREYS BELOW. ALL DETAIL POORER.

private rooms for members at the back. The arrangement is as follows: The Chambers, each of which is 47 feet by 88, are set with the long dimension running from front to back. They are two storeys high. The upper storey is a very graceful arcade, of clustered marble shafts and pointed arches, carrying a skylighted ceiling. Behind the arcade is a gallery all the way round, subdivided for the various classes of auditors, including the press, who are seated in the gallery behind the Speaker. These galleries are represented on the ground floor by a corridor surrounding the Chamber. At the front of the Chamber, that is on the side towards the facade, the corridor is extra wide because it includes the width of both the gallery above and the passage which is between the gallery and the offices along the facade. On the ground floor this double width corridor makes the public lobby, and the offices along the facade open off it, and are occupied by the telegraph and other offices to which the general public have access. The corridor-ends which abut on the lobby are closed with doors, and all beyond is sacred to members; who have thus an undisturbed promenade on each side of the Chamber (originally no doubt intended for division lobbies after the manner of the English House of Commons), and at the back a passage, off which open the reading, smoking and other retiring rooms for members. This passage is the main thoroughfare for all the privileged part of the House. At opposite ends of it—speaking in general terms—are the residences of the two Speakers, overlooking the river; the Speaker of the Senate in the northeast corner, the Speaker of the Commons in the northwest corner; and by way of this private thoroughfare they reach their much-enduring chairs, and return to breathe domestic peace when their House has happily gone into a committee of the whole. This private thoroughfare is also the means of communication between the two Chambers, and of access to the library, which lies behind, at the end of a one storey corridor.

All this arrangement is represented on the front, shown in Plate VI. The length between the tower and the nearest pavilion on each side represents the width (100 feet), devoted to each Chamber and its appendages. The pavilioned blocks on the two ends contain the offices of the permanent staff connected with Parliament; and these offices extend along the upper storeys of the central part. On each side of the tower are to be seen the raking windows which represent a staircase. This is the external manifestation of a two or two-and-a-half storeyed entrance hall, with a great stone stair ascending on each side: on the right hand to the Senate and on the left hand to the Commons. These stairs land at the lobbies of the respective Houses. People having business there no doubt enter by the small doors, at the flight of steps on each side of the Victorian tower, and ascend by an elevator. The grand entrance hall and stairs are for more ceremonious occasions. It is by this way the Governor-General approaches the Senate Chamber when he opens or closes Parliament. The main entrance is under the tower, which is, in fact, a *porte cochere*. To this His Excellency drives up in state, four-in-hand with a military guard, and enters the great hall on the ground level. The usher of the Black Rod meets him at the door, with all the respectful welcome that bowing can express, and conducts him up the stone stair to the Senate lobby, and along the centre of the Senate Chamber, through rows of waiting Senators on each side, to the upper end of the Chamber, where he bows him on to the throne.

We have described fully the Parliament Building, because of the interest of its plan.

The Eastern and Western Blocks are arranged more monotonously in plan for more monotonous portions of the public work. The Eastern Block has the distinction of

containing the office of the Governor-General, and the Privy Council Chamber, where cabinet councils are held. It is for this reason, no doubt, that it was distinguished from the Western block (as originally designed by the architect of both these buildings), by a more imposing tower. The Governor-General does not, however, enter at the tower, but under the *porte cochere* at the side, being the only civil servant who comes to his office in a carriage.

The Western Block was in fact, as first designed, a little too tame to make a good mate for the Eastern block. Mackenzie Tower (Plate XVI.), forms part. It is difficult, This defect was remedied by the addition of which the to understand why the Mackenzie Tower, which is 272 feet high, was made higher than the Victoria Tower, which is only 255 feet—to adopt the greatest height given, among conflicting authorities. The terrace upon which the Victoria Tower stands must be taken into account in estimating its advantage; and, partly from this reason, but mainly because the Mackenzie Tower is on the far side of its building, there is no conflict between it and the Victoria Tower in the front view of the buildings. There is a Laurier Tower now making its appearance, which we may hope has the good manners of the statesman it will commemorate.

The harmony of the original buildings is wonderful, considering that they were the work of two architects, and were designed in competition—that is to say, without opportunity of consultation. The style of the buildings was, no doubt, decreed, and was the fruit of the Gothic Revival in England, and Sir Charles Barry's success with the Palace of Westminster, which was then nearly completed. The uniform and distinctive material used throughout, has, perhaps most to do with the harmonious appearance of the whole, but the manner of using it is rather remarkably assimilated in the different buildings. There is some evidence of one influence in this, and the influence may have been that of Thomas Fuller who, as soon as his firm was given the commission to execute the Central building, moved to Ottawa and lived with the work until its completion.

CLOTH HALL AT YPRES; AN EXAMPLE OF FLEMISH GOTHIC, SHOWING THE STRONG HORIZONTAL FEELING WHICH IS CHARACTERISTIC OF THE PARLIAMENT BUILDINGS AT OTTAWA.

The rubble walling is of sandstone from the Nepean quarries, close at hand. Its general tone is buff, varied with brighter tints. The cutstone work is Ohio sandstone, and the relieving arches over cutstone openings are of red Potsdam sandstone from St. Lawrence County, New York. Spandrels are filled with bright colored pieces, fitted together in a patchwork mosaic, as may be seen in Plates XII. and XIV. This occurs most, or altogether, in the work of Messrs. Stent and Laver, and accords well with the general vigor of their design.

There is no church-window gothic about the work of either of the designers. They worked freely in the style. Mr. Fuller, we at any rate know, had studied and practised in England, when the Gothic Revival was in its full tide of enthusiastic hope, and his career began by winning the competition for the cathedral at Antigua. The English church architects' models had, however, little influence upon this building, which, if it is indebted to old work at all, got its inspiration from the gothic civic buildings of Italy and the Netherlands, where a feeling for the horizontal is the conspicuous characteristic of the design. The windows of the principal floor, in Plate VI., have a peculiarity, in the low springing line, about the middle of the total window height, which materially helps this horizontal effect. In a general way all the buildings are remarkable, in spite of their numerous windows, and their coupling and tracery, for an effect of solid wall which, particularly in view of the interesting character of the stone employed, seems most appriate.

The strong picturesque quality of the Eastern Block generally receives the most admiration. How strong the work is that has produced this picturesque quality may be seen by referring to Plates IX. and XII. The segmental and obtuse pointed arches, in these bottom features of the tower, are rather startling, seen by themselves; but in the general view of the building, in Plate X. they are seen to be not more forcible than is necessary at the base of so strong a tower. Plates IX., XII., and XIII. show nearly all details of the tower, which is interesting as a study of strong and original modern gothic.

The central building may be all formal dignity in front; but at the back, looking over the river it is as picturesque as any of them. The library, supported by the four ventilating towers of the two chambers, is in the prominent position, crowning the cliff. At any distance the buildings and towers all group together, and, as has been remarked, bear some resemblance in mass to the groups of pines which crown the heights on the same river in another part of its course.

The Parliament Buildings are to be seen rising high above all the houses from every distant view. The choosers of a site for the Public Buildings of the Province of Canada did certainly choose well; and the builders builded well; and the Dominion has done well to adhere to the same style, in adding to the group.

PERSPECTIVE VIEW OF RESIDENTIAL SCHOOL FOR BOYS TO BE ERECTED AT BOBCAYGEON, ONT. MR. W. A. LANGTON, ARCHITECT.

HILL CROFT, BOBCAYGEON,---A Country Residential School for Boys.---To be Situated on a Delightful Site.---Building Provides for Family, Servants and Boys Departments.---Description of Building and Surroundings.

THE site of this building is a small plateau, forming an intermediate level on a slope of land, rising continually, in a broken manner, from the shores of Sturgeon Lake to a higher level of farming land.

The building faces south and west, and the ground rises northwards, sheltering the school by its general slope, and by a shoulder which rises abruptly close behind the house, overlooking the boys' quarters and offering a fine slope for tobogganning in winter.

A country road passes along the southerly side of the grounds; with a garden before the house and the boys' vamps up from the highway, at the end where the house is placed, and slopes gradually for some 300 feet to a private road, which comes over the hill and connects with the high road at this end of the school grounds.

The house has, therefore, an outlook over its own grounds, with a garden before the house and the boys' tennis lawn beyond; and the view beyond takes in the hill on the right, the high road, as a central object in the middle distance, climbing over a slope, and, towards the left, the lower level of the land along the lake, and its distant shores, which are high.

The house is designed to be a residential school for young boys, who will be members of the family, in the modified sense that is desirable for both parties.

The essence of the problem—as in all dwelling house problems—is an arrangement which will give contact between the different divisions of the household, at the proper points, and at none other. The difference between this household and one of an ordinary kind is that in most households there are but two divisions, viz.: the family and the servants; in this household there will be three, viz.: the family, the servants, and the boys.

The outlook over the highroad seemed most appropriate for the servants' quarters—to keep them cheerful. It is also convenient to connect the kitchen closely with the road; that vehicles of supply may touch its entry without entering the space behind the house, which is reserved for the purposes of a yard and drying ground.

The secluded interior of the lot is the natural place for the boys' quarters; and the proper position for the family rooms is between the other two departments, in contact with each and adjacent to the road, though not looking over it.

There is no reason why the service department should touch the boys' quarters directly. It is better that these two divisions should be kept apart as far as possible, except in so far as the dining-room may be considered as a room concerned with the boys. The dining-room as a common meeting ground for the three divisions of the household, must be in contact with all three; but not in such a way as to bring the boys to it by the same approach as the family. This is managed simply enough, because the dining-room, like the kitchen, should have the eastern aspect. Thus the two extend along the whole eastern side of the house, leaving the front of the house, with the western and south-western aspect, for the family rooms.

The boys' bedrooms are connected with the upper floor for purposes of service, but they have no right of entry to the house that way. They can enter the house only on the ground floor; and can, of their own initiation, go no further than into the side passage leading to the front hall. This passage, which is their means of communicating with the only two rooms in the house that they will have any cause to enter uninvited—the dining-room and the Head's study—is cut off, by a second door, from the front hall.

The boys' rooms are all contained in the wing; and

WEST ELEVATION.

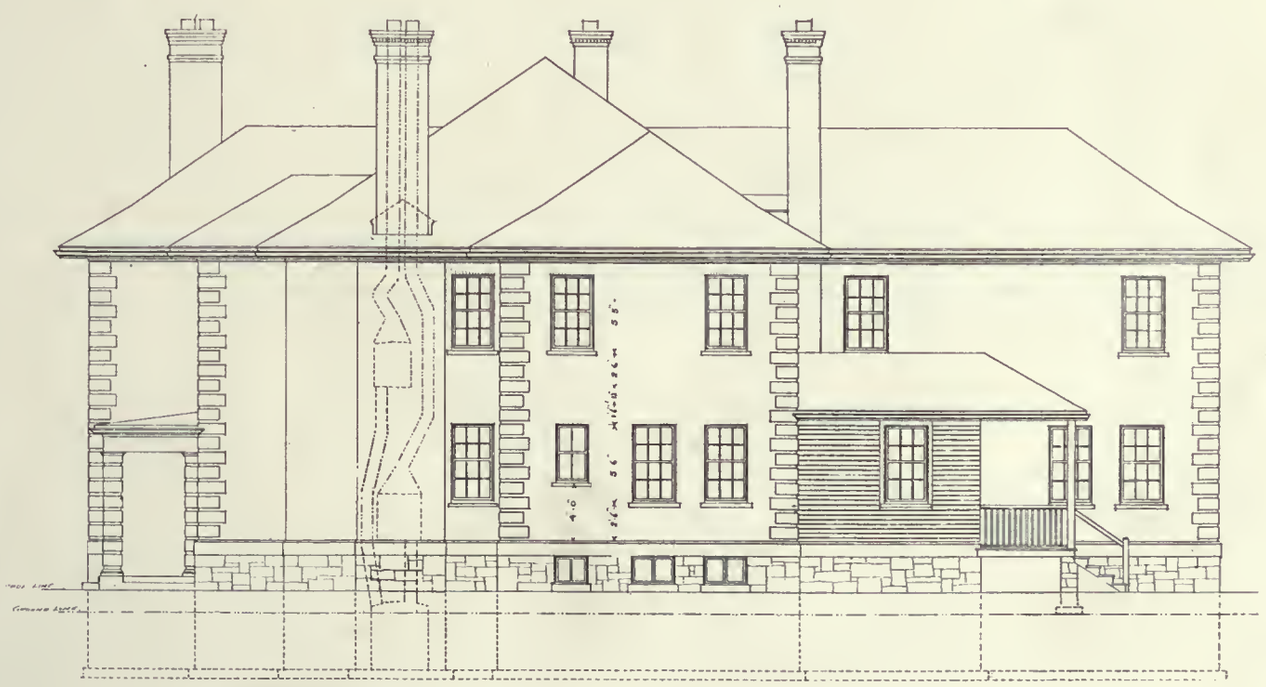
A RESIDENTIAL SCHOOL FOR BOYS TO BE ERECTED AT BOBCAYGEON, ONT. MR. W. A. LANGTON, ARCHITECT.

the plumbing room, which opens off their wing, makes it also self contained for the purposes of housemaids' service. Their bedrooms and bathroom are on the first floor; their class rooms and common sitting room on the ground floor; and, in a high basement storey, are the locker rooms for their sporting things, a gymnasium, and a room for carpentering.

Their entry on the far side of the wing keeps them, in their coming and going, from the front of the house. A path along the upper side of the grounds takes them to their tennis lawn at the lower end, and to the private road outside, which leads to their playing field, down on the flats near the lake.

During the holidays, when the boys' wing is empty, there will be no perceptible change in the rest of the house, which is much what the family would ordinarily have had if there had been no school; except that the dining-room is larger.

Externally, the building is of white brick, because the white brick is better than the red in that neighborhood. To vary the excessive whiteness—which the clean country air has left unchanged, in old houses in the neighborhood which have been built of the same kind of brick—a dark red mortar has been used, and the green and pink tinged bricks have been selected for the face work. In addition to this the arches over openings have been built



SOUTH ELEVATION.

A RESIDENTIAL SCHOOL FOR BOYS TO BE ERECTED AT BOBCAYGEON, ONT. MR. W. A. LANGTON, ARCHITECT.

of unusually colored specimens, burned dark or fire flashed; and the heading courses are laid with arch brick, which are selected from both red and white kilns, and have ends with every kind of indefinable color of a tertiary character.

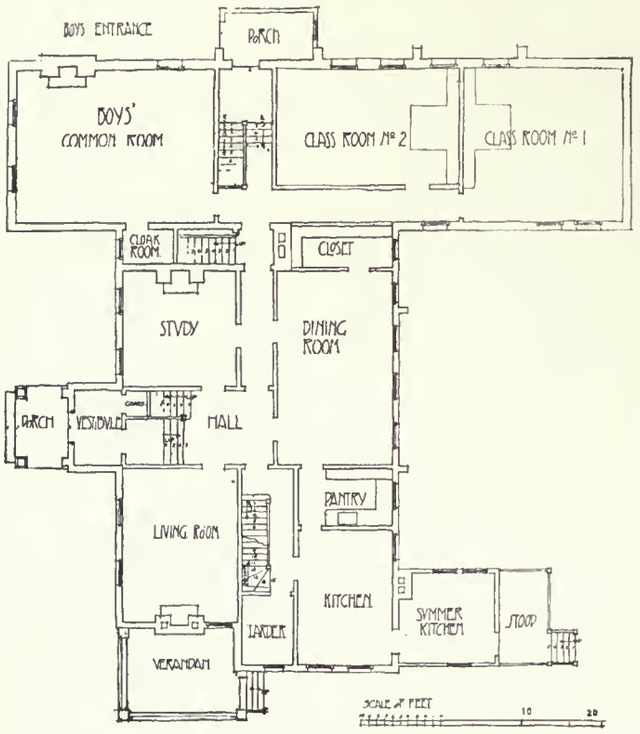
TORONTO'S NEW ASPHALT PLANT.--- Will Enable City to Carry Out All Repair Work Promptly.

AN ASPHALT PLANT, with a capacity of 1,500 sq. yd. per 9-hr. day, has recently been completed for the city of Toronto, at a contract price of $28,575. Its purpose is to enable the city to carry out all repair work promptly and probably lay a few small pavements each year. Complaints have been frequent in the past that openings in asphalt pavements were not promptly repaired, and it is expected that no unreasonable delay will arise hereafter in executing such work. The buildings have steel frames, galvanized roofs and sides, and reinforced concrete floors. The machinery was recently described in a report by City Engineer C. H. Rust as follows:

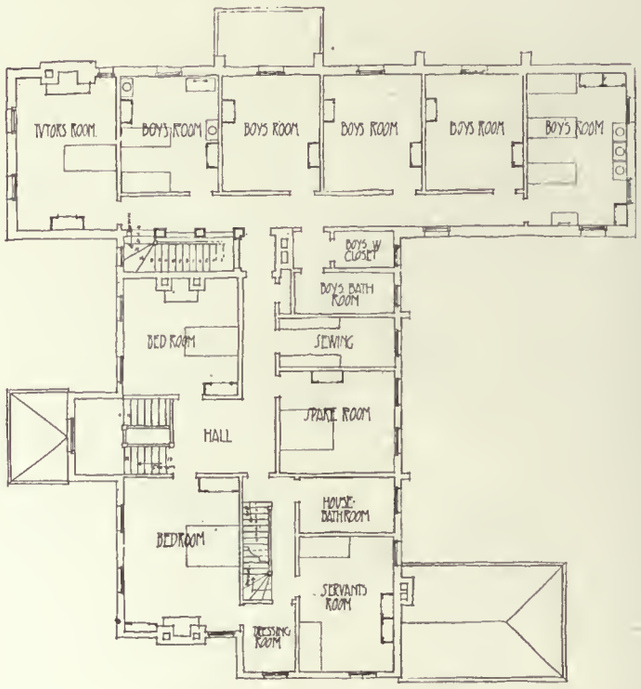
There are two self-contained rotary driers, the revolving cylinders being 40 in. diameter and 19 ft. 6 in. long. Draft is supplied by a 50-in. exhaust fan which discharges into a Cyclone dust collector. The driers are fed by two chain elevators, and the hot sand or stone is discharged into an enclosed elevator and conveyed to steel storage bins holding 10 cu. yd. each, situated on the second floor, the stone bin being fitted with a rotary screen. There is also a storage bin for limestone dust provided on the second floor, having a capacity of 4 cu. yd. and fed by a dust elevator. The hot material and the dust are drawn by gravity into their respective weighing boxes which discharge into the mixer; the mixer has a capacity of 1,100 lb. of topping mixture.

The asphalt cement is prepared in three enclosed melting tanks provided with mechanical agitation and having a capacity of 2,000 imp. gals. each. The asphalt cement is elevated by air pressure to the asphalt weighing bucket, running on an overhead trolley to the mixer. The storage tank for flux has a capacity of 10,000 imp. gals. The flux is blown from it to the weighing tank on the first floor and drawn by gravity into the kettles.

The asphalt barrels are hoisted to the charging floor by a barrel elevator. Power to the main portion of the plant is supplied by a 10 x 12-in. engine, and to the agitating tanks and barrel elevator by a 5 x 5-in. engine. Compressed air for forcing the asphalt cement out of the tanks and other purposes is furnished by a 6 x 8 x 12-in. Knowles direct-acting air compressor. Steam is supplied to these engines by a 60-h.-p. Star water tube boiler. Street and plant tools, including 8-ton and 5-ton steam asphalt rollers, five wagons, hand rollers, pitch kettles, etc., and twelve asphalt dump wagons, complete the equipment.



GROUND FLOOR PLAN.



FIRST FLOOR PLAN.

A RESIDENTIAL SCHOOL FOR BOYS TO BE ERECTED AT BOBCAYGEON, ONT. MR. W. A. LANGTON, ARCHITECT.

THE RECENT ACTION of the City Council of Vancouver, in ordering the demolition of condemned buildings, has aroused a bellicose spirit on the part of certain owners whom the mandate is destined to directly affect. A number of the places scheduled to go are occupied by business firms, who claim to have leases which entitle them to occupancy, and in many cases the owners and tenants are in collusion to defeat the city in its efforts to remove these dangerous structures, by "sitting tight," and, if necessary, force the civic workmen to pull down the buildings over their heads. Threats of procuring injunctions against the city have also been made by some owners, but, despite this opposition, the Council is evidently determined not to be swerved from its purpose. Already a gang of workmen, under the direction of the City Engineer, has started to raze a number of unoccupied buildings included in the list, and as soon as these are out of the way, the others are to follow. It now remains for the authorities to see that the work is carried out in a consistent manner, without fear or favor, and thus prove that building by-laws and other expedient measures are active rather than passive, and that the interest of the community is to be considered ahead of that of the individual.

SMALL HOUSE OF DUTCH COLONIAL COTTAGE TYPE DESIGNED BY ARCHITECT COLLIER STEVENSON.

DWELLING OF DUTCH COLONIAL COTTAGE TYPE.---A Moderate Priced Residence Designed to Meet the Requirements of a Small Family.---Plans Provide for Many Built-in Features.---A Model of Compactness and Convenience.

THAT small residence construction has shown a wonderful improvement in recent years is without question.

Not only is this fact noticeable in the larger cities, but also in the country towns and villages. The moderate size home of to-day has more of an architectural significance, more individuality of design, is better planned, provides to a greater degree for the comfort of the occupants, and is more practicable and livable in every way than the average home of twenty years ago. People are gradually being educated up to higher ideals as regards habitation; they are becoming more exacting in their domestic requirements; a more refining influence is making itself felt; while, on the other hand, architects have found a wonderful stimulus in this general tendency, and are exerting their best efforts to produce a better type of residence structure.

Not only is this seen in design and arrangement, but in the principles of constructive economy which are being adopted, and whatever may be said to the contrary, it seems quite clear that, considering the design, arrangement, construction, equipment and finish of modern homes, as compared with those of the past, the cost to-day, if anything, is not proportionately greater.

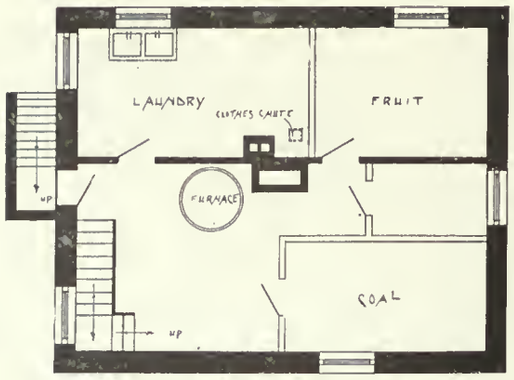
A particularly attractive small house of recent design is shown in the accompanying illustrations. It is an adaptation of the Dutch Colonial cottage type, by Architect Collier Stevenson, of Hamilton, at which place it is to be erected next spring.

On the outside the building is pleasingly striking and

FRONT ELEVATION.

SIDE ELEVATION.

homelike in appearance. Over the foundation of broken coursed ashlar, the walls of the first story are of red brick, having white joints, while the upper portion is covered with moss-green shingles, with the exception of



BASEMENT PLAN, SMALL HOUSE OF DUTCH COLONIAL TYPE. ARCHITECT COLLIER STEVENSON, DESIGNER.

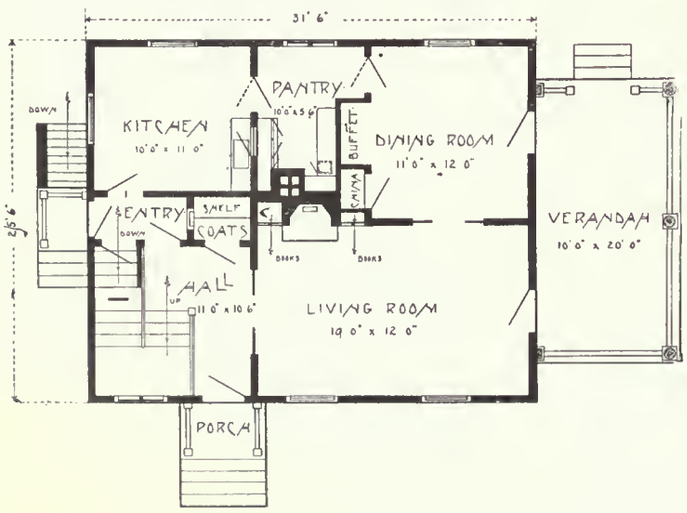
the side walls, which are stained a dark brown, all tones harmonizing well and contrasting cheerfully with the white woodwork of the verandah and porch.

Inside, the arrangement as for compactness, convenience and direct communication of the various rooms, leaves little or nothing to be desired.

The first floor provides for an entrance hall, large living-room, dining-room, kitchen and pantry, all admirably located. In the entire scheme there is not the least indication of waste space, all nooks and corners have been made to serve a utilitarian purpose. The woodwork is of Georgia pine, without moulding, stained a warm dark brown, while the hall, living-room and dining-room have dull green finished walls, with coved ceiling of rough plaster in warm buff.

Both the living-room, which has a large buff brick mantel, with built-in bookcases on either side, and the dining-room opens onto a spacious verandah at the side.

The dining-room, although somewhat small, affords ample room for the necessary furniture, as the niche takes the buffet out of the main part, being placed in the centre of a well-balanced wall arrangement, with a door



FIRST FLOOR PLAN, SMALL HOUSE OF DUTCH COLONIAL COTTAGE TYPE. ARCHITECT COLLIER STEVENSON, DESIGNER.

on either side, leading to the china closet and to the pantry, the latter being well situated between the dining-room and kitchen, and providing a direct connection between the two.

Over the sink in the kitchen is a small glass door, giving access to the built-in cupboard in the pantry, thus saving many steps in the washing and putting away of dishes.

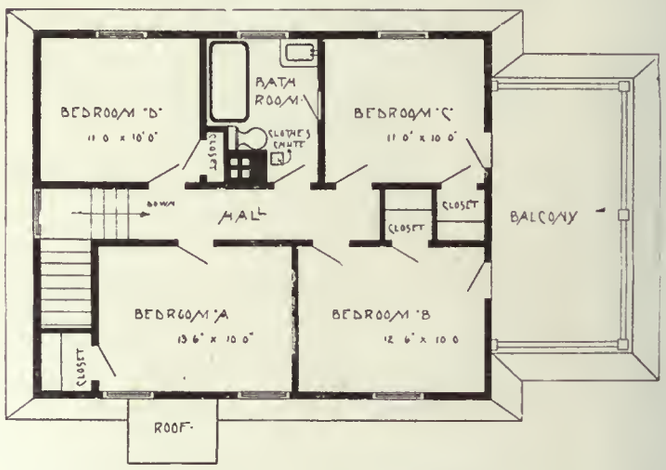
Upstairs there are four bedrooms, each having a separate clothes closet. No unnecessary space has been devoted to useless halls, and the bathroom is so arranged as to be convenient to each room, and yet present no unsightly vista from without, even with the door wide open.

All the woodwork on this floor is painted white, with the exception of the doors, which are mahogany-stained. A clothes chute, having door to same from pantry through which it passes, extends from the bathroom to laundry in basement, which is equally easy to reach from out of doors as from the kitchen.

Economy in construction has been effected in locating the chimney, so as to make it suffice for the entire house, and also in the plumbing by placing the laundry, kitchen and bathroom one over the other.

The cost of the building complete will vary from $2,500 to $3,000, according to location and interior finish.

GOVERNMENT CHARGES for Hydro-Electric Developments are arousing so much controversy in this country that some information concerning a project in Nor-



SECOND FLOOR PLAN, SMALL HOUSE OF DUTCH COLONIAL COTTAGE TYPE. ARCHITECT COLLIER STEVENSON, DESIGNER.

way, supplied by Consul-General Henry Bordewich, stationed at Christiania, is rather timely. He reports that two Government bills were recently laid before the Storthing to give permission to a German company manufacturing chemical products to acquire the Tyin and Matre water courses in Bergenstift, West Norway, for the purpose of developing 60,000 to 70,000 h.-p. Among the conditions, the company is to pay yearly to the State 26.8 cents per horse-power beyond the 10,000 h.-p. which the watercourse is supposed to supply in its natural state while undeveloped. The company is not allowed to raise the price of electric energy within the kingdom and is bound to supply 500 h.-p. for public use at a yearly rate of $13.40. The work of development shall be commenced within five years and completed within 12 years; for the former period the company is permitted to employ foreign engineers and workmen to such extent as they deem necessary, although the ordinary conditions as to Norwegian employees and Norwegian material are laid down as the essential rule. After the expiration of 75 years both plants shall revert to the State.—ENGINEERING RECORD.

CANADIAN-MADE CEMENT exhibited by the Western Canada Cement and Coal Company, of Exshaw, Alta., was awarded a diploma at the Spokane Interstate Fair, in competition with leading American and German brands.

PNEUMATIC CAISSONS.---Various Designs and Methods of Construction.---How They Are Sunk and Sealed to Form the Foundations of Large Buildings and Bridges.---Difficulties and Dangers Encountered.---Some Practical Illustrations.

By T. KENNARD THOMSON

Mr. T. Kennard Thomson, whose article on "Pneumatic Caissons" is published herewith, was one of the early students at the School of Practical Science, Toronto University, from which he was graduated at the head of his class in 1886, with the degree of C. E. He is the son of the late William Alexander Thomson, who formerly represented the constituency of Welland in the Dominion House, and who was also the originator and builder of the Canadian Southern Railroad.

After spending three seasons in practical construction work on the Canadian Pacific Railway in the Rocky Mountains of British Columbia, Mr. Thomson was employed for two years by the Dominion Bridge Company at Lachine, and for a similar period by the Pencond Bridge Company at Philadelphia, which position he left to become bridge engineer for the Ohio extension of the Norfolk and Western Railway, having charge of the design and construction of 129 bridges, including the large Ohio River Bridge at Kenova, W. Va.

Since severing his connection with the latter company, Mr. Thomson has held various positions of responsibility in the engineering field. He was for eight years chief engineer for a prominent firm of foundations contractors, and also chief engineer for a well-known bridge company, besides being engaged on numerous occasions as a consultant on other work.

Mr. Thomson is the recognized authority on pneumatic caissons. He has designed and built pneumatic caissons for bridges over the Ohio, Monongahela, Susquehanna, Missouri and Harlem Rivers, and for the famous Hartford Stone Bridge over the Connecticut River, in addition to being retained on over twelve New York skycrapers. ... ...

During his experience he has underpinned buildings as high as 18 storeys, putting in new foundations with the slightest settlement, although sometimes the new foundations were 60 feet below the old. In carrying out these various works, Mr. Thomson has been in the air chamber of the caissons about 3,000 times.

He has also taken out a number of patents on improvements, and is a valuable contributor to engineering literature, among his subjects being "The Canadian Pacific Railway," "Bridge Building in America," "Notes on Cement," "Bridge Specifications," "Foundations for a Twenty Storey Building," "The Mutual Life Foundations," "Notes on Caissons," and others.

The publishing rights for this article in Canada have been acquired by special arrangement with the Railroad Age Gazette of New York City, and we believe that we are particularly fortunate in procuring for the benefit of our readers so comprehensive and instructive a treatise on one of the most interesting problems in present day engineering.

T. KENNARD THOMSON.
M. AM. SOC. C.E.
M. CAN. SOC. C.E.
M. AM. SOC. M.E.

CAISSONS, under the name of Plenum Pneumatic Process, were first used in America in 1852 for a drawbridge over the Harlem river at Third avenue, where a number of cast-iron cylinders about 4 ft. in diameter were sunk to support each pier.

As the French have made some progress in this line, the contractors of the Third avenue bridge brought a French engineer over at a high salary per diem, but after about a week, having learned all he could teach them, they let him go home, much to his disgust. This bridge was rebuilt by the city of New York some 43 years later, using a modern large caisson instead of a number of small ones, and the old cylinders, on being removed, were found to be in a very good condition.

The word "caisson" is taken from the French caisson, from caisse, meaning a box or chest, and is also used for an ammunition carriage. It is often used to describe either open cofferdam work or pneumatic work, the first more by architects than engineers. Open cofferdam work, as the name would imply, is simply an excavation with supporting sides to prevent the surrounding material from caving in, while pneumatic work requires in addition a roof or floor some 6 or 7 ft. above the cutting edge or bottom of the excavation. The roof can be a temporary one and removed after the cutting edge has reached bottom, or it can be left in place. While the roof has been put on top of the sides after they have been driven as far as they are to go, it very rarely is; one of the few cases being the Harlem river tunnel.

The usual method, however, is to build the caisson first, with the roof or deck about 6 or 7 ft. from the cutting edge—the side having first been excavated to the water level—work in the open by cheap labor, of course, being cheaper than excavation in the air chamber by high-priced sand hogs, with the cost of the compressor, plant, etc., in addition.

OBJECT OF AIR PRESSURE.

By working very quickly and steadily, caissons have been sunk through New York quicksand some 16 to 18 ft. before air was applied, but the material becomes soggy very quickly, and it is more advisable to apply the compressed air from the start, generally beginning with 3 or 4 lbs., on account of operating the doors, etc., although theoretically the pressure should start at zero, for as the only object of the compressed air is to keep the water from flowing in, the pressure of the air should just balance the pressure of the water. The weight of fresh water is about 62 1-2 lbs. per cubic foot, or 434 lbs. per square inch on the bottom, so if the water is 10 ft. deep the pressure will be 4.34 lbs. per square inch, and if the depth is 100 ft. the gauge will show 43.4 lbs. per square inch, which is about the limit of pressure in which men have been able to work.

It would naturally be expected that caissons being sunk in a field or city might not have as great a water pressure at the same depth as a caisson being sunk in the middle of the river, but, as a rule, the actual pressure required in both cases will not be found to vary much from the pressure calculated from the hydrostatic head of water. It is as dangerous to have too high pressure as it is to have too little pressure, for if it is too high a blow-out will occur, suddenly reducing the pressure in the working chamber and allowing the outside material to rush in before the pressure can be raised again.

In the Rapid Transit tunnel under the Harlem river,

which I have referred to, the sides were driven first and the roof was sunk from the surface on to the solid side walls of 12 in. x 12 in. sheeting so as to leave 25 ft. of water above the roof at low tide, this being the Government requirement. Instead of driving the 12 in. x 12 in.. sheeting one at a time, the contractor bolted three of them together, and by spiking two 3 x 4 in. timbers on in such a way that one 3 x 4 in. piece on the adjoining three 12 x 12 would fit into it, forming a sort of tongue and grooved joint, which has proved very effective.

In this case the contractor did not wish to go to the expense of putting enough weight on the roof to withstand the entire air pressure which would be required to keep the water out of the air chamber; so he split the difference and used half the air pressure, theoretically required; that is, from 10 to 12 lbs. per square inch, and relied on the pumps to keep the water down. The pumps could not have handled the work without the assistance of the air pressure. This compromise plan proved successful, although the water broke in several times, giving the men a pretty good scare.

The success was undoubtedly due to the nature of the soil; clay, to a large extent, for this scheme would be too risky in a silty sand or gravel.

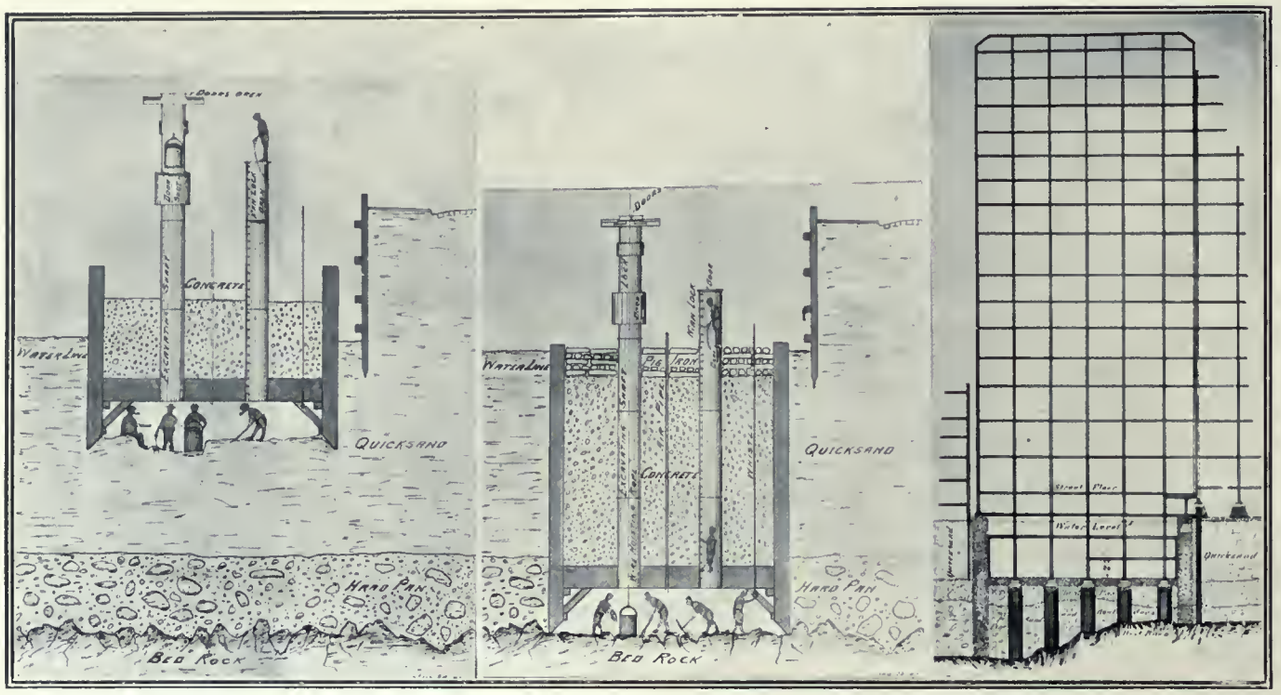
The first section to be sunk had a temporary roof under which the permanent roof was built after the material had been excavated, but the removal of this temporary roof, a solid wooden platform 3 ft. thick was found to be so expensive and tedious that the next section to be sunk had the permanent roof of cast-iron lining inside of the concrete with half the sides (that is, the entire upper half of the tunnel) built on floats so that when it was sunk in place all that remained to do was to complete the lower half of the tunnel. This was not only much cheaper than the first plan, but also much safer, and was first suggested by the writer.

VARIATION IN DESIGN AND CONSTRUCTION.

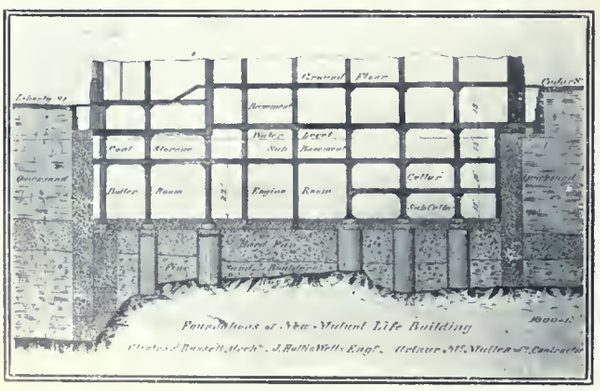
For ordinary caissons, great variation has existed, and still exists, in the design and construction, some engineers using very thick timber side walls with a timber roof or deck 10 or 12 ft. thick, others reducing the thickness of the timber roof to 3 ft., while others again use plain concrete or reinforced concrete, and employ timber only for forms, while a few build the whole caisson and cofferdam of steel and cast iron. A good example of steel caissons was the Mutual Life building, where the sizes ran from 3 ft. diam. for under-pinning cast iron caissons, to 8 x 22 ft. for the main caissons.

Several contractors in New York have recently tried sinking caissons of concrete only, using timber for forms and removing the forms as soon as possible. Theoretically, this method is the cheapest of all, but practically it has been found that it paid to leave an outside shell of timber on to permit the sinking to proceed continuously, which is not possible when removable forms are used, necessitating a cessation of sinking for a day or so, sometimes several times for each caisson, to permit the concrete to harden before being subjected to the friction of the ground. The removal of the forms required considerable labor, sometimes high-priced, as in the case where iron angles were used and the forms were held together by means of steel bolts, which gave the iron unions a chance to insist upon the bolts being put in and taken out by iron erectors.

Concrete also causes slightly greater friction than planed boards, especially where the latter are greased.



SECTIONAL DIAGRAMS OF THE METHOD EMPLOYED IN CONSTRUCTING FOUNDATION FOR A LARGE BUILDING, SHOWING THE SAND HOGS AT WORK UNDER THE ROOF OR DECK OF THE CAISSON. IN THE FIRST DRAWING THE CAISSON IS FAIRLY STARTED, WHILE IN THE SECOND IT HAS REACHED BED-ROCK AND IS ABOUT READY FOR CONCRETE IN THE AIR CHAMBER. THE THIRD DIAGRAM SHOWS THE COMPLETED FOUNDATIONS OF THE MUTUAL LIFE BUILDING, NEW YORK CITY.



FOUNDATION OF MUTUAL LIFE BUILDING.

Most people seem to object to grease on the concrete isself.

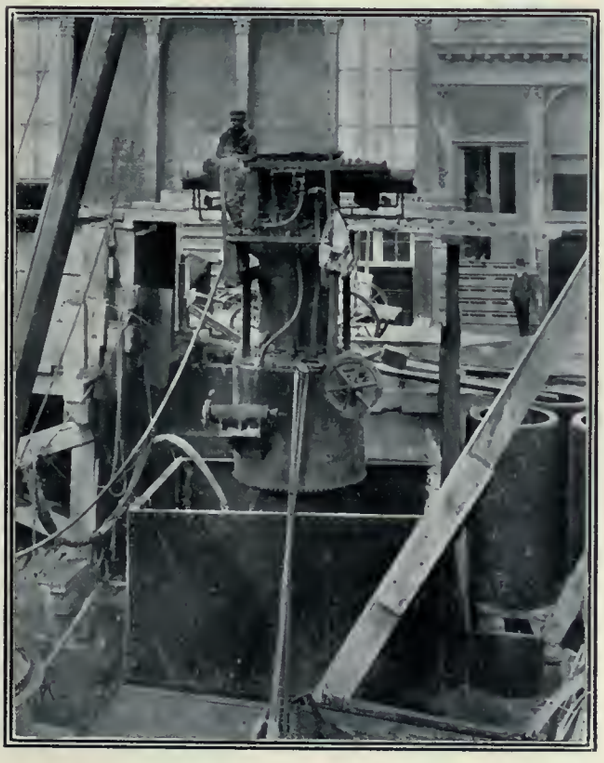
In New York, as in many other places, the least friction is obtained by gradual but continual sinking, for allowing the caisson to take a quick drop of several feet and then perforce allowing it to stand for some time, gives the quicksand and other material a chance to adhere to the sides of the caisson, causing a very considerable increase in the amount of friction which must be overcome before the caisson can start again. Using forms instead of permanent sides, of course, prevents continual sinking.

FRICTION DIFFICULT TO ESTIMATE.

Friction is a very hard item to estimate, as it depends not only on the nature of the material, but also on the method of sinking, and on one job in New York City where very careful records were kept it was found that the friction varied from 150 to 650 lbs. per square foot of exposed surface, the material passed through being what is called New York quicksand.

In order to reduce the friction on the sides, nearly all beginners want to make the bottom of the caisson of larger cross-section than the top, thinking that as the hole excavated will thus be larger than the caisson above the cutting edge, that they will thus obtain very little or no friction, but this has been repeatedly found to be a mistake, for in most cases it results in the surrounding material "caving in" and jamming against the sides, increasing the friction enormously.

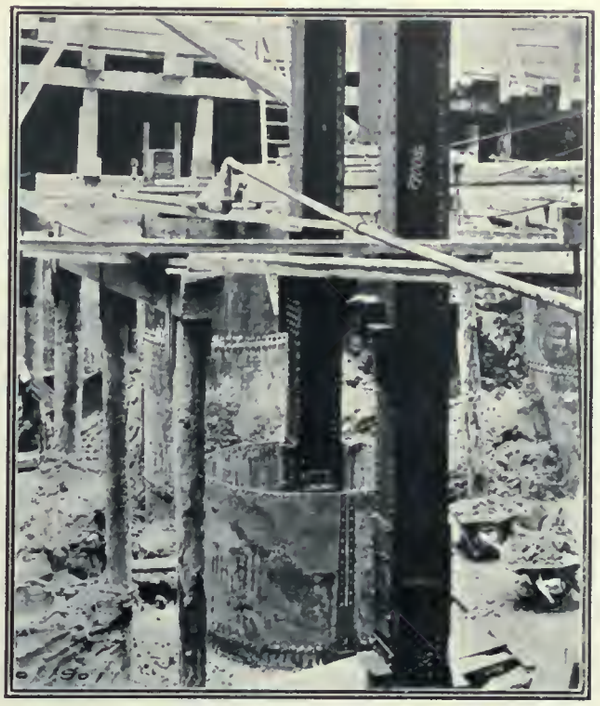
At the Hawkesbury bridge, in Australia, where cylindrical open steel caissons, or cofferdams, were used which tapered from the bottom to the top, the material was excavated by dredging, and instead of the surrounding material flowing against the sides and causing a jam, as is the usual case, the reverse happened, and a water space



LOCK WITH TWO TOP HORIZONTAL SLIDING DOORS, MUTUAL LIFE BUILDING.

or water-filled cavity was left around the sides, with the result that it was impossible to hold the caisson plumb. This gave so much trouble that material was dumped around the sides and then work was suspended for a year to allow the earth, etc., to pack around the caissons, after which sinking was resumed, successfully.

To give an example of the opposite result in this country, an engineer once divided his caisson into two piers



VIEW OF CONSTRUCTION WORK ON THE FOUNDATIONS OF THE MUTUAL LIFE BUILDING, SHOWING STEEL COLUMNS IN PLACE BEFORE CELLAR WAS DUG, THE STEEL COFFER DAM BEING REMOVED AS THE EXCAVATION PROCEEDED.

above the deck, leaving an open space of some 20 ft. between the two piers, and in addition the sides were battered, with the result that the boulders, etc., caved in and jammed so firmly that some 1,200 extra tons of pig iron were required to overcome the friction—a very expensive experience for the contractors. As these contractors had to sink a second caisson of similar design, they profited by their experience and built a cofferdam on each side between the two piers and filled the space with earth, etc. They also built the sides vertical. While the railroad saved a few yards of concrete by dividing the caisson into two parts above the deck, and similar economies, it had to pay fully fifty per cent. more per cubic yard for the next bridge it built immediately following, which shows that the mere cutting down of dimensions does not always mean economy.

Another favorite expedient, and an equally costly one, is trying to overcome friction by jetting, thus saving the purchase and handling of pig iron, which always consumes a great deal of time and money.

It is, of course, very easy to shove a jet pipe, of 3-4 in. diameter or so, down the side of the caisson, and to pump water through the pipe at high pressure, at the same time moving the pipe around the caisson, overcoming the friction by forming a sort of water jacket around the sides, which allows the caisson to sink, or rather, drop several feet at a time. This can often be repeated several times to advantage, but it disturbs the surrounding ground to such an extent that, in many cases, the material cakes against the sides, making each succeeding operation harder than the one before.

DANGER OF OVERWEIGHT.

The only economical method of sinking is to have just sufficient weight so that the caisson will continue to move downward as fast as the cutting edge is undermined. Too

much weight is obviously dangerous, as in soft material there is a risk of the cutting edge penetrating the material until the air chamber is filled with earth and water, and even if the men have all had time to escape it is expensive work digging in from the shaft to make room for the men and buckets.

The usual method, after a caisson has fairly started on its downward course, is to dig about a foot below the cutting edge except just around the cutting edge itself, then removing the material directly under the cutting edge itself, and by slightly reducing the air pressure for a very short interval the net weight of the caisson and its load is increased enough to overcome the friction, and to allow the cutting edge to reach the bottom of the excathe water level below the cutting edge, in which case it is not usual to excavate below the cutting edge.

When passing through hard material, such as hardpan, boulders or rock, it is important to see that the excavation is made wide enough, or the caisson will surely become jammed. In fact, I have seen a 3-ft. diameter cylindrical cast-iron underpinning caisson become so jammed that four hydraulic jacks aggregating 320 tons would not budge it, and as the jacks were acting against the wall of a building it was not considered safe to jack any more for fear of injuring the building that we were underpinning.

Much difference of opinion exists as to the proper form of cutting the edge, which, as might be inferred, is the bottom of the caisson, the idea being that it cuts its way into the underlying material, though, as we have seen it is often necessary to excavate under the cutting edge itself. Many strive to obtain a knife edge (for the cutting edge) by means of steel plates and angles; while I have in many cases contented myself with an 8-in. channel laid flat. The knife edge is, of course, ideal, but is very expensive, and where it is really needed is almost sure to become bent and distorted, in which case it is far worse than no cutting edge at all.

The cutting edge and sides should, of course, be designed with the object of giving the maximum room to work at or under the cutting edge, for, at the best, removing the material at the cutting edge is very much more expensive than removing the rest of the material.

While it is possible to analyze the strains in most structures, and it is possible to do so with a pneumatic caisson, still there is such a large element of personal judgment required that it is dangerous to lay down rules for others. Theoretically, if the air pressure just equals the outside pressure, it might be argued that there are no strains on the sides or roof of the air chamber, but we know, as a matter of fact, that sometimes these strains are enormous and irresistible, especially when the caisson gets out of plumb, or encounters harder material on one side than the other. Every experienced "sand hog" or caisson man has seen the roof badly deflected and the sides twisted out of shape. So it is essential for the designer to use his eyes and his judgment. He should also be familiar with the methods of the contractor who will use his plans—for a design that would be quite safe for one contractor would not be at all safe for another.

CAISSON CONSTRUCTION.

All wooden caissons should have an outside tongued and grooved sheeting of 2 in. or 3-in. plank laid vertically to avoid friction on long horizontal joints. Most contractors, however, use plank with a calking edge instead of tongued and grooved, and then calk with oakum.

For small caissons, say from 5 ft. to 12 ft. square, there should be a horizontal wall of 8-in. or 10-in. timbers from the cutting edge to the roof instead of the plank sheeting, properly braced at the corners, and inside of this there should be a 12-in. x 12-in. belt course under the roof. One solid course of 12-in. x 12in. timbers is ample for the roof or the deck, and if concrete is placed on the deck as fast as the caisson is sunk, the plank sheeting will be sufficient for the side walls above the deck, with light horizontal waling pieces, spaced about 5 ft. apart vertically.

For large boxes, up to 30 ft. wide, I have used, successfully, 27-in. sides, below the deck; that is, 3-in. plank against 12 x 12 horizontals, inside of which I placed a wall of 12 x 12 posts, about half of which extended from the cutting edge to the roof and the rest projected from 2 to 6 ft. above the deck, while the corner posts and an intermediate about every 15 ft. apart were extended to the top of the cofferdam, properly spliced at the joints.

Above the deck, horizontal 12 x 12-in. walings spaced from 3 to 5 ft. apart vertically were placed outside of the posts, the sheeting being spiked to the walings.

If the concrete were placed in the cofferdam on top of the caisson as fast as the caisson was sunk, all the bracing above the deck could be removed as the concrete reached the bottom of the brace, or omitted altogether in some places, but it is often necessary to keep the concrete 20 to 30 ft. lower than the surface of the water in order to prevent the caisson from becoming too heavy, when very heavy cofferdam bracing will be required to withstand the hydrostatic head. This is especially so when the water is deep, say, over 30 ft., and bottom of the river consists of fine silt. Sixty feet of water is the deepest in which I have started a caisson.

For deep water work it is necessary to so design the caisson and plant that there will be no danger of turning turtle, lack of which provision has resulted in several accidents.

Reference has been made to the advisability of having a shell of timber or steel, even where the concrete is always above the ground while being deposited, in order to save time and expense, and it is also necessary to prevent new or green concrete from being parted by the friction of the ground.

In sinking the first caisson for a New York City skyscraper, the Manhattan Life building, steel caissons were used, on top of which brick work was built, but it was found that the friction broke the new mortar, thus pulling the brick work away from the caisson. In any case, the cofferdam should be very securely attached to the caisson, the necessity of which was proved in a river caisson where the clay was taken out of the air chamber and dumped over the side of the cofferdam to which it adhered, and broke the whole cofferdam, 106 ft. long, away from the caisson.

Many small New York caissons have been built with wooden sides and a 2-in. plank "form" under the roof, on which 2 ft. of concrete has been laid and allowed to set for a couple of days, after which the form was removed and the concrete continued. At first, forms were also used instead of cofferdams for the sides above the roof, but after this scheme had been used for three or four buildings it was abandoned as not economical in practice.

In these caissons, sometimes the steel shafts were left in, and in other cases collapsible steel shafts or wooden forms for the shafts were used and then removed. Removing or leaving out the steel shaft in a small caisson is very risky and has been attended by accidents where the caisson has broken in two owing to greater pressure on one side of the cutting edge than the other.

Steel caissons have been used a great deal in the past, but are not used in New York much now, except, perhaps, for circular caissons, especially where of very small diameter. The advantage of using steel for round caissons up to 10 or 12 ft. in diameter, consists in the rapidity in which the light sections of cofferdam can be bolted on and filled with concrete, teh time saved often being enough to pay for the extra cost of material. Another advantage is the ease with which they can be made watertight.

Small caissons for underpinning purposes are made from 30 to 36 in. diameter, of cast-iron or built-up steel

plates. A good plan is to use steel cutting edge sections and make the upper sections of cast-iron, using 1 1-2 to 2-in. metal. In underpinning the adjoining buildings to the extension of the Mutual Life building, in 1900, we used 26 of the small caissons from 60 to 80 ft. deep.

Twenty-seven inches inside diameter is the smallest pneumatic caisson we have worked men in, but they were cramped for room, and 33-in. inside diameter or 36-in. outside has been found to be a much better size.

For the main caissons of a new building, anything under 6-ft. in diameter is unsatisfactory, as there is not sufficient room for the men and bucket, and besides it is hard to keep small caissons plumb and in line.

In the above only those caissons in which the roof is left in place have been considered, but there are many places where it is desired to sink the caisson shell with a temporary roof, and, of course, a temporary weight; where, for instance, the base of the column must be set below the surface of the ground before the main part of the cellar is excavated. This has been done in a number of cases in New York in recent years, where there are from three to four floors below the street level, both for the purpose of saving time by allowing the erection of the steel work to commence before the cellar is excavated, and also in order that the steel work and concrete floors may be used, as the cellar excavation proceeds, to obtain sufficient bracing for the side caissons, which are usually only 6 or 8 ft. wide, forming a wall around the buildings sometimes 60 to 70 ft. below the street line, and are entirely too light to withstand the enormous water and earth pressure without the horizontal bracing afforded by the floors.

TRINITY AND U. S. REALTY BUILDINGS, NEW YORK CITY, WHERE THE WORLD'S RECORD FOR CAISSON SPEED WAS MADE. EIGHTY-SEVEN CAISSONS WERE SUNK AND SEALED IN 60 DAYS, THE LAST 57 OF WHICH TAKING BUT 30 DAYS.

CALCULATING STRAINS.

It is necessary to use considerable common sense and experience in attempting to calculate the strains in a caisson. As regards the deck, for example, it is very easy to calculate the weight to be carried by the deck and the strains that would result therefrom, and we know that the air pressure acting up against the roof will counterbalance a great deal of this weight, making it, in fact, something like a pontoon floating in the water. But, on the other hand, the air pressure is often slacked down to almost nothing in order to overcome the friction and is raised again before much water has time to enter the working chamber; and sometimes an accident to the air plant will suddenly cut off the supply of air, throwing a tremendous strain on the roof. If the principal weight on the roof is concrete it will in many cases be self-sustaining unless too fresh.

The same with the sides. If the material were absolutely homogeneous all around and the caisson were sunk absolutely plumb, which almost never happens, and the air pressure were kept just equal to the outside pressure, then we would have practically no strain on the sides—but all practical caisson men have seen the sides of caissons collapse, and some very strongly built ones at that. A very much more frequent cause of accident than loss of air pressure is to strike some obstruction on one side, deflecting the cutting edge, and thus throwing much of the weight of the caisson on the weakened side, making bad worse.

A caisson 8 ft. wide has had its sides so distorted and compressed that there was not room left for a 29-in. bucket to enter the working chamber from the shaft. In this case the working chamber was made much too light to start with, and collapses occurred in the working chamber, and a couple broke in two above the deck and had to be stopped where they were in the quicksand, some 20 ft. above hardpan, and the excavation continued under the cutting edge by lining the sides, as in the case of a vertical tunnel—a very risky proceeding, but successfully accomplished.

Some caissons have been sunk as much as 5 ft. out of plumb, an inexcusable state of affairs for a small caisson, for while we have said that very few caissons are absolutely plumb, still there is no excuse for their being more than a few inches out.

Large concrete steel caissons have been sunk, and in one case it was claimed that by using reinforced concrete the company had saved $100,000, as compared with the cost of the steel caisson they had contemplated; but I have built an equally large caisson, 46 x 130 ft., of wood, the total cost of which was only about $25,000. So if the

cost of the reinforced concrete caisson were compared with a wooden caisson it would be rather difficult to show a saving of $100,000.

In building wooden caissons I very seldom halve the timbers or use dovetailed joints, preferring to use butt joints as much as possible with plenty of drift bolts. The trouble with butt joints, however, is that while a carpenter will make a dovetail or halve-joint fit he will probably leave an inch or so play in a butt joint.

The deck timbers, as well as those in the sides, should be planed on one side and one edge, for the sizes would otherwise vary too much to get a good job, while the planking for the outside and inside of the air chamber should be either tongue and groove, or the sides should be planed for a calking joint. The plank should, of course, have its faces also planed.

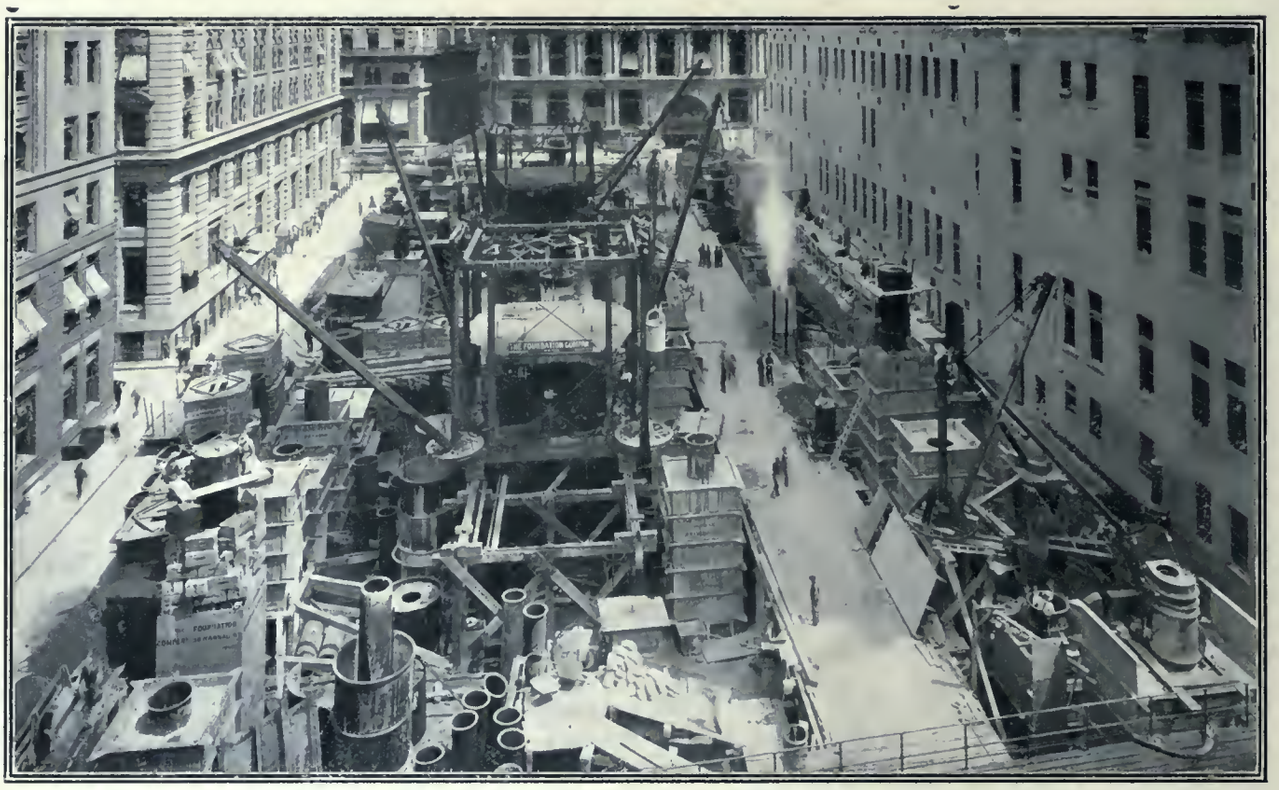
It is very important, and difficult, to keep the water out of the cofferdam, and it requires great care with the calking, for sometimes a joint under the cutting edge is not completely calked, with the result that the water finds its way up through the sides and into the roof or deck and thence through the concrete, forming a very bad leak which it is impossible to stop, as its location cannot be discovered. This often necessitates continual pumping in the cofferdam while new concrete is being deposited, which is, to say the least, of no benefit to the concrete.

One of the most important contrivances on a pneumatic caisson is the air lock, without which the work cannot be carried on.

EARLY AND MODERN AIR LOCKS.

A lock is essentially an air chamber having two doors, one opening to the atmosphere and one into the working chamber or shaft. In the early caissons the lock was placed below the shaft in the working chamber, and when the material was placed in the bucket in the lock, the lower door was shut and the air allowed to escape from the lock, when the upper door was opened, allowing the material to be hoisted out. This was an inconvenient and unsafe position for the lock; in fact, it seems to be about the worst position that could have been selected, for if the caisson became too heavy there would be danger of smashing the lock, and then the lock had to be taken to pieces and taken out before the shaft could be filled. The reason for putting the lock in such an awkward position was probably to permit adding to the shaft and cofferdam without removing the lock, before the idea of having an additional door at the bottom of the shaft in the air chamber occurred to caisson men. This door at the bottom of the shaft is now used when it is desired to lift the lock off temporarily to place more shafting, so as not to permit the air to escape from the working chamber during the operation. The door is also useful in case of emergency or accident.

It probably did not take long for the advantages of placing the lock on top of the shaft to become apparent. But at first the hoisting mechanism was placed inside of the lock—so the bucket would be lifted from the working chamber up into the lock, after which the bottom door would be closed and the material dumped through a side door or lifted up through a top door. Cumbersome and slow as such a method is, requiring the material to be handled twice instead of once, it is still used in Europe, but very seldom in this country.



FOUNDATION WORK IN PROGRESS, NORTH TRINITY AND U. S. REALTY BUILDINGS. EVERYTHING SHOWN IN THIS PICTURE DISAPPEARED BEFORE THE IRON WORK WAS ERECTED.

It was long, however, before this lock was superseded by the modern locks which permit the bucket to be lowered into the air chamber, filled, taken out, emptied and returned to the working chamber without detaching it (if desired) from the cable of the hoisting engine. The first lock to accomplish this time and money-saving result had the top door in two horizontal halves, meeting over the centre of the shaft, having a hole for a stuffing box about 3 or 4 in. diameter at the centre of the joint between the two halves. This stuffing box was so arranged with packing, etc., that the steel cable could pass through it freely without allowing much air to escape. The stuffing box, of course, remained on the cable near the bale of the bucket, when the bucket was taken out of the lock.

It has now been almost entirely discarded, as it has been found by experiment that it is only necessary to

allow a hole on the door or doors sufficiently large for the cable to pass through, and that the resulting loss of air is not sufficient to make a stuffing box (patented) necessary. As there is no object in the cable passing through the bottom door of the lock when the bottom door is shut, the best form for the lower door is a single round door slightly larger than the opening, hinged on one side, and known as a flap door, as it swings up against its door seat and is held there by air pressure. A rubber gasket is usually attached to the door to prevent the air escaping between the door and its seat. The gasket is usually 1-2-in. thick and from 3 to 4 in. wide, in the shape of a ring, about the diameter of the opening.

Thus, in present practice, the derrick lowers the bucket into the lock when the upper doors close against the cable, and after the lock has been filled with air the bottom door is allowed to drop open of its own weight, when there is nothing in the way to prevent the bucket being lowered to the working chamber, filled with material and hoisted into the lock again. Then the lower door is swung up by levers from the outside, the air in the lock allowed to escape, permitting the top doors to be opened, etc., and the entire cycle of filling, emptying and returning a half-yard bucket is performed twenty times an hour; a vast improvement on the old system. Numerous patents have been taken out to get around the origninal patent. One has a circular flap door for the top as well as bottom, the top door having a slot from the side to the centre, permitting the door to shut while the bucket is suspended in the lock, an additional contrivance being required to then close or cover the slot.

Another lock, much more used, has a circular top door, so placed that the edge of the door is directly over the centre of the shaft, permitting the hole for the cable to be put in the side of the door instead of the centre. This requires the lock tender to give the bucket or cable a slight push as the bucket enters and leaves the lock, which he easily accomplishes.

It would seem that every conceivable useful form of lock has been patented, and though there are numerous lawsuits pending, none have been settled.

All the locks described so far have doors which open in, so that when they are shut the air pressure tends to hold them shut, which is the only safe way, for the greater the air pressure the tighter the door will be shut. But to get around the original patents, locks have been built with upper doors which are held on from the outside by means of screws, etc., and when the bucket is taken out of the lock the door remains on the cable with the stuffing box, over the bale of the door. This patent was at once bought up, and as its only use would be to get around other patents, very few of the locks were ever manufactured.

REMOVING MATERIAL BY BLOW PIPES.

In city work the material excavated from the caissons is nearly always removed by buckets through the air locks, but in big river caissons it is usually much cheaper to use "blow pipes." A "blow pipe" is simply an iron pipe, usually 5 in. diameter, from the deck of the air chamber to the surface. At the top is an elbow to deflect the material, and in the air chamber is a flexible pipe connected to the iron pipe; at the lower end of the flexible pipe is a valve. The sand or other material is shovelled up against the valve and when the valve is opened everything in front of it, even good-sized pebbles, is blown out, sometimes 100 ft. or more beyond the end of the pipe. The material can be blown out so much quicker than it can be shovelled against the bottom of the pipe that the valve is necessarily kept closed much of the time.

The blow pipe is operated by simply allowing the compressed air in the working chamber to escape, carrying the material with it, the air pressure, of course, not being increased beyond the pressure required to keep the water out of the working chamber. But as a rule "blowing" is not resorted to until the pressure is about 8 or 10 lbs. per square inch. The men have to be careful not to let their hands get caught, as they would have a good chance of losing them; in fact, the force is so terrific that the very hardest material is required for the upper elbows, and I have seen cast-iron elbows with metal two inches thick worn clean through in a couple of hours, and less. Sometimes big blocks of oak are cut to fit over the elbow and roped on until a new elbow can be obtained.

The contractor for the first caisson for a New York skyscraper attempted to blow out the quicksand—blowing it out very wet and allowing the water with a good deal of sand to escape into the sewers. This was a very economical arrangement at first, until the sewers got "plugged" and the city put a stop to the operation.

METHOD OF CONCRETING WORKING CHAMBER.

Bucket locks are much used for concreting the working chamber as well as for excavating small caissons; but for the large caissons or where there are two shafts, a special concrete lock is used. This is usually an ordinary 3-ft. shaft, with a door in the bottom and a cone above the lower door. The lock is placed on top of the shaft and has a hopper arranged over it. As soon as a yard or so of concrete has been dumped into the lock, the top door is shut and the bottom door is opened, allowing the mass to fall down the shaft into the working chamber. The concrete can thus be taken in about as fast as the men below signal that they are ready for it.

Concrete should be made very wet, wherever possible, but the men in the air chamber do not like it wet at all, and they are always asking for dryer concrete. As long as the concrete is spread in approximately horizontal layers it cannot be too wet, but when it is necessary to bench it around the sides and under the roof it is impossible to use wet concrete. It is customary to fill the air chamber in horizontal layers to within about 3 ft. of the roof and then bench the concrete around the sides and under the deck until there is only a space under the shaft left. The men, of course, prefer, where they can, to keep a working space about 5 ft. high. The concrete is usually carried to within 3 or 4 in. of the roof, and the remaining space is then filled with mortar, packed in place with a wooden rammer about 3 x 1 by 3 ft. long, driven or pounded with an 8-lb. hammer—which gives a very good job, but is, of course, very slow.

Sometimes the concrete is carried up horizontally to within 18 in. of the deck and allowed to set hard, at least 12 hours being necessary, when the air is taken off and wet concrete is dumped down the shaft. The trouble with this method is to be sure that all the spaces under the roof get filled, for no one who has not tried it would believe that the water in the concrete would disappear so completely. I have seen a caisson with two 3-ft. shafts about 6 ft. centre to centre, where the concrete was dumped down one shaft in an absolutely "sloppy" condition, and yet when we suspended work to examine the concrete we found that the concrete was filling the shaft it was dumped in without filling the space under the deck to the adjoining shaft. I have seen concrete dumped into a shaft so wet that one would expect to see a couple of feet of water on top of the concrete, and yet when the work was stopped the concrete looked almost dry.

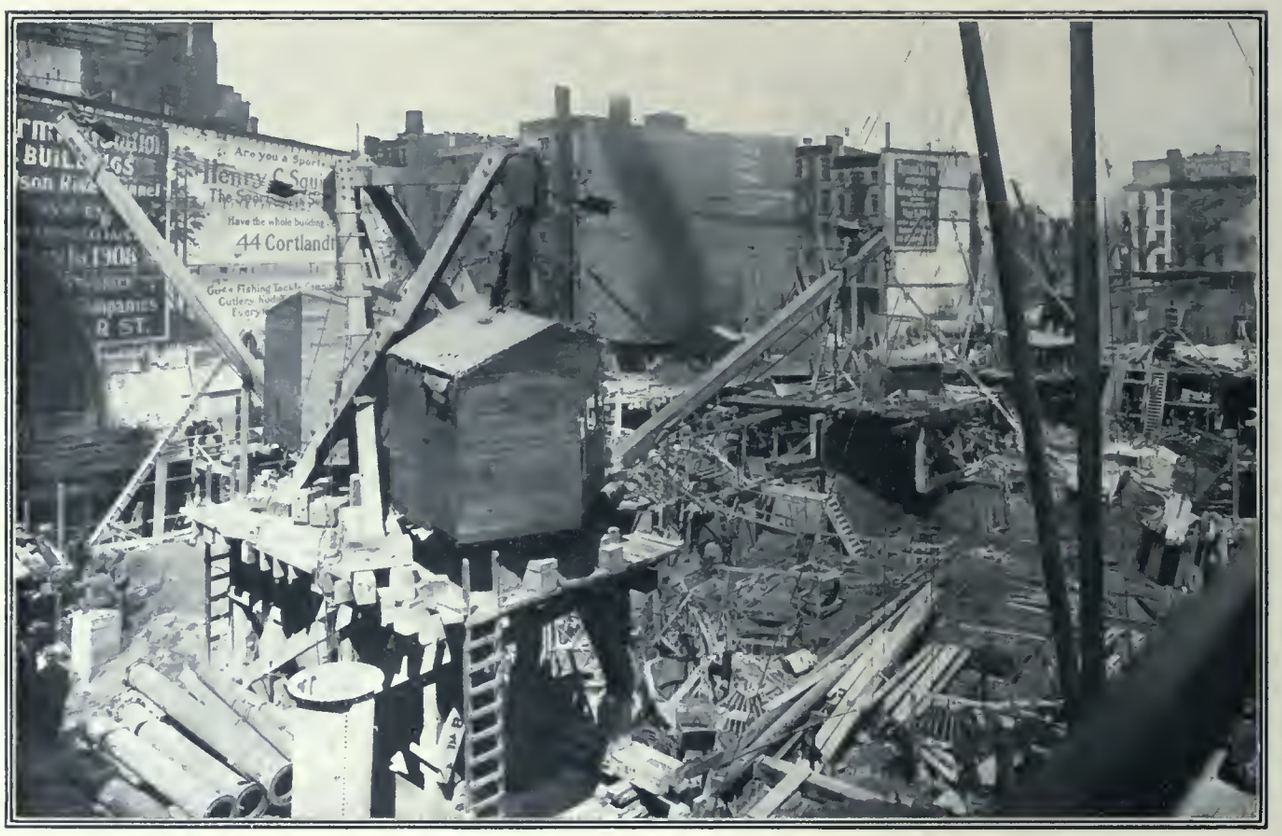
If mortar is made watertight the proportion should never be poorer than one volume of cement to two volumes sand, to insure filling all the voids in the sand. For the same reason the proportion of cement and sand should be the same for concrete where as much stone can be used as can be covered, depending on the smallness of the stone or gravel and the wetness of the mass; much more stone can be used if the stones are small and the mass wet. I have made caissons watertight against a head of 80 ft. of water by concreting to about 6 in. above the cut-

ting edge and then placing a layer of mortar about 2 in. thick and covering this at once with good wet concrete, 1—2—4. And yet many say that it is impossible to make concrete hold water—which, however, is certainly true as far as "dry" concrete is concerned, that is, concrete that requires ramming to bring the moisture to the surface.

The concrete in the cofferdam above the deck should also be put in very wet, and though it is very customary to use a 1—3—5 concrete for this purpose, I would much prefer a 1—2—4 mixture, though the amount of stone could be increased as stated above if judgment is used.

Great care should always be exercised when pumping is necessary to avoid pumping the cement out of the concrete and thus ruining the mass. I have heard a contractor brag of using eight big pumps, with 6 in., 8 in. and 10 in. discharge pipes, on an open cofferdam 30 x 50 ft., while concreting. Small wonder he had not much confidence in concrete after such abuse.

The amount of concrete placed on the deck of the caisson while sinking often depends on the amount of weight required for the penetration. On shore, for instance, the friction on the sides starts at the surface and the concrete on the deck has to be kept above the surface of the ground until all the concrete is in that will be required for the finished structure, when pig iron or other temporary weight has to be added. But in river work, where the water is often from 20 to 60 ft. deep to start with, the caisson would be too heavy if the concrete were kept up to the surface of the water; in fact, sometimes the level of the concrete in the cofferdam of the caisson is as much as 30 ft. lower than the surface of the water, which requires very heavy cofferdam bracing and makes any leak in the cofferdam or deck of the caisson very troublesome and dangerous on account of the great head.



EXCAVATION OF SITE AND CONSTRUCTION OF FOUNDATION FOR THE MC'ADOO TERMINAL BUILDING, NEW YORK CITY, SHOWING THE LARGE ELECTRICAL DERRICK USED IN CARRYING OUT THE WORK.

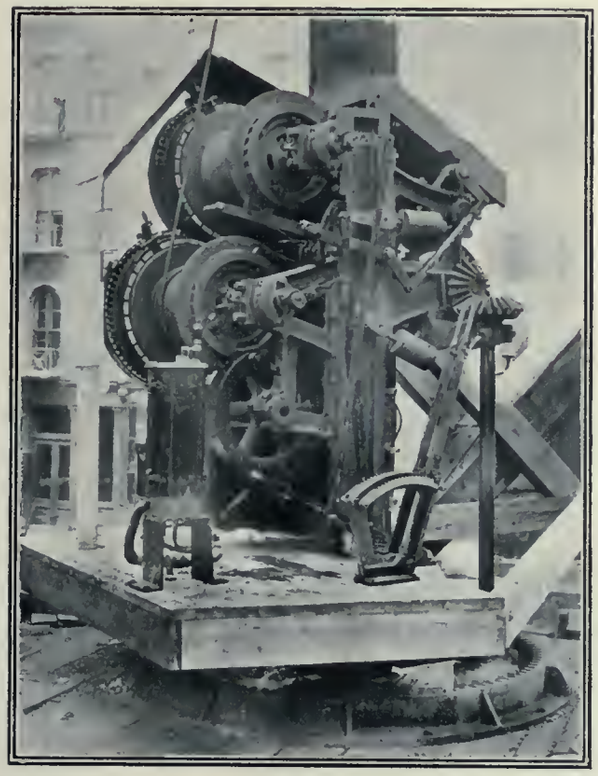
CAISSONS FOR RIVER WORK.

River caissons are usually built either on the shore and skidded or launched into the river, or else they are built on a pontoon, made of two or more parts bolted together. A pontoon is usually made by spacing 12 x 12 in. timbers about 3 or 4 ft. apart and spiking 3-in. plank on the bottom and then building side walls of 3-in. plank about 6 ft. high, the bottom and sides being well calked with oakum, giving a dry platform to build and calk the caisson on. We usually build the sides of the caisson about 14 ft. high above the cutting edge, when we expect the caisson to draw 8 or 9 ft. of water after the pontoon has been removed. But before this is done it is necessary to attach the bottom sections of the excavating and main shafts as well as all air and blow pipes, and gas pipes for electric wires and whistles.

The method usually adopted for removing the pontoon from under the caisson is to weight the center of the pontoon with gravel or stones and remove the bolts which connect the two halves together, and then flood the pontoon by opening a valve or two, which allows the caisson to float and removes the weight of the caisson from the pontoon. The pontoon then acts up against the caisson according to the displacement of the pontoon when submerged, itself, instead of according to the much greater displacement of the caisson. If sufficient weight has been placed on the pontoon, each half will often shoot from under the caisson as it sinks. At other times it is necessary to attach tugs to pull the pontoon sections away, or to rig up a few struts with block and tackle connected to a hoisting so arranged as to force the parts of the pontoon under the caisson down and out. While this is generally the operation of a few minutes, it is often bungled, and it once took several weeks, first because a green man tried to pull the pontoon away without sinking—thus pulling against the entire weight of the caisson, and second, because he allowed enough water to get in to freeze the caisson to the pontoon, and then sank them frozen together—a very expensive lesson.

The pontoon can, of course, be used over and over again, in fact, as often as there are caissons on the job,

unless time is an object, when it will often pay to build two pontoons. Caissons from 60 to 100 ft. long will often take three or four weeks to build, if built by an expert,



ELECTRICAL HOIST FOR MAST USED ON THE FOUNDATION WORK OF THE MC'ADOO TERMINAL BUILDING.

before they are ready to launch, which is a serious amount of time if 10 or 12 caissons are to be sunk in one season.

Caisson work in winter always costs more than if done in the summer, owing to the extra consumption of coal, trouble of packing air pipes to prevent freezing, to say nothing of the danger of ice and floods. Sometimes in silty rivers where, if a channel was dredged to float the caisson it would fill up at once with silt, it is necessary to build the caisson on a platform supported by piles at the site where it is to be sunk and to attach a dozen or so rods about 2 or 3 in. diameter to the cutting edge. The rods being threaded for most of their length and pass through plates held on frames around the caisson in such a way that when the caisson is completed it can be hung from these rods. By turning the nuts on the rods simultaneously the caisson can be lowered until it floats or until the resistance under the cutting edge is sufficient to support the caisson while the cofferdam is being placed on top. The rods are so arranged that as soon as the caisson is landed they can be disconnected and used over again for the next caisson. A caisson can usually be lowered in less than a day by this means, so the expense is not very serious.

It is very important to see that the site for the caisson is level before putting the caisson in position, and if it is not it should be dredged as nearly level as possible, otherwise the caisson will be thrown out of plumb and probably warped at the outset, and then will cause trouble all the way down.

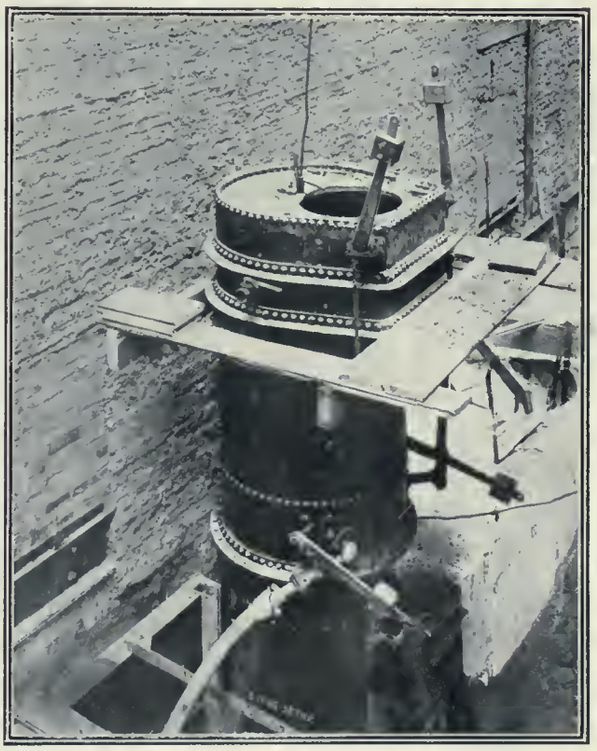
PROPER START IMPORTANT.

The expedient of dumping material in the low shots to level up is a very poor one, as the dumped material will not give nearly as much resistance to the cutting edge as the original surface, and distortion will probably occur. It is an exceedingly difficult matter to handle a warped caisson, and once a caisson is warped it is almost impossible to level it up again. As a caisson which does not start right in this respect seldom finishes right, half the battle is in the start.

Caissons sunk on land are held in place by shoring against any available structure until the cutting edge has penetrated sufficiently far to prevent loss of control. In a recent New York city job the concrete caisson standing 20 ft. in the air was insufficiently shored up, with the result that it fell over—a total wreck—costing the contractors several thousand dollars.

In river caissons clusters of piles are usually driven, when possible, near the four corners about 5 ft. or so away from the caisson, and a guide frame is placed between these piles and the caisson. These piles also serve to attach the sand hog boat house, the derrick boats, as well as scows of sand, stone and cement—making quite a cluster of necessary boats. The derrick boat often carries a 2-cu. yd. concrete mixer with hoppers or bins above to hold the sand, stone and cement, and should have at least two booms, one for unloading the material from the scows, using a clam-shell bucket for the sand and stone; and one to handle the concrete bucket, and when necessary the cofferdam material.

In many cases where the material is "blown out" it can be excavated faster than the cofferdam can be built and calked, so it would sometimes pay to have a separate derrick for building the cofferdam. This rapidity of sinking could not be obtained if the material were excavated by means of buckets, and if the material is to be so handled it would be economy to have a shaft for every 25 lineal feet of caisson length, and even if the material is to be blown out it would pay to have frequent shafts for economy in handling the concrete. But contractors will not as a rule put in so many shafts, for even if the caisson is 130 ft. long, they will probably not use more than two excavating shafts and one main shaft—the latter also being used at the end for concreting the working chamber.



PNEUMATIC LOCK USED ON THE SINGER BUILDING, NEW YORK CITY.

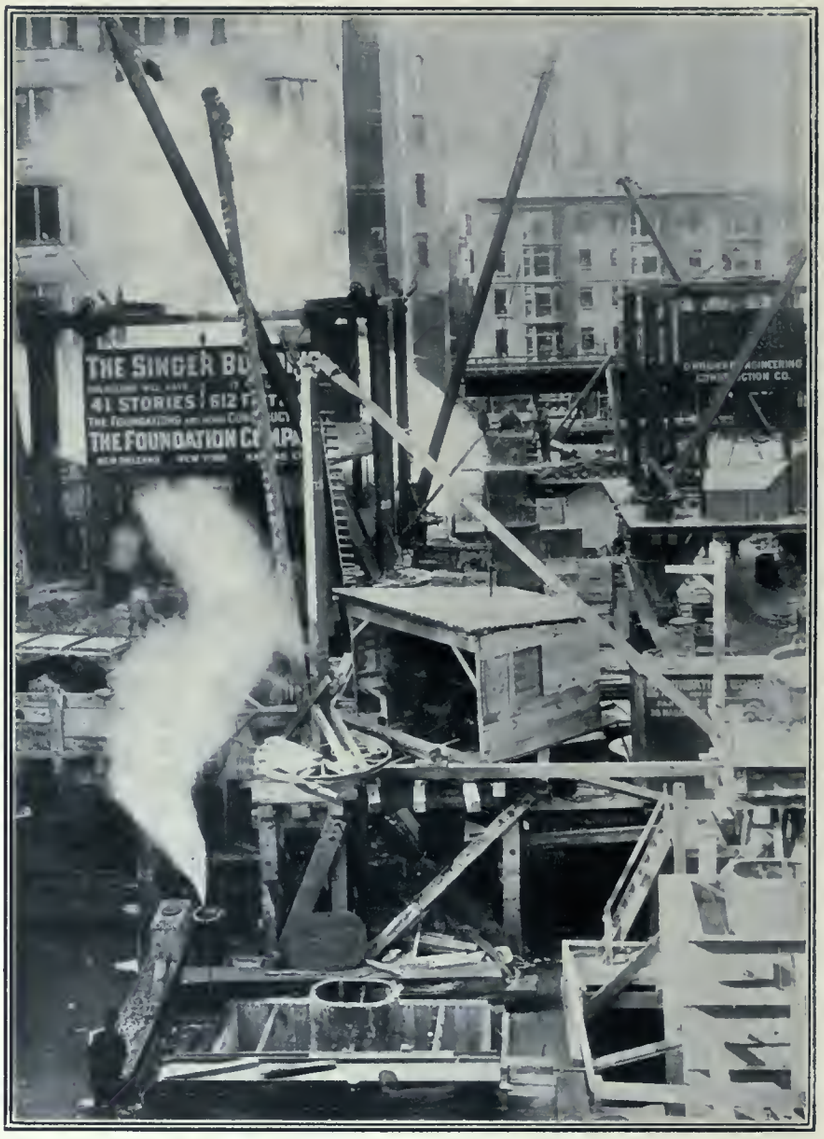
The pipes for supplying the compressed air are generally 4 in. diameter, and there should be at least two from the deck to the top to facilitate changing the con-

nection, etc., as the cofferdam is added to. One 4-in. line is sufficient from the caisson to the compression plant, with smaller pipes for high pressure to operate the locks. In winter it is necessary to place these in a box filled with manure, for I do not know of anything that will freeze quicker than a compressed air pipe.

The compressor plant with electric lighting and pumping plants is sometimes compactly arranged on a big float, though it often pays to place the entire plant on shore alongside of a railroad track on account of coal, etc.

In many cases we find an existing bridge parallel to the bridge under construction where the pipes find plenty of points of support, and in other places a light trestle is built or the piles can be laid directly on the bottom of the river, which, however, is not so desirable.

It is impossible to lay down any cast-iron rule for the size of the plant required, for it will depend not only on the number of caissons to be sunk at the same time, but also on the time of year or climatic conditions. It always pays, however, to have plenty of boiler capacity, say, for a fair-sized bridge, two boilers of 150 h.p. capacity each, or four of 80 h.p. each, while there should always be at least one more compressor than is actually required for the work, to allow for repairs, etc., which are sure to be needed. A work of this magnitude would probably require three or four compressors aggregating from 2,500 to 3,000 cu. ft. of free air per minute.



FOUNDATIONS OF THE SINGER BUILDING AND THE CITY INVESTING BUILDING, NEW YORK CITY, ON WHICH THREE TORONTO GRADUATES WERE ENGAGED IN THE PERSONS OF L. L. BROWN, SUPERINTENDENT ON THE SINGER BUILDING; E. W. STEM, CONSULTING ENGINEER ON THE CITY INVESTING BUILDING, AND T. KENNARD THOMSON, CONSULTING ENGINEER ON BOTH JOBS.

Nothing is so expensive on contract work as delay.

DIFFICULT TO ESTIMATE COST.

Reference has been made to the effect of the weather and locality on the cost of caisson work as regards coal, etc., and I may give two examples, in both of which the work took about one year, winter and summer. The first case was in the East, where there were some 20 medium-sized river caissons using 5,000 tons of coal at $3, making the total cost of coal about $15,000. The second was in the West, and though there were only about one-half as many caissons and the total cubic yards of caisson work was only about one-half in the western bridge than in the eastern one, the amount of coal, owing to the severe weather, was the same, while the price was $8 a ton, making the total cost of coal $40,000, which made the coal in the second bridge cost over five times as much per cubic yard of caisson work for the western bridge as it did for the eastern one, although both were handled by the same contractor, with the same plant and same staff. This is one of the reasons why it is so hard to figure the cost of pneumatic work in advance.

Ed. Note—The second and concluding installment of this article will appear in the December issue.

ARTIFICIAL PAVING STONE. --- New German Combination of Rock Refuse and Cement. ∴ ∴

A GERMAN firm at Wurzburg has recently placed on the market a patented artificial stone, called Vulkanol, for which much is claimed as a paving material. The stone, as described by U.S. Consul H. W. Harris at Nuremberg, is composed of crushed basalt or other similar rocks collected in part as refuse from quarries and mixed with a small percentage of cement. The mixture is subjected to heavy hydraulic pressure and formed into blocks of convenient size for paving. These blocks are then subjected to a process of burning under high temperature in specially prepared furnaces, which process continues for about twelve days. The blocks are then permitted to cool as slowly as possible. This process of manufacture, resembling somewhat remotely nature's process in the formation of volcanic rocks, furnishes the name Vulkanol.

The blocks are of a brown chocolate color, and show on a broken edge a similar color intermixed with white grains and small fragments of feldspar. The blocks are tough in structure and, it is claimed, withstand all the ordinary tests as to crushing, frost, disintegration, and so forth, that they do not become smooth or slippery by use, and are as durable as natural granite. For much-travelled streets, where heavily loaded waggons are in use, a 6-inch concrete foundation is recommended.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION. Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—Joseph Price, 152 Lee Ave., has taken out a permit for the erection of a two-storey brick factory on the north side of Queen street, east, near Ashdale Ave., at cost of $5,000. R. W. S. Chadney is the architect.

Toronto.—Messrs. Stockwell & Henderson, 103 King street west, have taken out a permit for the erection of a three-storey brick store and dye-house at 78-80 King street west, near Bay street, in accordance to plans prepared by architect J. Francis Brown, Board of Trade Building. The building will cost $20,000.

Port Perry, Ont.—The Weber Gas Engine Company, Janes Building, Toronto, will erect a 1 1-2 storey foundry at this place. The building will be of fireproof construction, with brick walls, concrete foundation, concrete floors, expanded metal partitions, steel and iron roof, electric lighting, factory plumbing, producer gas heating, and will cost $50,000. The structure will be equipped with skylights, vaults, and fireproof doors and windows. Architect F. H. Herbert, 65 Adelaide street east, Toronto, prepared the plans.

Alton, Ont.—The Beaver Woollen Mills of this place, owned by Wm. Algis, have been almost totally destroyed by fire. Loss estimated at $20,000, with insurance of $10,000.

Hamilton, Ont.—The People's Brewing Company of this place, have taken out a permit for the erection of a new brewery at an estimated cost of $131,000.

Summerstown, Ont.—The Royal Cheese Factory at this place has been totally destroyed by fire. Loss not stated. The building was owend by Mr. H. McLaren.

Winger, Ont.—The evaporators of the Erie Evaporator Company, at Winger, Ont., owned by Mr. W. J. Aikens, of Dunnville, have been totally destroyed by fire. Loss estimated at $80,000, covered by insurance.

Latchford, Ont.—The Empire Lumber Company's plant at this place has been damaged by fire to the extent of $30,000.

Sarnia, Ont.—Contracts have been awarded as follows for the rebuilding of the Standard Chain Company's building, which was recently destroyed by a wind storm. Mason work, John Forkin; carpenter work, Thos. Grace. A. Crockett, of Pittsburg, manager of the company, will superintend the construction of the buildings.

Montreal, Que.—The contract for the erection of a factory at 161 McCord street, for the General Fire Extinguisher Company, 620 St. Paul street, has been awarded to Chas. Thackeray, 242 St. James street. Plans for the building were prepared by Architect Robt. Findlay, 10 Phillips Place. The structure will cost $17,500. The carpenter work has been sublet to Shearer, Brown & Wills, 225 St. Patrick street.

Quebec, Que.—The planing and sawmills of Onesime Chalibur, at the corner of Princes Edward and Laliberte streets, Quebec, have been damaged by fire to the extent of about $3,000.

Causapscal, Que.—Among the recently incorporated companies is the Matapedia Lumber Company, capitalized at $140,000, with headquarters at Causapscal, County of Matane, Quebec. The incorporators are: Jean Baptiste Napoleon Piche, Odilon Napoleon Piche, Joseph Napoleon Piche, and Joseph Lurger Piche, all of Causapscal, Que., and Ernest E. Piche, Campbellton, N.B. The company is empowered to erect and operate sawmills, pulp and paper mills, and carry on a business of manufacturing woodwork.

New Glasgow, N.S.—Plans have been prepared for a new steel building, 135x50 ft., to replace the factory of the Humphrey Glass Company, which was recently destroyed by fire.

Glenwood, N.B.—Two large lumber mills at this place, owned by the Newfoundland Timber Estates, have been destroyed by fire. Loss estimated at approximately $100,000.

Hunter River, P.E.I.—The Starch Factory at this place has been completely destroyed by fire, entailing a loss of about $8,000, half of which is covered by insurance.

Vancouver, B.C.—A joint stock company will be organized by John Hanbury, Brandon, for the purpose of erecting a large sawmill on False Creek, near the south end of the new Granville street bridge, at this place. Mr. Hanbury is president of the Hanbury Manufacturing Company which owns mills in Brandon and the Kootenays.

Port Moody, B.C.—The British Columbia Refining Company has secured a site of eight and a half acres, with water frontage of 1,500 feet, at this place, on which they will erect an oil refinery, with an annual capacity of 72,000 barrels. Work on the plant, which it is estimated will cost $150,000 will be commenced shortly, and it is expected that the structure will be completed by March next. The enterprise is being promoted by Mr. Leon Melekov, of Vancouver. The officers of the company are: Messrs. Robert Kelly, T. F. Neelands, A. M. Tyson, Hugh McLean, Major J. Duff Stuart, and Colonel Tracy of Vancouver: Mayor Keary of New Westminster; and Fred L. King, President of the Keystone Oil Company, Ltd., of Seattle.

Gas Plants, Elevators and Warehouses

Toronto.—A. Campbell has been awarded the contract for alterations to warehouse on Don Esplanade, near Blevin Place, for H. B. Johnson, 137 River street. The improvements will cost $14,000.

Toronto.—Messrs. Wilson & Warden, 174 King street east, have awarded the contract for a two-storey and basement brick office and warehouse to be built at 60 Duchess street, near George street, at cost of $12,000, to Dancy Bros., 340 Palmerston Boulevard. Plans for the structure were prepared by Architect Geo. R. Harper.

Toronto.—The contract for a two-storey brick storage warehouse to be erected on College street, near Bellome Ave., at cost of $10,500, has been let to Self Bros., 78 Howard street. Wickson and Gregg are the architects.

Hamilton, Ont.—The Domestic Specialty Company's warehouse at this place, which was recently damaged by fire to the extent of $5,000, will be rebuilt at once.

Fort William, Ont.—The contract for the new Grand Trunk terminal elevator to be erected here, has been awarded to Messrs. James Stewart & Co. The elevator will have a capacity of 4,000,000 bushels, and will be absolutely fireproof.

Fort William, Ont.—Mr. W. J. Ross, of this place, has taken out a permit for the erection of a warehouse to cost $4,000.

Wyoming, Ont.—Mr. A. Laing's grain warehouse at Wyoming, Ont., has been destroyed by fire. Loss not stated.

London, Ont.—The Hobbs Manufacturing Company have taken out a permit for the erection of a one-storey frame storage building on Ridout street.

Montreal, Que.—Architects Mitchell & Creighton, Inglis Building, have awarded to Thos. O'Conner, 183 Ottawa street, the contract for plumbing and heating system to be installed in the new Lyman warehouse.

Montreal, Que.—Damage in the neighborhood of $50,000 was done by fire to one of the warehouses of the Montreal Cotton and Wool Waste Company, Ltd., 34 Duke st., Montreal, the loss amounting to about $12,000. S. E. Linchtenheim, managing director, states that the company, will rebuild immediately.

Winnipeg, Man.—The Scottish Co-operative Society has decided to at once erect six elevators in Manitoba, along the Grand Trunk Pacific. Others will be built next year. The company has a representative in the Grain Exchange at Winnipeg.

Victoria, B.C.—Tenders were recently opened for a cold storage warehouse to be erected at a cost of $100,000, for the B. Wilson Company, Limited. The building, which will be erected on Herald st., will be three storeys and basement in height, and will be equipped with a modern elevator service, tile floors in office, and other modern features. The power and machinery equipment includes two large boilers and an electric generator. Hooper & Watkins, of Victoria, are the architects.

Electrical Construction

Glencoe, Ont.—A by-law will be submitted to the local ratepayers on November 16, for the purpose of authorizing the expenditure of $11,000 for the establishment of a municipal electric light plant.

Montreal, Que.—Mr. Cowie, Engineer of the Harbor Commission, is preparing plans for an electric plant to be erected at a central point on the harbor front, for the production and distribution of power required for every purpose along the harbor.

Vancouver, B.C.—Revised plans for extensive improvements to be made by the British Columbia Electric Railway, in the way of developing the hydraulic and generating equipment of its plant at Lake Buntzen, have been prepared. According to the new plans the hydraulic equipment will be so changed as to have a capacity of 52,000 horse-power, and the electrical units to be installed will be equal to this amount. The work also involves extensive tunnel improvements and the construction of a massive dam at the outlet of Lake Coquitlam.

Bridges, Wharves and Subways

Toronto.—City Engineer Rust estimates the cost of constructing the proposed viaduct from Niagara and Wellington sts., over the railway tracks to Garrison Commons, at $165,000.

Toronto.—Plans are being prepared for the construction of a new bridge to cross the Don at the foot of Winchester street. The estimated cost of the structure, $15,000.

Hamilton, Ont.—It is reported that a new steel bridge will be built over the C.P.R. and T.H. & B. tracks at Garth street.

Michipicoten River, Ont.—Tenders will be received up to 4.30, November 27, for the construction of a wharf at the mouth of the Michipicoten River, District of West Algoma, Lake Superior, Ont., according to plans and specifications on file at the office of J. G. Sing, Resident Engineer, Confederation Life Building, Toronto; E. B. Temple, Resident Engineer, Port Arthur; Postmaster at Michipicoten River, Ont.; and at the Department of Public Works, Ottawa.

Pelee Island, Ont.—Tenders will be received up to 4.30 p.m., November 23, for the construction of an extension to the west wharf at Pelee Island, Essex County, Ontario, according to plans and specifications on file at the offices of J. G. Sing, Resident Engineer, Confederation Life Building, Toronto; H. J. Lamb, Resident Engineer, London; Postmaster at Pelee Island; and at the Department of Public Works, Ottawa.

Peterboro, Ont.—A by-law will be submitted to the local ratepayers in January next, for the purpose of authorizing the construction of a new bridge at Smith street.

Port Hope, Ont.—At a meeting of the Town Council it was decided to accept the tender of W. G. Gibson for the construction of the new bridge on Walton street, subject to plans and specifications to be prepared by the solicitor and Street and Bridge Committee. The bridge will cost $3.095.

Providence Bay, Ont.—Tenders will be received up to 4.30 p.m., November 16, for the construction of an extension to the wharf at Providence Bay, Township of Carnarvon, Manitoulin Island, Algoma, Ont., according to plans and specifications on file at the offices of J. G. Sing, Resident Engineer, Confederation Life Building, Toronto; H. J. Lamb, Resident Engineer, London Ont.; the Postmaster at Providence Bay, Ont., and at the Department of Public Works, Ottawa. Nap. Tessier, Secretary, Department of Public Works.

Missanabie, Ont.—The C.P.R. bridge near Missanabie, Ont., has been destroyed by fire. The structure will be rebuilt.

Stratford, Ont.—At a meeting of the City Council it was decided to accept the offer of the Grand Trunk Railway Company to build a new steel bridge at this place.

Montreal, Que.—Mr. Cowie, Engineer of the Harbor Commission, is preparing plans for the construction of a new dry dock to be equipped with all the latest devices.

Montreal, Que.—The Harbor Commissioners are arranging for the construction of a cement wall or case along the piers, to protect the piles from decay. This work will be carried on as soon as the necesary funds are available.

Lake St. John, Que.—The bridge spanning the Assouapmouchouan River, Lake St. John district, has been destroyed by fire. The bridge, which was of wood, was constructed by the Provincial Government at cost of $20,000. It will probably be replaced by a more substantial structure.

St. Andre, Que.—Tenders will be received up to 4.30 p.m., November 23rd, for the construction of an extension to wharf at St. Andre, Kamouraska County, Province of Quebec, according to plans and specifications on file at the office of J. L. Michaud, Resident Engineer, Merchants Bank Building, Montreal, P.Q.; A. R. Decary, Resident Engineer, Post Office Quebec, P.Q.; the Postmaster at St. Andre de Kamouraska, P.Q.; and at the Department of Public Works, Ottawa.

Three Rivers, Que.—Tenders will be received up to 4.30 p.m., November 27, for the construction of a timber dock and ice breaker at Three Rivers, according to plans and specifications on file at the offices of A. Decary, Resident Engineer, Post Office, Quebec; Chas. Desjardins, Clerk of Works, Post Office, Montreal; F. X. Berlinger, Resident Engineer, Three Rivers; and at the Department of Public Works, Ottawa. Nap. Tessier, Secretary, Department of Public Works, Ottawa.

Devil's Island, N.S.—Tenders will be received up to 4.30 p.m., November 19, for the construction of an extension to the breakwater at Devil's Island, Halifax County, N.S., according to plans and specifications on file at the offices of C. E. W. Dodwell, Resident Engineer, Halifax, N.S.; E. G. Millidge, Resident Engineer, Antigonish, N.S.; the Postmaster at Eastern Passage, N.S.; and at the Department of Public Works, Ottawa. Nap. Tessier, Secretary, Department of Public Works, Ottawa.

Minasville, N.S.—Tenders will be received up to November 19, for the construction of a breakwater at Minasville, Hants County, N.S., according to plans and specifications on file at the offices of C. E. W. Dodwell, Resident Engineer, Halifax, N.S.; E. G. Millidge, Resident Engineer, Antigonish, N.S.; the Postmaster at Minasville, N.S.; and at the Department of Public Works, Ottawa. Nap. Tessier, Secretary, Department of Public Works, Ottawa.

Lower Caraquet, N.B.—Tenders will be received up to 4.30 p.m., November 16, for the construction of a wharf at Lower Caraquet, Gloucester County, N.B., according to plans and specifications on file at the offices of E. T. P. Shewen, Resident Engineer, St. John, N.B.; Geoffrey Stead, Resident Engineer, Chatham, N.B.; the Postmaster at Lower Caraquet, N.B.; and at the Department of Public Works, Ottawa.

Fredericton, N.B.—The City has laid a request before the Hon. Dr. Pugsley, Minister of Public Works, for an appropriation of at least $20,000 for the construction of new wharves at this place.

St. John, N.B.—Tenders will be received up to 4.30 p.m., Nov. 20, for the construction of a wharf at Partridge Island, St. John Harbor, St. John County, N.B., as per plans and specifications on file at the offices of E. T. P. Shewen, Resident Engineer, St. John, N.B.; Geoffrey Stead, Resident Engineer, Chatham, N.B.; and at the Department of Public Works, Ottawa. Nap. Tessier, Department of Public Works, Ottawa.

Harvey Bank, N.B.—Tendegs willl be received up to 4.30 p.m., Nov. 20, for the construction of an extension to Dow's Wharf at Harvey Bank, Albert County, N.B., according to plans and specifications on file at the offices of E. T. P. Shewen, Resident Engineer, St. John, N.B.; Geoffrey Stead, Resident Engineer, Chatham, N.B.; the Postmaster at Harvey, N.B., and at the Department of Public Works, Ottawa. Nap. Tessier, Secretary, Department of Public Works, Ottawa.

Winnipeg, Man.—The Transcontinental Railway engineers have submitted to the special committee of the City Council for approval, plans for the proposed bridge across the Red River, from Lombard street to the St. Boniface side. The plans provide for two separate superstructures on the same abutments, one for the G.T.P. and the other for street cars, roadway and footpath. Estimates will be submitted on approval of the plans.

Waterworks, Sewers and Canals

Hamilton, Ont.—The Fire and Water Committee has awarded to the John Montgomery Company, of Toronto, the contract for a system to pump water to the mountain top. Contract price, $6,500. The contract calls for a compressor, motor, four tanks and two water elevators.

Hamilton, Ont.—Contracts have been awarded as follows for the Hamilton Waterworks system, viz.: Pumps, John McDougall Co., contract price, $7.220; motors, Canadian Westinghouse Company, Hamilton, contract price, $12,928. The latter company also secured the contract for the installation of the new pumps and motors for the Beach pumping house. Their tender was $20,148.

Burlington, Ont.—A by-law will be submitted to the local ratepayers for the purpose of authorizing the installation of a waterworks system at this place.

Owen Sound.—At a meeting of the City Council it was decided that a by-law be submitted to the ratepayers in January for the purpose of authorizing the expenditure of $100,000 for an extension of the local waterworks system.

Trent Canal.—Tenders will be received at this office up to 4 p.m., Nov. 17, for the works connected with the construction of the Lindsay section of the canal. Plans and specifications can be seen, and forms of tender obtained at the office of the Chief Engineer of the Department of Railways and Canals, Ottawa, and at the office of the Superintending Engineer, Trent Canal, Peterboro. L. K. Jones, Secretary, Department of Railways and Canals, Ottawa.

Vancouver, B.C.—The following contracts have been awarded in connection with the extensions to the Waterworks System at Vancouver, B.C., viz.: Steel mains, Thomas Piggott, of Glasgow, per W. Beverly Robinson, contract price $59,939; cast iron pipe, A. J. Forsyth, Vancouver, contract price, $29,491; pipe for main at Second Narows, Evans, Coleman & Evans, Vancouver, contract price, $44 per ton; 100 Ludlow hydrants, Robertson-Godson Company, Vancouver, contract price, $40.50 each.

Saskatoon, Sask.—The by-laws to authorize the raising of $30,610 for the extension of the sewarage system and $26,000 for the extension of the waterworks system, Saskatoon, Sask., have been given their second reading.

Saskatoon, Sask.—Messrs. McVean & Craig, Prince Albert, Sask., have been awarded the contract for the construction of the extensions of the sewers and waterworks systems at this place to the new City Hospital and Alexandra School.

Railway Construction

Toronto.—At a meeting of the City Council it was decided to construct an independent street car line from the centre of the city, along Adelaide St., to the north-west section of the city.

Hyde Park, Ont.—The Grand Trunk Railway is negotiating for a site at Hyde Park, five miles from London, on which to erect a new station. A new siding will also be built.

Ottawa.—The Canadian Western Railway Co. will make application at the next session of Parliament for articles of incorporation for the purpose of constructing, equipping, maintaining and operating a railway system in the Western portion of Canada.

Fort William, Ont.—Tenders were recently opened by J. Oakley, Chairman of Street Railway Committee for the construction of the street railway car barn and machine shop for the city of Fort William. The buildings will be of brick and reinforced concrete, with steel roof trusses, and will cost $30,000. H. S. Hancock, City Engineer, is the architect.

The Grand Trunk Pacific Railway has decided to at once erect ten station buildings at various points along the line where depots have not as yet been provided. Tenders for these buildings will be called for in the near future.

Montreal.—The Grand Trunk Railway is contemplating the installation of a block system on the main line from Montreal to Sarnia, and also from Sarnia to Chicago. It is believed that the work will be started in the spring, and will cost about $1,350,000 for the 900 miles of track.

Montreal.—It is reported that Chief Engineer R. G. Kelly is at work on a new terminal scheme for Montreal, which will involve a cost of several millions of dollars. The plans in contemplation include the construction of an air line from the Victoria Bridge to Bonaventure station, where it is proposed to locate the terminal structure.

Montreal.—The new Grand Trunk Railway ticket offices, at the corner of St. James and St. Francois Xavier Sts., have been badly damaged by fire. Loss not stated.

Winnipeg, Man.—The contract for the construction of new carshops, etc., for the Winnipeg terminals of the National Transcontinental Railway, has been awarded to Messrs. Thomas Kelly & Sons, of this city. The work, which calls for the expenditure of about $500,000, will be commenced at once.

Winnipeg, Man.—J. H. Tremblay, St. Boniface, Man., has been awarded the contract for the two large freight sheds to be rected near the Union Depot, in the C.N.R. yards, for the joint use of the Grand Trunk Pacific and the Canadian Northern, at a contract price of $92,749. The buildings, which will be of structural steel, will be 500 feet long, one being 40 and the other 50 feet wide.

Winnipeg, Man.—The Grand Trunk Pacific Railway has awarded to the Carter-Halls-Aldinger Company, of this city, the contract for the erection of three sta-

tion buildings at the following places, viz.:Wainwright Biggar and Waterous, Sask. The total cost of the structures will be approximately $40,000.

Victoria, B.C.—Chas. M. Hayes, general manager of the Grand Trunk Pacific Railway, announces that tenders will be called for in the immediate future for the construction of an additional 200 miles of railway west of Wolfe River, extending well into British Columbia.

Saskatoon, Sask.—The Canadian Northern Railway will, in all probability, let the contract this fall for the erection of a new station building at this place.

Saskatoon, Sask.—The Canadian Northern Railway will immediately start the erection of new freight sheds on First avenue, between Twentieth and Twenty-first streets. The plans call for a building 240 feet long by 40 feet wide, of metal clad construction, with hardwood floors.

Business Buildings

Toronto.—Architects Ellis & Connery, Manning Chambers, are preparing plans for a large department store building to be erected upon the circle now occupied by Knox College, for the British-Canadian Departmental Stores, Limited, London. The building will be 368 feet square in ground dimensions, and twelve stories in height, having granite and marble for the three lower stories, above which will be glazed terra-cotta. The frame of the building will be of steel and concrete construction. The elevator service will include 21 passenger and eight hydraulic plunge elevators. A large glass canopy, arching into domes at the entrances, which will have revolving doors, will extend around the building over the first story. A complete power and machinery plant will be installed for the purpose of providing light, heat and ventilation. It is estimated that the building will cost $1,250,000.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for five stores and dwellings to be erected at the north-west corner of Bloor street and Brunswick avenue for Geo. Phillips, 586 Huron street, at an estimated cost of $25,000. The building will be three stories in height, of pressed brick construction, with stone foundation, slate roof, maple floors, pine interior finish, open plumbing, combination lighting, steam heating, plate glass display windows, electric bells. The owner will purchase the necessary materials for the mason and carpenter work, which he will do himself; contracts for the other branches of the work will be sub-let.

Hamilton, Ont.—The McLaughlin Carriage Company has purchased a property on King street, near the corner of Bay street, on which they will erect a new $15,000 building.

Fort William, Ont.—W. J. Pierson, contractor, has been awarded the contract for the erection of the Enzer block on Simpson street.

London, Ont.—Tenders have just been opened for the construction of two stores etc., adjoining the Oddfellow's building, for the London Loan Company. Plans and specifications for the building were prepared by W. G. Murray, architect, Masonic Temple.

Glencoe, Ont.—Messrs. R. F. Howard & Son have purchased the site adjoining their present building, on which they will erect a new structure, two stories in height, 44 by 90 feet.

Montreal.—J. C. Cusson, 96 Agnes St., has taken out a permit for the erection of three buildings, containing three stores and five dwellings, on St. James street, at cost of $13,000.

Montreal.—Architects Mitchell, Creighton & Creighton, Inglis Building, have awarded to Geo. Heavins, 46 Bleury St., the general contract for the building to be erected on Lorne Crescent avenue for Messrs. Fraser Bros.

Montreal.—The Castle Blend Tea Co., Limited, have taken out a permit for the erection of two store buildings at 382 St. James street, Montreal, at cost of $7,000. Architects Saxe & Archibald, 59 Beaver Hall Hill, prepared the plans.

Montreal.—Contracts have been awarded as follows for alterations to residence, to be changed into stores, on St. Denis street, near St. Catherine street, for Mr. J. Beaudry, viz.: Steel, Dominion Bridge Company; plumbing and roofing, John Date; carpentry, Jos. Marcotte; masonry, and brick, M. Huberdeau, all of Montreal.

Montreal.—The establishment of O. Poirier, dealers in leather, etc., on St. Paul street, has been damaged by fire to the extent of $8,000.

Montreal.—The Prevost Estate Property, which has a frontage on St. Catherine street of 128 feet and 271 feet on Mountain street, has been purchased by J. Stephenson Brown, real estate agent, Guardian Building. It is quite probable that a large building will be erected on this property, of which information will be given later.

Three Rivers, P.Q.—The Bell Telephone Company have awarded the general contract for the erection of its new Exchange Building, to be built here, to C. E. Deakin, 11 St. Sacrament street. Montreal. J. W. Carmichael, also of that city, is the architect.

Minitonas, Man.—Messrs. Foley & Larson's general store, at this place, has been destroyed by fire. Loss estimated at $16,000, partly covered by insurance.

Brandon, Man.—Messrs. Nation & Maybee, have taken out a permit for the erection of a brick store building on the corner of Ninth street and Pacific avenue, at a cost of $5,000.

Edmonton, Alta.—The floors of the wholesale building of Foley, Lock & Larson, at this place, have collapsed. The building, which is practically new, is three stories in height, of solid brick construction. The damage is estimated at over $100,000.

Edmonton, Alta.—C. L. Carsley has taken out a permit for the erection of a store and office building on First street, at an estimated cost of $9,500.

Public Buildings

Toronto.—The Parks Committee has again sent on to Council the recommendation that the proposed palm house in Allan Gardens be built. The matter has been referred back to allow of lavatories and a boiler house being added to the plan, but the committee made no change. The building will cost $30,000. City Architect McCallum is the designer.

Toronto.—The Property Committee has forwarded to the City Council the report of Commissioner Harris, recommending the erection of a new registry office on a property near the City Hall.

Toronto.—Messrs. Keith & Fitzsimmons, 111 King street west, have been awarded the contract for installing the electric wiring and fixtures in the circulation department of the new Carnegie Library on College street.

Collingwood, Ont.—The Main Exhibition building, at this place, has been destroyed by fire. Loss estimated at approximately $8,000. It is proposed to erect a one-story building to replace same.

Kingston, Ont.—R. N. F. McFarlane has been awarded the construction of the city hall dome at a contract price of $12,135. It will be of wood construction.

Niagara-on-the-Lake, Ont. — Messrs. Baker & Jordhal, Manning Chambers, Toronto, have been awarded the contract for the Rifle Range to be constructed at Niagara-on-the-Lake for the Dominion Government.

Montreal.—The City Morgue has been damaged by fire to the extent of $15,000.

Montreal.—Estimates are being prepared on fire escapes for the City Hall. It is proposed to ask the Finance Committee for the necessary funds, which is approximated at $6,000.

St. John, N.B.—The Executive of the Exhibition Association is contemplating the erection of new exhibition buildings at this place.

Vancouver, B.C.—The Board of Park Commissioners have decided to ask the City Council to submit a by-law to the ratepayers for the purpose of authorizing the expenditure of the sum of $35,000 for new improvements. Of this sum $25,000 will be required for the proposed new bath house at First Beach, the remaining $10,000 to be used in providing athletic grounds, etc. Plans prepared by Architect C. E. Blackmore for the proposed bath house, have been approved. The plans provide for a building of white concrete, with tile floor, eight shower baths, etc.

Vernon, B.C.—Tenders, addressed to the undersigned, will be received up to 4.30 p.m., Nov. 20, for the construction of a public building at Vernon. Plans and specifications can be seen and forms of tender obtained at this Department and on application to the Postmaster at Vernon, B.C. Nap. Tessler, Secretary, Department of Public Works, Ottawa.

Banks

Revelstoke, B.C.—Architect A. F. Dunlop, Lindsay Building, Montreal, has prepared plans for a branch bank building to be erected here for the Molsons Bank.

Clubs and Societies

Toronto.—The Lakeview Curling Club, 146 Harrison street, Toronto, has taken out a permit for the erection of a one-story brick curling club building at the above address. Architects Denison & Stephenson, 20 King street west, are the designers of the building.

London, Ont.—St. John's Athletic Club has taken out a permit for the erection of a club house at the corner of Oxford and Waterloo streets.

Ottawa, Ont.—The Board of Management of the King's Daughters have purchased the property known as Berwick Hall, No. 219 Laurier avenue west, and will either make extensive alterations and additions to the building or erect an entirely new structure on this site.

Walkerville, Ont.—The Tecumseh Boat Club has decided to erect a new clubhouse on a site adjoining the Pratt farm. The property has a frontage of 138 feet. Plans for the proposed building have been prepared by Messrs. Porter and Kerrigan, of the Canadian Bridge Company, and are at present in the hands of Architects Watt & Crane, who will make the required alterations, and who will superintend the construction of the building. The structure, which will be of frame and plaster cast construction, will cost in the neighborhood of $6,000, exclusive of plumbing, heating and lighting.

Montreal.—Architects Saxe & Archibald, 51 Beaver Hall Hill, have awarded the contract for alterations and interior decorating in the Masonic Temple on Dorchester street to Thomas Wand, 326 Laval avenue.

Nelson, B.C.—Tenders have recently been called for the new block to be erected on Baker street by the Fraternal Order of Eagles. The building will be two stories and basement in height, of brick and stone construction; the first floor and basement to be used for stores and the second floor for lodge purposes. The main hall will be 34 by 65 feet, and will have a parquetry flooring.

Asylums and Hospitals

Toronto.—The site for the new General Hospital, to be erected on College street, has been purchased. The property acquired is bounded on the north and south by College and Hayter streets, and on the east and west by Elizabeth street and University avenue, and has a frontage of about 725 feet, with depth of 620 feet. Architects Darling & Pearson, 2 Leader Lane, are preparing new plans for the building, which, it is estimated, will cost about $1,112,000. The president of the General Hospital Board is J. W. Flavelle.

Ottawa, Ont.—The sum of $30,000 has been subscribed so far for the new hospital building to be erected at Bayswater, by the Anti-Tuberculosis Society of Ottawa. Of this sum, $10,000 will be contributed by the Daughters of the Empire.

Kingston, Ont.—At a meeting of the City Council it was decided to erect an isolation hospital, to accommodate twenty patients, on the smelter site. Estimated cost of building, $2,500.

Hamilton, Ont.—At a meeting of the Hospital Board it was decided to ask the City Council to submit a by-law to the ratepayers next January for the purpose of authorizing the expenditure of $25,000 to complete the Fever Hospital, and to further equip the Nurses' Home.

Montreal.—The Montreal League for the Prevention of Tuberculosis has accepted Lt.-Col. Burland's offer of $50,000 for a tuberculosis dispensary and institute, providing they would give an ad-

ditional $50,000 as an endowment fund. Co. Burland has purchased a building, on Belmont Park, at a cost of $30,000, and is having plans prepared for its conversion into a combined hospital and dispensary, at an additional cost of $20,000. It is expected that the building will be completed by May 1st next.

Regina, Sask.—Ald. Thompson states that the excavation work for the new Municipal Hospital to be erected at this place will be commenced in the near future, and the foundations will, in all probability, be completed this fall. Tenders will be called for as soon as the plans are completed.

Residences and Flats

Toronto.—Architects Ellis & Connery, Manning Chambers, have prepared plans for an eighteen suite apartment building to be erected on Carlton street, near Parliament street, for J. Curry. The building will be of solid brick construction, with stone trimmings, tar and gravel roof, marble and tile work in entrance, hardwood interior finish, gas and electric lighting, open plumbing and steam heating.

Toronto.—Architect W. G. Hunt, 255 Westmoreland avenue, has prepared plans for two semi-detached two and one-half story dwellings to be erected at 252 Westmoreland avenue for J. Bulger, Bartlett and Van Horne streets, at cost of $7,600. The building will be of brick construction, with stone foundation, shingle roof, pine floors, pine interior finish, open plumbing, hot air heating, combination lighting, plate and art glass and electric bells.

Toronto.—Architect W. G. Hunt, 255 Westmoreland avenue, has prepared plans for a two and one-half story brick residence to be erected at 184 Howland avenue, for Mr. Condes, at cost of $4,000. The building will have stone foundation, shingle roof, oak floors, pine interior finish, open plumbing, hot water heating, combination lighting, plate glass, electric bells and one mantel. The general contract for the building has been awarded to M. Wallace, 489 Church street.

Toronto.—J. W. Devitt, 92 Albany avenue, has taken out a permit for the erection of three pairs of two-story and attic semi-detached brick dwellings on the east side of Palmerston avenue, near London street, at cost of $15,000. The building will be erected by the owner.

Toronto.—The contract for the erection of a two-story and attic brick dwelling on the west side of Poplar Plains Road, near St. Clair avenue, for C. E. Potter, of the City Dairy Company, has been let to J. W. Ham, 490 Givens street. Plans for the building, which will cost $9,000, were prepared by Architect J. H. Stanford.

Toronto.—Architect E. G. Wilson, 77 Victoria street, has prepared plans for a two story residence to be erected on Castle Frank avenue, for D. C. Smith, 33 Rose avenue, at an estimated cost of $4,500. The building will be of brick construction, with brick foundation, shingle roof, oak floors, oak and pine interior finish, open plumbing, combination heating, hot water heating, one dumb waiter, art glass, electric bells and four mantels. The building will be erected by the owner, and the first story will be faced with cement stucco.

Toronto.—Mr. Geo. Phillips, 556 Huron street, has purchased the property at the north-west corner of Bloor street and Brunswick avenue, on which he will erect a block of stores, with apartments above, at cost of approximately $75,000. The site has a frontage of about 77 feet on Bloor street, with depth of about 110 feet.

Toronto.—The Keltz Building Company, care of Architect W. G. Hunt, 255 Westmoreland avenue, who designed the structure, has taken out a permit for the erection of six pairs of brick veneer front and roughcast dwellings on the west side of Gladstone avenue, near Haila street, at cost of $18,000.

Toronto.—L. J. Bland, 18 Vermont avenue, has taken out a permit for the erection of three pairs of two-story semi-detached brick dwellings on the south side of Dupont street, near Christie street at cost of $12,000.

Toronto.—Architect J. H. Stanford, Yonge Street Arcade, has prepared plans for the erection of a residence at 657 Palmerston avenue for J. W. Devitt, 92 Albany avenue, at cost of $4,000. The building will be of brick construction, with stone foundation, slate and gravel roof, pine floors, pine interior finish, open plumbing, combination lighting, hot air heating. The contract for the mason work has been awarded to F. W. Weale, 55 Linusay avenue.

Toronto.—R. C. Vaughan, 639 Huron street, has taken out a permit for the erection of five pairs of two-story, semi-detached brick dwellings on the south-east corner of Dupont street and Howland Road, at cost of $20,000.

Toronto.—Messrs. Love Bros., Limited, 1000 Gerrard street east, have taken out a permit for the erection of three pairs of two-story semi-detached brick veneer front and roughcast dwellings on the east side of Logan avenue, near Gerrard street, at cost of $10,800. Architect, F. H. Finney, 43 Victoria street. The owners will do the construction work.

St. Catharines, Ont.—Contracts have been awarded as follows for a two-storey 30 by 44 feet frame residence to be erected for Miss F. Richardson: Masonry, cement work and plastering, W. Bennett; carpentry work, Williams & Nesler; heating, plumbing and sheet metal work, John Peart. Architect A. E. Nicholson prepared the plans.

Hamilton, Ont.—Alanson Moote has taken out a permit for the erection of three brick dwellings at the corner of Stinson and Ontario avenue, at cost of $8,400. A permit was also granted to M. M. Webb for the erection of six brick dwellings on McNeil street, east of Queen street, at estimated cost of $12,000.

Brantford, Ont.—Chas. Sills has been awarded the contract for the erection of two houses on Egerton street for Henry Pierce.

London, Ont.—A. Templar has taken out a permit for the erection of a two-storey brick residence on Beaconsfield ave. Other permits recently issued include a one-storey brick veneer dwelling on Dean street for H. Paisley; a brick veneer dwelling at the corner of Maitland and Victoria streets for F. W. Radcliff; a two-storey brick building on Dundas street for H. G. Abbott, and a two-storey brick building on Talbot street for Fleming and Houghtby.

Montreal.—Joseph Levy, 56 Laval avenue, has taken out a permit for the erection of a house containing five dwellings, at 246 St. Hubert street, at estimated cost of $16,500. Architects, J. E. Vanier & W. McGregor, 5 Beaver Hall Square.

Montreal.—Architect J. Rawson Gardiner, New York Life Building, has awarded the following contracts in connection with the residence to be erected on Bellevue avenue, Westmount for Arthur Fry, care of Munderloh & Co., 51 Victoria Square: Concrete work, Swan, Church & Co., 40 Hospital street; brick work, P & J. O.Brunet; plumbing, H. Baille, 294 Mountain street; carpenter work, N. Panze & Fils, Notre Dame street west and Greene avenue.

Montreal.—The contract for the electrical work for a residence at 922 Park avenue Annex, for Mr. Thos. Wand, general contractor, has been awarded to C. Lapierre, Lindsay Building.

Montreal.—Architect Jas. E. Adamson, Coristine Building, has prepared plans for a residence to be erected on Crescent street for Chas. Skelton.

Montreal.—Mrs. B. Robinson, 230 Laval avenue, has taken out a permit for the erection of a house, containing three dwellings, on Mance street, at cost of $11,000. A permit has also been granted to J. P. Howard, 271 Sherbroke street west, for the erection of a residence at 740 Pine avenue, at cost of $7,000.

Montreal.—Architect Jas. E. Adamson, Coristine Building, has completed plans for a pair of semi-detached villas to be erected on Grosvenor avenue, Westmount, for Rupert M. Sharp.

Montreal.—Architect Alphonse Piche, 54 Victoria Square, has awarded the following contracts for the erection of two houses on St. Antoine street for Mr. Als. H. Martin: Masonry, Corbeil & Frere, 192 Clarke street Annex; brick, J. A. Legault, 198 Ferdinand street, St. Henri; plumbing and heating, Hickey & Anbut, 324 St. Antoine street; steel, Structural Steel Company.

Montreal.—Theo. Lefebvre, 1384 St. Andre street, has taken out a permit for the erection of four houses, containing twelve dwellings, at the corner of Cazelais and Walnut streets, at cost of $15,000. A permit has also been issued to F. Larosgere, 1388 St. Hubert street, for the erection of two houses, containing four dwellings, on Drolet street, at cost of $6,000.

Montreal.—Architects Peden & McLaren, 20 St. Alexis street, have awarded to Messrs. Sparrow & McNeil, Coristine Building, the general contract for the erection of a residence on Grosvenor avenue, Westmount, for Mr. Thom.

Montreal.—Architects E. & W. S. Maxwell, 6 Beaver Hall Square, have completed plans for two houses to be built on Pine avenue for Mr. E. M. Renouf and Mr. W. S. Maxwell.

Montreal.—Mrs. Marie Papineau, 182 St. Denis street, has taken out a permit for alterations to house, at estimated cost of $10,000.

Verdun, Que.—Architect Alphonse Piche, 54 Victoria Square, Montreal, has prepared plans for a house to be erected for Z. Charland.

Montreal.—Architect Jas. E. Adamson, Coristine Building has prepared plans for a residence to be erected on Grosvenor avenue, Westmount, for Thos. M. Barrington.

Outremont, Que.—Architect W. F. Doran, 180 St. James street, Montreal, has prepared plans for a residence to be erected here for F. H. Carlin.

Outremont, Que.—Architects Ross & Macfarlane, 1 Belmont street, Montreal, have awarded to James Young, 7 McCulloch avenue, of this place, the contract for the excavation, masonry and brick work for two residences for Mr. Gammell to be erected here.

Winnipeg, Man.—Gibbons & Company have been awarded the general contract for an apartment building to be erected for A. Monkman. The building will be of brick construction, four stories in height, and will cost $20,000. Architects James Chisholm & Son, are the designers.

Edmonton, Alta.—E. J. Taylor has taken out a permit for the erection of a residence on Thirteenth street at an estimated cost of $3,200.

Vancouver, B.C.—Peter Agren has taken out a permit for the erection of two frame houses on Beach avenue at cost of $6,000.

Hotels

Toronto.—Architect F. H. Herbert, 65 Adelaide street east, has prepared plans for the rebuilding of the Nurse Hotel at the Humber, which was badly damaged by fire some time ago.

Norway, Ont.—Mr. Chas. F. Lavender, of the old Woodruff House, Kingston Road, near Woodbine avenue, will erect a new three-storey hotel building on the present site of the Norway Hotel.

Portsmouth, Ont.—The hotel building of James Short, at this place, has been damaged by fire to the extent of over $3,000.

Fire Stations and Jails

Montreal.—Tenders were recently opened for the construction of a police station in St. Jean Baptiste Ward, according to plans and specifications prepared by Architect Jos. Art. Godin, 120a Park Lafontaine. L. O. David, City Clerk, City Hall.

Brandon, Man.—The contract for the erection of the new South Ward Fire Hall has been awarded to John Forbes at contract price of $4,370. The contract includes both heating and plumbing.

Vancouver, B.C.—The Fire and Police Committee have awarded to Messrs. Campbell, Burke & McLay the contract for the erection of a fire hall in Grandview, according to the competitive plans submitted by Mr. H. B. Watson. Amount of tender, $6,920, complete with heating, wiring, lighting, plumbing, etc.

Vancouver, B.C.—It is understood that a by-law will be submitted to the ratepayers next January for the purpose of authorizing the erection of additional jail quarters. It is proposed to provide a separate building for convicts.

Opera Houses and Rinks

Toronto.—Mr. Shea, of the Shea Theatre, on Yonge street, has applied for a permit to erect a new playhouse on the south-east corner of Victoria and Richmond streets. The building will have a frontage of 82 feet, a depth of 167 feet, and height of 70 feet. It will be fireproof throughout, and will be built of brick, stone, steel and concrete. There will be two galleries and an abundance of exits.

Toronto.—Plans have been prepared and approved for the erection of a new building for the Lakeview Club to replace the one recently destroyed by fire. The following are officers of the club: President, Geo. C. Loveys; vice-president, T. A. Drummond; secretary, Hugh Spence.

Fort William, Ont.—The Executive of the Curling Club have had plans prepared for the erection of a $10,000 curling rink to replace the one recently destroyed by fire. E. S. Rutledge, Fort William, can be addressed .

St. Mary's, Ont.—The St. Mary's Curling Club is contemplating building a rink at this place.

Cobalt, Ont.—Messrs. H. B. Dunbar & Bro., Haileybury, Ont., have been awarded the contract for the new skating and curling rink to be erected here. The building will be 50 feet in height, and will have corrugated iron roof. Estimated cost, $6,000. W. R. Graham, of this place, is the architect.

Winnipeg, Man.—A permit has been issued to the Grand Opera Company for the erection of a brick theatre building on the west side of Main street, between Jarvis avenue and Dufferin avenue. Among the members of the company are the following, all of Winnipeg: W. B. Alsip, Douglas Bros., and A. & W. Melville. The building will cost $35,000, Architects A. & W. Melville, Union Bank Building, prepared the plans for the structure.

Winnipeg, Man.—A new curling rink is to be erected here for the Stratheona Curling Club. The building will be of frame construction, with shingle roof, and will cost $3,500. Plans for the building have been prepared by Architects James Chisholm & Son.

Lethbridge, Alta.—Mr. Sam. Griffiths, of Sweet Grass, Mont., has purchased four lots here at the corner of Crabb and Bompas streets, on which he will erect a large opera house.

Churches

Toronto.—The congregation of Our Lady of Lourdes Church, Sherbourne street, will erect a new church in the rear of the present building next summer. The new building will accommodate 1,000 people. Rev. Father Cruise is pastor of the church.

Brantford, Ont.—Plans for the new Lutheran Chapel at the corner of West and Nelson streets have been submitted to the contractor and it is expected that the work wi.. start shortly. Plans for the new church have also been completed.

Montreal.—Architect J. A. Karch, 17 Place d'Armes Hill, has awarded to Messrs. Sparrow & McNeil, Coristine Building, the contract for the erection of St. Thomas D'Aquinas Church, on St. Antoine street. The building will be of pressed brick construction, with stone trimmings.

Montreal.—Architect R. Montgomery Rodden, 8 Beaver Hill Square, has awarded to W. J. Graham, 85 Cathcart street, Montreal, the contract for plumbing to be installed in the new Presbyterian Church to be erected at Maisonneuve. The general contractors of the building are Laird, Paton & Son, Limited, 485 St. James street.

Ste. Angele, Que.—Architects Ouilett & Levesque, 115 St. John street, Quebec, received tenders up to Nov. 14 for the new church building to be erected at St. Angele, Que., for the Roman Catholic congregation. The building will be of stone construction, with stone foundation and galvanized iron roof. Estimated cost, $30,000.

Three Rivers, P.Q.—Architects Daoust & Lafont have awarded the general contract for the erection of church and presbytery for the parish of Ste. Phillipe to Mr. Roy of Quebec.

Preston, Ont.—The Roman Catholic congregation of this place is contemplating the erection of a new church building.

Schools and Colleges

Toronto.—The Property Committee of the Board of Education have awarded contracts as follows for improvements and enlargements to the Morse street school: Masonry, H. Lucas & Son, 141 Havelock street, $7,427; carpentry, F. Armstrong & Co., $5,194; plastering, T. Blackburn & Son, 208 Broadview avenue, $1,033; painting, R. G. Johnston, 80 Gerrad street, east, $345; roofing and tinsmithing, Robert Rennie & Sons, 378 Berkeley street, $1,127; heating and ventilating, W. F. Rutley Company, 36 Toronto street, $272; structural steel, Reid & Brown, 63 Esplanade East, $798.

Toronto.—The Government has approved the application of the Board of Governors of Toronto University, to be permitted to raise funds on the security of their property, for the erection of a public and high school building in connection with the new Department of Pedagogy. A site on the south side of Bloor street, between Spadina avenue and Huron street, has been procured for the Department of Education. The building will cost $150,000.

Toronto.—The Property Committee of the Board of Education have awarded contracts as follows for improvements and enlargements to the Queen Alexandra School, viz.: Masonry, Charles Bulley, 18 Withrow avenue, $3,750; carpentry, W. Williamson, 133 Woodbine avenue, $2,156; plastering, T. Gander & Son, 38 Marian street, $338; roofing and tinsmithing, R. Rennie & Son, 378 Berkeley street, $942; heating and ventilating, Frank Armstrong & Co., $1,296; heating registers, Nash Thermostat Company, $299; structural steel, Reid & Brown, 63 Esplanade east, $184; painting, J. Phinemore & Son. 10 Gerrard street east, $338.

Toronto.—The Property Committee of the Board of Education have awarded contracts as follows for improvements and enlargements to the Howard School: Masonry, H. Lucas & Sons, 141 Havelock street, $6,664; carpentry, Frank Armstrong & Company, $4,229; plastering, T. Blackburn & Son, 208 Broadview avenue, $610; painting, J. R. Robinson, $380; roofing and tinsmithing, Webb & Dunlop, 15 Kensington avenue, $660; heating and ventilating, W. F. Rutley Company, 36 Toronto street, $845; structural steel work, Trussed Concrete Steel Company, 23 Jordan street, $600.

East Toronto, Ont.—The Board of Management of the Alexandra School for Girls has decideo to petition the Government for a grant of $20,000 for the erection of an addition to the present building, and for the laying of a two-inch water pipe for a distance of 3,000 feet.

Eglinton, Ont.—Contracts have been awarded as follows for the enlargement of the public school at this place: Masonry, Harry Jennings, 105 Cottingham street, Toronto; carpentry work, Messrs. Fisher & Ramsay.

Ottawa, Ont.—At a meeting of the Public School Board plans were submitted by the Building Superintendent for the converting of the Kent Street School into a commercial and technical school. The plans provide for a four-room addition to the north and south ends of the present building; the interior of the building would also be remodelled.

Clandeboyne, Ont.—The trustees of Union S.S. No. 12, Biddulph and No. 4 McGillivray, have decided to build a new school building next summer, for which a site, immediately east of Cunningham's hotel on the road to Lucan, has been selected.

Woodstock, Ont.—At a meeting of the City Council by-laws were given their third reading and passed, providing for the issue of $10,000 in debentures for col-Company, Limited, 706 Mark Fisher Bulding, has been awarded the contract for laying 42,000 square feet of "Dolo-ment" in the Salaberry School.

Montreal.—The Montreal Doloment Company, Limited, 706 Mark Fisher Building, has been awarded the contract for laying 42,000 square feet of "Dolo-ment" in the Salaberry School.

Richbucto, N.B.—The Grammar School Building, at this place, has been destroyed by fire. Loss estimated at $4,000.

Oak River, Man.—The four-room brick public school building, at this place, has been destroyed by fire.

Calgary, Alta.—The Management Committee of the School Board has recommended the establishment of a high school in the east end of the city and the purchase of two school sites in the south-west section of the city .

Fernie, B.C.—The Fernie Construction Company has been awarded the contract for the erection of the new public school building at the corner of Victoria avenue and Thompson street.

Civic Improvements

Toronto.—The City Council has decided to carry out extensive local improvements, including sewers, concrete curbings, pavements, concrete sidewalks and plank sidewalks, on certain described streets.

Toronto.—The City Engineer has recommended the paving of the following streets, viz.: Asphalt pavement, on Galley Ave., from Roncesvalles Ave. to Sunnyside Ave., on King street, from west side of Berkeley street to St. Lawrence street, on Dufferin street from Lindsay Ave. to Bloor street.; asphalt block pavement on North Markham street from Olive Ave. to Vermont street.; vitrified brick block pavement on King street from west side of St. Lawrence street to Queen street.

Toronto.—City Engineer Rust has recommended the construction of the following pavements: Margueretta street from College street to Bloor street, asphalt, $15,387; Beaumont Road, from Glen Road, 600 feet east, asphalt, $3,620; Silver Ave., from Golden Ave. to Morrow Ave., brick. $2,879; Pearson Ave., from Roncesvalles Ave. to Sunnyside Ave., brick, $3,497; Shaw street, from Bloor street to Burnfield Ave., vitrified block, $24,948; Huntley, from Bloor street to the bridge, macadam, $3,016; Lane, first west of Jarvis, from Shuter to south end, concrete, $2,039.

Brantford, Ont.—At a meeting of the Collegiate Institute Board plans were submitted for the new Collegiate Institute to be erected at this place. A by-law will be submitted to the ratepayers in January for the purpose of authorizing the expenditure of $50,000 for this improvement. The plans call for a building three storeys in height, with an annex in the rear for advanced technical school work. Architects Chapman & McGriffin, 59 Yonge street, Toronto, prepared the plans for the building.

Brampton, Ont.—The contract for the construction of the wall and sidewalk on Main street has been awarded to D. W. Mitchell at a contract price of $3,910.

Fergus, Ont.—A by-law will be submitted to the ratepayers for the purpose of authorizing the expenditure of $12,000 for the laying of new cement walks.

Golden, B.C.—The Trustees of the Golden School District have been instructed to carry out their plans with respect to the erection of the new school building at this place. The estimated cost of the building is $9,000, towards which the Provincial Government has made a grant of $5,000.

Miscellaneous

Toronto.—A company to be known as the Georgina Houses, Incorporated, has been organized for the purpose of providing homes for working women throughout Canada. Among those belonging to the corporation are: Canon Welch, Provost Macklem, Mr. D. W. Saunders, K.C., and others all of Toronto.

Toronto.—City Engineer Rust has recommended the purchase of a new hydraulic dredge, at a cost of about $76,000.

Windsor, Ont.—Detroit capitalists have organized a mining company, to be known as the Lady of the Lake Mining Co., Ltd., with head office at Windsor. The company is capitalized at $1,000,000.

Pembroke, Ont.—Many of the best buildings of the town of Pembroke, Ont.,

have been destroyed by fire, entailing a loss of approximately $500,000. The chief losers are: The National Manufacturing Co., $140,000, insurance $90,000; Mrs. J. W. Munro, $75,000, fully insured; J. P. Millar, $20,000, partially insured; A. Millar & Son, $25,000, partly insured; Moffat estate, $10,000; Pembroke Milling Co., $40,000, insured; Mrs. W. W. Dickson, $12,000; Branch Bank of Ottawa, Royal Bank of Canada, Bell Telephone Co.'s office, Leland Hotel, Brash's Hotel, the Public Library, and several residences.

Klock, Ont.—Among the recently incorporated companies is the Algonquin Lumber Company, Limited, capitalized at $48,000, with headquarters in the village of Klock, Township of Cameron, Nipissing District, Ont. The incorporators are: John Henry Maybee, lumber merchant; Milo Edgar Woodcock, lumber merchant; and William Sylvester Woodcock, lumber merchant; all of the village of Edwards, County of St. Lawrence, New York State; and Frederick Dennis Sullivan, lumber merchant, and William Andrew Sullivan, lumber merchant, both of Watertown, N.Y.

Port Arthur, Ont—The ratepayers have passed a by-law authorizing the expenditure of $25,000 for an addition to the telephone system at this place.

Matheson, Ont.—The new town of Matheson, on the T. & N. O. Railway, originally called McDougall's Chutes, has been literally wiped out by fire. Among the buildings destroyed are: Messrs. Revillon Bros., fur and general merchants' store; Messrs. Rothschild Bros.' dry good store; Taylor's hardware store; John Clark's general store; R. A. Douglas' drug store, the post office, and the Syrian colony. The T. & N. O. Railway station was not damaged. Loss estimated at approximately $75,000, with no insurance.

Montreal, Que.—Among the recently incorporated companies is the Asbestos Lagging and Insulator Company of Canada, Limited, capitalized at $10,000, with headquarters at this place. The incorporators are: Philippe Durocher, advocate; Alexander Campbell Calder, manager; Calixte T. Jette, bailiff; Oscar Gagnon, student; and Edgar Reginald Parkins, advocate, all of Montreal.

Ste. Emelie, Que.—Tenders, addressed to the undersigned will be received up to 4.30 p.m., November 23rd, for the construction of a roadway and enlargement of block at Ste. Emelie (Leclercville) Lotbiniere County, Province of Quebec, according to plans and specifications on file at the offices of A. Decary, Resident Engineer, Post Office, Quebec, P.Q.; on application to the Postmaster at Leclercville, Lotbiniere County, Que.; and at the Department of Public Works, Ottawa. Nap. Tessier, Department of Public Works, Ottawa, Ont.

St. John's, N.F.—A wharf and the Blair, Gordon & Company's block at 117-185 Water street, have been destroyed by fire entailing a heavy loss partly covered by insurance. The block was occupied by the owners and a number of other mercantile houses.

St. John, N.B.—The Maritime Dredging and Construction Company of this place has been awarded the contract for dredging in the local harbor.

Victoria, B.C.—Tenders will be received up to 4 p.m., November 30th, for the supplying of lead pipe and brass goods, as per specifications, copy of which may be obtained on application to W. W. Northcott, Purchasing Agent, City Hall.

Penticton, B.C.—The following buildings at this place have been destroyed by fire, viz.: Pomeroy's fruit and tobacco store, Kent & Son's harness store, and Weatherby's barber shop. Loss estimated at $30,000.

Calgary, Alta.—A company, to be known as the Calgary Paving Company, has applied for letters of incorporation. The company purpose operating in the West, and will make Calgary their headquarters. The directors will be Messrs. W. H. Warswick, S. McNeil, Contractor McNeil, and J. E. Warswick, of Calgary.

Toronto.—Contracts have been awarded as follows for a $5,000 residence to be erected on Indian road, for Mr. Thomas McIlwain, 147 Jamieson avenue, viz.: Brick, stone and excavating, Hall & Son, 32 Boustead street; heating and plumbing, Mr. Wray, 247 Delaware avenue; plastering, T. Lyons, 109 Westmoreland avenue; electric wiring, Reeder Electrical Mfg. Co., 1526 Queen street west. The building will be 2½ storeys in height, of brick construction, with stone foundation, slate roof, maple floors, pine and hardwood interior finish, open plumbing, hot water heating, electric lighting, cement cellar and walks. Architects, Simpson & Young, 17 Toronto street.

Toronto.—The City Engineer has recommended the laying of the following pavements, viz.: asphalt, Brock avenue, from Bloor street to 1,000 feet south, $6,245; asphalt, Barton avenue, from Brunswick avenue to Howland avenue, $1,501; asphalt, Dufferin street, from Gordon street to Subway, $8,913; asphalt, Margueretta street, from Bloor street to 988 feet north, $5,893; asphalt, Margueretta street, from Dundas to Bloor street, $18,572; bitulithic, Oriole road, from St. Clair avenue to Lonsdale avenue, $11,538; vitrified block, Dufferin street, from south side of Gordon street to Dundas street, $9,608; asphalt, Berkeley street, from King street to Duke street, $2,264.

Toronto.—Tenders will be received after November 18, for all trades required in the erection of a $5,000 apartment house on King street west, Parkdale, for Mr. W. Alderson, 68 Cowan avenue. The building will be three storeys in height, of brick construction, with stone foundation, felt and gravel roof, pine floors, pine interior finish, open plumbing, hot water heating, combination lighting, dumb waiters, plate glass, art glass and electric bells. Architect, J. H. Galloway, 77 Victoria street. Tenders will be received by owner.

Quebec.—The general contract for the work to be done on the Matane and Gaspe Railway, has been awarded to the H. J. Beemer Company, of New York. Work has already been commenced, and the first two miles of track, and the substructures for the bridge over Metis River will be completed this fall. The total length of the railway will be 240 miles.

Toronto.—The general contract for a store and dwelling to be erected at 178 Queen street west, for Mr. S. Hallis, 233 Queen street west, has been awarded to Mr. P. Anderson, 45 Hazelton avenue, who will purchase all necessary materials and do the entire work. The building will be two storeys in height, of brick construction, with stone foundation, gravel roof, maple and pine floors, oak and pine interior finish, floor and walls of tile in store, open plumbing, combination lighting, hot water heating. Specifications include one dumb waiter, three skylights, ornamental columns, plastic relief work, plate glass, electric bells, refrigerator. The front of the building will be of enamelled brick, buff brick and Indiana sandstone. Estimated cost, $8,000.

Toronto.—Architect P. H. Firney has prepared plans for the erection of an addition to the E. H. Harcourt & Co.'s factory at 255 Wellington street west. The building will be of brick construction, with brick foundation, felt and gravel roof, pine floors, cement floor in basement, combination lighting. Specifications include structural iron, metal ceilings, fireproof doors and windows, plate glass, electric bells. Work on the building, which will cost $5,000, will be commenced this fall, or early next spring.

Toronto.—Architect Leonard Foulds, 43 Victoria st. has prepared plans for a 2½ storey residence to be erected on DeLisle street, Deer Park, for Mr. W. B. Markle, Adelaide street east; estimated cost, $5,000. The building will be of brick construction, with brick foundation, shingle roof, concrete cellar and walks, oak floors, pine and hardwood interior finish, open plumbing, hot water heating, combination lighting. Specifications include tile, plastic relief work, plate glass, art glass, electric bells, three mantels. Size of building, 27 by 37 ft.

Toronto.—The Ontario Asphalt Block Company of Windsor, will in all probability establish a plant on the water front at this place. A site of three acres will be required, and, in the event of the company locating here, they will erect a substantial structure, and employ a large number of men. Vice-President of the Company, C. W. Cadwell, Windsor; Local Agent, T. B. Goodman.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has prepared plans for a $3,000 residence to be erected on Avenue Road, north of Bloor street, for Mr. Geo. Griffin, North street. The building will be of brick construction, with brick foundation, slate shingle, felt and gravel roof, oak floors, Georgia pine interior finish, combination lighting, open plumbing, hot air heating, ornamental columns, plastic relief work, plate glass, electric bells and two mantels.

Toronto.—Mrs. I. Standish, 18 Toronto street, has taken out a permit for the erection of a 2½ storey brick dwelling on Warren Road, near Clarendon Avenue, at cost of $9,000. Architect, W. R. Gregg, Bank of Commerce Building. Builders, Orr Bros., 35 Queen street east.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has completed plans for two 2½ storey dwellings to be erected on Avenue Road, north of Bloor street, for Mr. Geo. Griffin, North street. The buildings will be of brick construction, with brick foundation, slate shingle, felt and gravel roof, oak floors, Georgia pine interior finish, combination lighting, open plumbing, hot air heating. Specifications include ornamental columns, plastic relief work, plate glass, electric bells, two mantels. Estimated cost, $5,000.

Toronto.—W. Fountain, 30 Adelaide st. west, has taken out a permit for the erection of a two-storey brick stable and carriage house at 8-10-12 Vanauley st, near Queen street, at cost of $3,500. Architect, Jas. Thompson, 43 Victoria street.

Toronto.—Architects Eden Smith & Son, 199 Yonge st, have awarded the following contracts for the erection of a $12,000 residence on Oriole Road, north of St. Clair avenue, for Mrs. T. J. Brough, 199 Yonge street, viz.: Mason work, T. Fussell, 53 Poplar Plains Road; carpenter work, Robinson & Wilson, 1123 Dufferin street; plastering, R. C. Daney, 171 Spadina avenue; plumbing, J. T. Aggett, 880 Yonge street; heating, J. Harrison, 608 Yonge street; tinsmithing, Geo. M. Bryan, 524 Yonge street. The building will be of brick construction, with brick foundation, shingle roof, oak and pine interior finish, oak and pine floors, cement floor in basement, cement walks.

Toronto.—The Canada Bowling Club, which holds a lease on the Avenue Road grounds, with an option of purchase, is contemplating the erection of a $10,000 modern club house.

Toronto.—The congregation of Woodgreen Tabernacle, Queen street east, will next spring erect a new school room in connection with their church, for which the sum of $5,100 has already been contributed. The Rev. S. W. Fallies is pastor of the church.

Toronto.—The congregation of St. James Cathedral is contemplating the erection of a new parish house, to cost approximately $60,000, for which a general canvass will be made. The Rev. Canon Welch is rector of the church.

Montreal, Que.—Messrs, Doig & Barnes, who have been awarded the general contract for a pair of semi-detached houses to be erected on Durocher street, for Mr. A. R. Tourgis, have sub-let the following contracts: Plumbing and heating, Findleton & Russell, roofing, Richardson, Simard & Co.

Montreal, Que.—Israel Reeves, 1482 St. Dominique street, has taken out a permit for the erection of three houses, containing nine dwellings, on St. Urban St., at cost of $9,000.

Montreal, Que.—Francis Villeneuve, 1785 St. Lawrence Boulevard, has taken out a permit for erection of a house, containing three dwellings, on Esplanade avenue, at cost of $6,000.

Montreal, Que.—Architects Ross & MacFarlane, 1 Belmont street, have awarded the following contracts for the erection of two houses in Outremont, for Mr. B. Gammell: Plumbing and heating, D. A. Bethune; plastering, Frank Charles; painting and glazing, W. J. Chapman; carpentry, D. M. Long; roofing, Richardson, Simard & Co.

Montreal, Que.—O. Beault, 914 Esplanade avenue, and B. Marcel, 524 Gilford street, have taken out a permit for the erection of three houses, containing nine dwellings, on Esplanade avenue at an estimated cost of $11,000.

COMPETITIVE CONTRACTS.---Present Method of Estimating Uncertain and Costly.---New System Proposed.

IN view of the recent discussion among architects and contractors in both England and America upon the merits and demerits of the present system of competitive tendering, the following editorial from a recent issue of the ENGINEERING RECORD will prove of interest to our readers.

The general custom of letting building contracts after receiving competitive bids based on plans and specifications prepared by an engineer or architect has never been regarded with favor by many leading representatives of these interests, but it was not until recently that any serious attempt to suggest a substitute for this system was made. Last May, however, a committee of the Illinois Chapter of the American Institute of Architects prepared a report criticizing the present method of securing competitive bids and suggesting another system of contracting, which report has aroused considerable interest and is deserving of careful consideration; it should be stated at the outset, however, that The Engineering Record is not prepared to accept the arguments for the new method, although agreeing in the main with the criticism of the present practice. The fundamental objection to the method of awarding contracts after securing competitive bids is the great expense incurred in preparing bids, and the committee has done some good work in ascertaining definitely what this expense amounts to.

Five representative contractors furnished the committee with statements of the time and money spent by them in one year in making competitive bids for buildings, which would cost from $100,000 to $150,000 as a rule. The average number of contracts estimated by each builder during the year was 72 and the average number which he obtained was 10. The average value of the time spent by the office force of each firm on each estimate was $125 and the average expense on each estimate incurred in addition by the numerous sub-contractors and material men was $378, making a total of $503 spent by each builder, his sub-contractors and material men on each building. In addition to these expenses the head of each contracting firm spent 21 per cent. of the total time given to his business in estimating or overseeing the work of estimating. As there are usually at least six bids taken for each building, their cost would be about $3,018, or from 2 to 3 per cent. of the cost of the building. Each builder estimated on 72 structures, so that the expenses for the five contractors for this work was $180,583. Deducting one-third of this for sub-contractors' bids used in common by the general builders, leaves approximately $120,000. As only ten contracts were secured by each bidder, or 50 for all, the expense of the bids from which work was actually secured was $25,150, so that the expense incurred for estimating other contracts which they did not get was $95,000, which sum was a dead loss to the five contractors, sub-contractors and material men in one year. As some one must make up the loss to them it is charged on the books as estimating and office expenses and the owners from whom buildings are obtained must pay for it. There were taken out in Chicago in 1906 building permits for structures estimated at $63,000,000, which means, according to the above figures, an expense of $1,260,000 for estimating, of which only $210,000 resulted in securing work. In this one city, therefore, this enormous sum of about $1,000,000 was spent fruitlessly in one year, assuming that the reports received by the committee from the five builders were correct. A loss which is also quite serious from the viewpoint of good construction was the time given by the heads of the firms to making or overseeing estimates. The committee reports that the time spent by contractors on estimating and securing contracts is undoubtedly a great detriment and loss to every building erected.

A strong argument is also made by the committee to the effect that competitive bidding does not necessarily establish a true and proper basis on which to make a building contract. It is pointed out that all court rulings involving building contracts have been made on the principle that the consideration in a contract must be commensurate with the obligation assumed, while under the system of competitive bidding, builders will sometimes not only hazard their legitimate profits but also run the risk of serious loss in order to secure a contract. It is often asserted concerning this contention that the builder has as many chances for making very large profit as he runs risks for loss, but such a consideration is contrary to the spirit of the law regarding contracts, just mentioned. A contract should neither be a speculation nor a hold-up. It should provide with certainty a reasonable profit for the builder who carries it out efficiently. The great desideratum is some form of contract by which the skill of the builder in directing the execution of work may be properly compensated without forcing him to obtain his profit by skinning the cost of the work down to the minimum possible without violating the terms of the contract. What is desired is real co-operation and sympathetic service, which is not likely to be attained, according to the committee, under the present system of competitive bids except where the competition is restricted to firms which will only do good work. Unfortunately in most cases the owner of the building has friends who induce him to allow less responsible bidders to estimate, and it often happens that these bidders receive the contracts at a low figure and proceed to make as much profit as they can by doing as little and as poor work and supplying as cheap material as the terms of the contracts will permit.

The practice of securing competitive bids is a very old one and at the time it first became firmly established the work was in most cases of such a nature that the cost of it could be estimated fairly closely by experienced builders. The modern structure is so complicated, however, that it is not an easy matter to make such estimates, as is very well shown by the wide difference between the bids of thoroughly responsible builders for the same work. In some cases the complications are so great that a percentage or cost-plus-fixed-profit contract seems to be the fairest method of carrying on construction, although it is generally acknowledged that they are not at all desirable for most classes of work.

Although lump-sum contracts have these disadvantages it has been possible to substitute for them anything better for most work, and accordingly the proposal of the committee of the Illinois Chapter is very interesting. This proposal is, in substance, to do away with all the expense, or most of it, incurred by contractors in estimating, by employing a professional estimator to make a complete estimate of all labor and material in the proposed building. He would be paid by the owner, would be absolutely independent in his position and his success in business would depend solely on the accuracy of his estimates. His reputation would suffer just as much if he made them too high as if he made them too low, according to the committee, which believes that the nature of his position would enable him to secure better prices for the great mass of the material for the building by eliminating middlemen's profit and reducing the opportunity for combinations. The owner would go over the plans and specifications of the building and the estimator's report of its construction, and if the cost was satisfactory to him, the papers would be turned over to a contractor whom the architect and owner considered thoroughly responsible. If the contractor was satisfied with the amount of the estimate, he would be given the contract to build the structure for the estimated amount plus a fee depending upon the character of the structure

and its magnitude. At the completion of the work if the building cost less than the estimate, the committee suggests that the amount so saved would be divided equally between the contractor and the owner, while if the cost of the structure ran over the amount of the estimate, the loss would be divided equally. It is the committee's belief that in this way the interest of the owner and contractor would be the same, for whatever would be for the contractor's gain and profit would also benefit the owner. Their relations would, therefore, be harmonious instead of being just the opposite, as they are now.

The basic idea, it will be seen, is the introduction of a new factor in contracting, the independent estimator. Some of the readers of this journal will doubtless recall that a few years ago a firm in a New England city undertook such work as a business speculation. They took off quantities from architects plans and specifications, and estimated them closely, and then sold this information to contractors. The business did not develop to any extent, which is a pretty good indication that it was not found desirable by contractors. The Engineering Record calls attention to the committee's suggestion of a modification of this former venture as a matter of interest, but it would point out that the proposed plan depends solely on the high character and independence of the professional estimator. Every architect having much experience with large buildings where the expense of estimating is at all serious, will doubtless agree that a client would be perfectly justified in awarding the contract for such a structure on a percentage basis to a few builders whose reputation for square dealing is universally recognized. The trouble lies in the fact that very few business men are sufficiently acquainted with building operations to know these contractors; few parties put up more than one or two buildings and it is but natural that they should see greater economy in the system of competitive bidding than in awarding the work without competition to a builder named by the architect. It is safe to say that, as a practical proposition, no matter whether an independent estimator figures the cost of a structure or not, the average owner, who is the man who really settles the matter, will insist upon shopping around among builders whose names are suggested by his architects and also among those to whom his friends urge him to give a chance. It should not be forgotten that while the architect and builder are carrying on construction work all the time, the average owner knows nothing about such work and will insist on having things done in what may be termed the average business way, that of securing competitive bids.

FIRE RESISTING RESIDENCES.---Would Add Much to the Permanent Architecture of the Country. ---Radical Reform Needed.

AT THE PRESENT TIME the problem of building is a very grave one after one gets outside the suitable range of ordinary steel construction such as is employed in large city buildings. For all small structures there has been until recently the same old choice that has been available for 5,000 years: wood, brick, and stone, alone or in suitable combination. The more slightly civilized people have generally used wood as nearest to the hand and easiest to work, and those of larger experience and powers have gone on to brick and stone. Here in America our civilization is still too crude and the country is too new to have gotten fairly beyond the timber stage. We are not so many generations yet past the log cabin, in spite of the fact that our material progress has taken on the outward form of orderliness and even complexity. This, however, seems really to be only skin deep when one judges it not as a Chauvinist, but as a man of affairs. It is not a civilization of great stability and depth that looks coolly at the casualty list of nearly a hundred thousand killed and wounded annually on the railroads and contemptuously figures the probable cost of safety appliances per victim. The same superficial quality still appears in our building. It would be hard to imagine a country better capable in skill and resources of fine permanent architecture, and it would be quite impossible to find one in which fine permanent architecture has been until quite recently a smaller proportion of the whole.

As a nation we build for to-morrow or next week and lay bets at rather small odds with the insurance companies that our structures will burn before they rot or tumble down. A large proportion of the buildings erected in some parts of this country are apparently of the flimsiest timber construction compatible with their holding together until they are sold, and in consequence the losses annually by fire rise to an amount that it simply appalling. Insurance with all its benefit to the individual in case of disaster cannot make up to the community as a whole the losses thus incurred. Somehow, in the long run, the losses get back to the public in every case, and when, as in the San Francisco disaster, the insurance companies have suddenly to settle enormous losses the reflected effect upon general business may be serious in its results. It is time, therefore, to make radical rules for reform in building, time in particular for structural engineers to urge the building of relatively fireproof structures. The present scarcity and high price of timber should serve as an active stimulus to this good work. Is it not practicable, for instance, to take at least some features of modern steel construction with reasonable economy into some classes of buildings now generally of timber? The frame apartment house fortunately is getting scarce under the pressure of building regulations, but it ought to be as extinct as the dodo. Apartmnets have, in fact, been worked toward steel fireproof construction, but there are still left many that are little better than timber boxes with a brick exterior casing.

Another line of improvement is opened by concrete construction, in its several types of monolithic, hollow-block and tile-concrete. When the concrete industry gets fully under way and architects learn to use the material in less expensive ways, it ought to be possible to build a house or a shop almost as cheaply of concrete as of timber, although the time has hardly yet arrived. Why should one not have some combination of concrete and steel as the normal material for residences, structures that would neither burn up or rot down. The ordinary frame dwelling of the present day has a limited life and requires large and frequent repairs. The mere item of painting it, capitalized at any reasonable rate, would justify the use of material that does not require painting. The chief depreciation in a frame house is in the exterior shell, which is exposed to the elements, and if one reckoned only the interior, repairs would be few. Given a concrete exterior and the repair bills would be small. There is occasional objection to concrete on æsthetic grounds, yet are not these due rather to its present unfamiliarity than to any intrinsic faults? It is hard to see why a well-designed building should be reckoned as inartistic merely because its exterior is of one material rather than another. It is to be hoped that architects will take up more generally the possibilities of the new material in some form other than stucco, the present craze, and see what can be done with it from the artistic standpoint. It should not be difficult to manage, and as a matter of fact there are already not a few capital concrete dwellings in existence. Timber structures are essentially archaic in type, belonging to a period of small means and meager resources, from which our country ought ere this to have emerged permanently, and if nothing else can hurry it into improvement the terrific and needless losses chargeable to fire and fire protection ought certainly to do so.—ENGINEERING RECORD.

FIRST CANADIAN CEMENT CONVENTION. --- Canadian Cement and Concrete Association to Hold Their Initial Convention and Exhibition in St. Lawrence Arena, Toronto, the First Week in March.

DEFINITE arrangements have been completed for the first annual convention and exhibition to be held by the Canadian Cement and Concrete Association, and from March 1 to 6, 1909, Toronto will be the mecca for delegates and visitors from every section of the Dominion, who are interested in the growing industry, whose allied branches the association has been formed to promote.

This gathering will be the result of a movement started several months ago, to bring together all those who are in any way engaged in the production of cement, the manufacture of cement machinery and appliances, or the use of this material in various forms of construction.

Announcement of the time and place of the convention have been sent broadcast throughout the country, and if the encouraging responses which have been received to

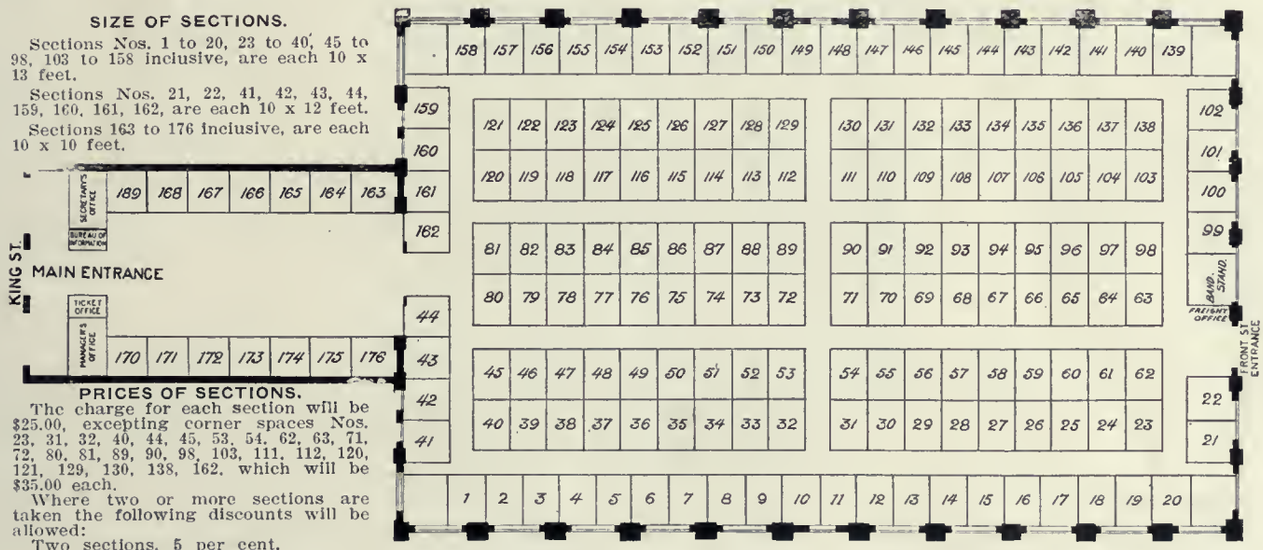


DIAGRAM OF EXHIBITION HALL——ST. LAWRENCE ARENA, TORONTO.

date can be taken as an indication, the convention will be in every way an unqualified success.

The event is to take place in the St. Lawrence Arena, which is ideal for an occasion of the kind, as the building is of ample size to provide quarters for both business sessions and exhibition, so that the two can be conducted simultaneously, apart from and without conflict with one another. The large floor area which has been reserved for the exhibits, as seen in the accompanying diagram, makes quite evident how important will be this feature alone. In arrangement it affords the greatest opportunity to the exhibitor and public for display and inspection; and, judging from the many subscriptions for space that have so far been received, every available section will be well occupied at the appointed time.

Toronto, as a place for this convention, could not be improved upon. Being centrally located and within a reasonable distance from Chicago, Detroit, Cleveland, Buffalo and other points, it will enable manufacturers of block machines and concrete appliances on the other side, who are desirous of entering the Canadian field, an excellent opportunity of showing their products and of arranging for their manufacture and sale in this country. The gigantic strides that concrete construction is making in the Dominion is to be seen on every side. In the cities monolithic structures of this material are rapidly multiplying in factories, warehouses and business buildings, while in the suburbs and in the smaller municipalities, where suitable clay is not to be found, cement blocks are being adopted as a most desirable material for residences and other types of buildings.

Another reason why Toronto is admirably located for the first convention and exhibition of the Canadian Cement and Concrete Association, is the fact that possibly no other province in the Dominion has done so much for the promotion of the use of cement for municipal work, and in the construction of highway bridges, culverts and roadway work, than has Ontario. The Provincial Government has for some time past carried on a campaign of education in the use of cement in municipal and county highway work, and has done much to greatly encourage the use of cement by municipalities and counties throughout Ontario. The engineers in these municipalities, who have had charge of this work, have not only shown their willingness to attend this convention, but have also consented to lend it their active co-operation, believing that the information to be gleaned from the convention and the exhibit of cement and concrete machinery and appliances will prove most valuable to them in solving the local problems with which they have to deal.

Manufacturers and dealers desiring space for exhibitory purposes can procure application forms, plan of building, rules, regulations, and all necessary information upon application to Mr. R. M. Jaffray, manager of the exhibition, 1 Wellington street west, Toronto.

THE QUEBEC BRIDGE will be constructed under the supervision of the Dominion Government, which will, on December 1, take over the assets and liabilities of the Quebec Bridge Company. The work of construction will commence as soon as possible after the engineers entrusted with the work have finished their work, and the plans have been properly approved. These plans are being prepared to provide much heavier members in the superstructure than was used in the former structure.

MACHINERY AND TRADE

THE CLAY OF THE DON BANKS.

IN ANCIENT DAYS the people of the earth worked in materials that were convenient to them. In the Stone Age they fashioned their implements and constructed their abodes of the stone that was native to their particular vicinity. Later, when the art of using wood was accomplished, we find those places with neighboring forests using this material to good effect.

This ancient law has obtained down through the ages, until to-day, when we find our different localities and cities characteristic of the materials at hand, Quebec building in the granite peculiar to its vicinity, Montreal grey and sombre in the grey stone from the Laurentian Mountains, Kingston with its lime stone, Ottawa and the Northern towns worked out in wood, and in Toronto and surrounding country, the clay of the Don banks stands out prominently in hundreds of buildings. This product has been moulded and fashioned in many ways, by many hands, for many years, and is seen throughout this district in every shape from the lowly cottage to the mighty skyscraper.

The art of best utilizing this excellent natural material has been applied by the manufacturers of Don Valley Brick, and their product has won a place of high esteem with the architect and builder. The Don Valley Brick Company has been established for over twenty-five years. Their plant is one of the largest on the continent. Its machinery, equipment and shipping facilities are unsurpassed.

During these years the company's products have always been of a first-class quality. To-day they are better than ever. This is attested to in an eloquent manner by the way in which they are being universally specified.

TERRANO STAIR TREADS.

SOMETHING new in stair work that is commending itself to architects and builders, is stair treads, made from Terrano. While Terrano stair treads have only recently been introduced to the building public, they have already been adopted for a number of important structures.

The eminent satisfaction this material is giving as a jointless flooring, is, perhaps, the best assurance of how well it will serve in this new departure. These treads can be furnished in any color and with any style of nosing and from a standpoint of economy, durability and appearance they are claimed to be the best stair treads on the market.

Aside from being of a hard, impervious nature, and absolutely fireproof, they are half the weight of other hard materials used for stair treads, and equally as strong. They assure a firm foothold, and where required a special non-slipping safety tread can be supplied.

Furthermore, they can be cut with an ordinary hack-saw and chisel without breaking or chipping, and in event of a tread in any manner being broken after it is in position, it can promptly be replaced. As Terrano stair treads are made in Canada they can be furnished promptly and without delay to the contractor in charge of the work. They are molded at the factory to fit the iron stair frames according to requirements, and are delivered at the building ready to be put in place.

The number of important contracts already secured for this new feature, includes the Y.M.C.A. Building, Ottawa; Technical School, Toronto, and Bell Telephone Building, Montreal.

For ordinary requirements, the average thickness of treads of this character is 1 1-4 inches, and when necessary for extra heavy service, or spans of large dimensions, the treads are reinforced so as to withstand the most severe strains and usage.

Risers of this material can also be supplied, and when combined with Terrano treads make an exceptionally attractive staircase. Where concrete stairs are built, Terrano is especially recommended as a finish. The material in this case being trowellel into a continuous sheet over the concrete from top to bottom, making a jointless, dustless stairway of fine appearance.

All Terrano work is guaranteed to be free from imperfections and satisfactory in every way. Over two hundred floors of this material—including the floor of the Art Gallery, Toronto Exhibition, which was given a first award and medal—have been laid up-to-date, and it is now being used and specified by all the leading architects in Eastern Canada.

Write to the Eadie-Douglas Company, general sales agents, 22 St. John street, Montreal, and 77 Victoria street, Toronto, for a list of buildings in which it is being used, and attests as to the satisfaction it is giving. Prices, samples, and full information will be furnished upon request.

ARCHITECTURAL RELIEF WORK.

AN EXCEPTIONALLY splendid edition—something which will be found to be practicably indispensable to the architect—is the new catalogue issued by W. J. Hynes, 16 Gould St., Toronto. This catalogue is devoted entirely to architectural relief decoration, and it is published for the purpose of assisting the architect in the selection of designs in carrying out work of this character.

The great extent to which plastic relief work is being employed in Canada, is seen in the many fine public, business and residential buildings which have been erected in the past few years. It is but another indication of the refined taste which people are cultivating in their surroundings. A room decorated in relief work has its character stamped upon it for all time. It gives that permanence and dignity to architectural lines which have been fully appreciated by architects in all ages and countries.

Modern methods of manufacture and application has made it possible to meet the building requirements in this line to-day, at a cost that is very much less than heretofore; and with careful study and design, one is able to perfect any desired scheme of decoration from the simplest to the most ornate, from stock or special models as required.

Throughout the catalogue are a large number of plants showing the different lines of plastic relief work carried in stock by this firm. Centres, cornices, capitals for columns and pilasters, friezes, brackets, consoles, bosses, corbels, architraves, wall and ceiling panels, enriched moulding, etc., etc., in a great variety of designs, are illustrated on a black background which brings out their every detail in an effective manner. Opposite each

plate is a page giving the corresponding number, description and price of each design shown.

In addition there are a series of designs of ceiling plans for different size rooms, with the approximate cost of the ceilings fixed in position; diagrams showing the proper location of wooden grounds for nailing purposes in cornice and beam work; sectional drawings of column and pilaster work, etc., all of which the architect will find of inestimable value.

While the catalogue gives an excellent idea of the range and general character of this firm's work, it does not by any means place a limitation on the numerous designs carried in stock. It simply enables one to judge the firm's capabilities and the vast possibilities of their materials in decorative work.

The basis of all staff castings listed in the catalogue is calcined plaster strengthened and reinforced with different fibres, canvas, scrim cloth, etc., as the occasion demands. Casting in finer interior cements such as Keene's, Parian, Caen Stone, etc., are not carried in stock, but made only to order. The firm, however, can make any of their designs in these cements. Models which are made specially from designs and details, if requested, are not put into stock, but are either destroyed or surrendered upon completion of the work. By this means the best results can be secured, as it guarantees that the work will not be reproduced.

A design which is particularly worthy of mention is shown in Plate A. It is a plastic reproduction of the British Coat of Arms, executed for the entrance of the Bank of Montreal. Those who have seen this splendid casting speak in the highest terms of its beauty of detail and excellent workmanship.

The catalogue also contains several interior views of work done by this firm, besides a partial list of well known buildings throughout Canada in which their work appears. An inspection of any of these buildings is perhaps the best proof of what they are capable of doing along these lines.

Architects will find this catalogue of frequent use, and of immeasurable worth in specifying work of this nature.

The firm is admirably equipped to carry out architects' special designs in a careful and accurate manner. In connection with staff decorative work, they are also prepared to execute any and all kinds of plain interior or exterior plastering, including all required metal or wood furring, lathing, etc., thus enabling them to handle any architectural problem from start to finish with the greatest facility.

The catalogue may be had upon request to W. J. Hynes, 16 Gould St., Toronto.

ALEXANDRA WARE.

CATALOGUE F. of the Standard Ideal Company, Limited, of Port Hope, Ont., is the finest, most complete and useful volume of its kind that has ever been published. This is the consensus of opinion among the architects in whose hands it has recently been placed, and a glance through its pages demonstrates fully that the architects are not amiss in their conclusion.

From cover to cover, it is a veritable masterpiece of the engraving and printing art in catalogue work, and in every feature it reveals that high standard of quality, workmanship and care in production, which so characterizes the goods to which it relates.

It is printed on heavy gloss coated paper and profusely illustrated with the best quality of vignettes, showing the extensive line of plumbing fixtures and appurtenances which the company manufactures. The catalogue, being of loose-leaf style, is capable of being added to and revised, with new plates of designs and price lists, as the occasion demands.

In composition, arrangement, general detail and character of make-up, there is nothing more elaborate that has ever been seen in Canada. And it may be well, in this connection, to mention the fact that this splendid production is an all-Canadian accomplishment, even to the stock on which it is printed. It is a tribute to the high degree of excellence to which commercial printing in this country has attained—a degree in fact which enables the Canadian publisher in this line, to take rank with the best producers of other countries. Furthermore, the cordial manner in which this book has been received shows quite plainly that it is to the interest of manufacturers and supply dealers, when publishing a catalogue, to see that it has the stamp of quality, even if a little additional expense is necessary.

The arrangement of the Standard Ideal Company's catalogue is indeed commendable. Following a bird's-eye view of the company's plant, at Port Hope, Ont., and a brief Introductory, regarding the quality of Alexandra Ware (both in rich-toned three-colored plate work) the entire book is taken up with the various fixtures and appliances manufactured, including complete bathroom sets, separate bath-tubs, wash-stands, drinking fountains, laundry trays, kitchen sinks, factory sinks, bath-room and brass fittings, etc. All are arranged in classified order and

STANDARD IDEAL COMPANY'S NEW CATALOGUE.

indicated by linen index tags, on which is printed the names of the various class of goods to which they individually refer. The series of plates illustrating the styles and arrangements for complete bath-room equipment are particularly worthy of note, as is also the splendid array of separate bath, lavatories, etc., of "Alexandra Ware."

Alexandra Ware is not to be confounded with fire clay products (erroneously named and marketed as solid porcelain ware) as the latter are covered with a thin glazed coating upon the interior, which is usually crazed or cracked, permitting the water to seep through in time into the pores of the clay, and thereby causing it to become water-logged and unsanitary. The "Alexandra Ware" has been constructed with a view of obviating the defects which are found in fire clay products. It has heavy porcelain enamel both on the exterior and interior and each bath and lavatory has a "pure air space," instead of the porous clay body. Being made in two parts, it is more convenient to handle and install than the other variety, which, owing to its very nature, is extremely heavy and cumbersome. While massive in appearance, "Alexandra Ware" is simple and practical in construction. In quality, finish,

and design, it leaves nothing to be desired, either from a sanitary or an artistic point of view.

Prices and more detailed information regarding these excellent products, will be furnished by the Standard Ideal Company, upon request. The company has branches at Toronto, Montreal and Winnipeg.

MOTOR DAGO.

ASIDE from adding to the appearance of the interior of a building, marble mosaic and terrazo floors owing to their non-combustible nature, are regarded to-day as forming an important part in fireproof construction. The greatest difficulty architects and builders have experienced in the past with these floorings, has been in the lack of experienced contractors and workmen skilled in this work.

It will, therefore, be a matter of interest to those engaged in the design and construction of buildings to learn that the delays, inconvenience and expense heretofore occasioned in laying floors of this kind, have been overcome by an ingenious device, illustrated herewith, which is accomplishing great result, as it enables the mosaic or terrazo contractor to execute his work in one-half of the time formerly required, and in a more efficient manner. Furthermore, it makes possible for the contractor, to carry out a job at a distant point without the expense or difficulty of assembling a great number of workmen.

MOTOR DAGO RUBBING A FLOOR IN NEW PRINCESS THEATRE, MONTREAL.

This machine, known as the "Motor Dago" or rubbing machine, is the property of the Calkin Tile and Mosaic Company, of Montreal, designers and contractors in this particular line. Its development has been largely due to the initiative of Mr. Calkins, president of the company, whose twenty-five years' experience in tile and mosaic work, has made him thoroughly conversant with the business from one end to the other. The illustration shows the machine rubbing a floor in the new Princess Theater, Montreal, where 3,000 square feet of mosaic was laid and entirely completed by three men in 42 hours. It is simple in construction, having six rubbing wheels, and so geared that it may be moved in any desired direction at an average speed of twenty feet per minute. It is equipped with a seven and a half horse-power motor, and simply requires to be connected with the electric current. In results, it is capable of accomplishing in one day the work of twenty men.

Estimates, prices, and descriptive matter on mosaic and terrazo flooring will be furnished by the Calkin Tile and Mosaic Company, Ltd., 458 Bleury street, Montreal, upon request.

A HANDY REFERENCE BOOK.

A HAND-BOOK of practical calculation and application of reinforced concrete, published by the Trussed Concrete Steel Company, of Toronto, will be found of especial interest to artchitects and engineers who have occasion to design reinforced concrete structures.

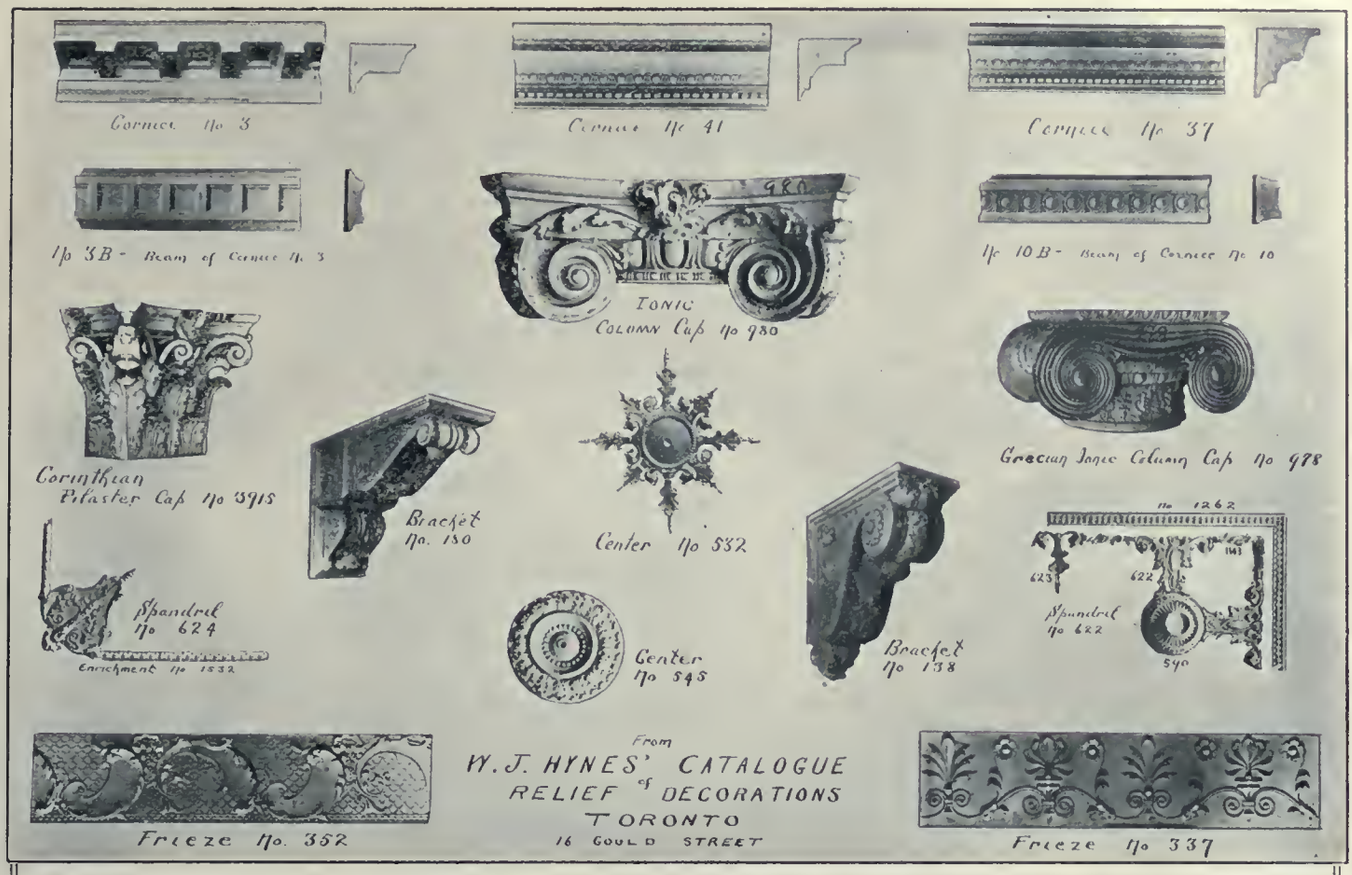
After a brief history and review of the method of reinforcing concrete, and a few pages descriptive of the Kahn system, the book takes up the theory of design, explaining the process of deriving the formulas mathematically from the elementary principles.

This is supplemented by tables showing the reinforcing required for beams and slabs of various spans, depths and loadings, together with tables for columns and footings.

The tables regarding the pressure of coal, earth and grain against the sides of bins, are of exceptional value, as are also the carefully compiled figures showing the relative amount of cement, sand and stone required for concrete of various proportions.

In addition, there is a complete set of tables of coefficients for the design of arches—by use of which the labor incident to design of this character may be considerably lessened—as well as a series of standard designs for both arch and girder bridges and culverts.

Altogether the book is a handy, compact little volume, which should prove a valuable adjunct to the reference library of any architect or engineer. It is comprehen-



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sively written, splendidly illustrated, and substantially bound in a linen surfaced pressed board cover.

Besides containing the information outlined above, it is replete with hints and examples on centering, waterproofing and other points of interest.

INTERIOR FURNISHINGS.

SPECIALLY designed furniture in specially planned buildings is not an uncommon thing to-day. In fact, "Made-to-Order" furniture is essentially a part of any interior where refined taste is manifest. No matter how elaborate in detail are the walls, ceilings and floors, without furniture that will harmonize with the general scheme, the effect is lacking.

An excellent example of the rich tone which the right kind of furniture gives to an interior, is seen in the Royal Bank, Toronto, which was illustrated in the last number of CONSTRUCTION. All the furniture in the building is of special design, and, with the exception of the chairs in the Board Room, was made by the Canadian Office and School Furniture Company, of Preston, Ont. The counter desk and movable furniture in the banking office, as well as the desk, cabinets, tables, etc., throughout, are made of selected mahogany; and the workmanship and finish has been executed in the most creditable and satisfactory manner.

The panelling in the Board Room is another well-executed piece of work, which was done by this company. These panels are of East India Mahogany, and in size are approximately 9 ft. wide and 13 ft. high, each. The company employes a competent staff, who are prepared to carry out architect's specifications in regard to specially designed furniture. They specialize in bank, office, hotel, drug and jewelry store and courthouse fittings.

MODEL SAND LIME BRICK PLANT.

THE following is an extract from a letter written by Dr. Ernest Horstmann, a well known authority on sand-lime brick, relative to the importance of adopting the proper process in the manufacture of products of this kind.

Among the sand-lime brick plants of the entire west coast, that of the Monterey Brick and Stone Company, at Seaside, near Monterey, Cal., takes a special place; not by the exceptional greatness of its output, which is merely 18,000 brick daily, and is, therefore, a proportionately small one, but by the steady demand occasioned owing to the superior quality of its product.

This fact serves to be all the more pronounced, as no matter how favorably sand-lime brick plants are installed, manufacturers, in their endeavor to place first-class products on the market, have suffered from detriments, due less to unscrupulous outside influences than to products of a low standard of other sand-lime plants working in the same districts.

At the present time indications point to a prosperous turn and a rapid development of the sand-lime brick industry, that is, providing the products come up to modern standards of sand-lime brick technique, and thus conforms to the requirements of the builders.

This, and not more or less, is to be expected of a first-class sand-lime brick, if they are to compare favorably and compete successfully with first-class bricks of other materials.

The fact that a good sand-lime brick in every particular can successfully hold its own with the first-class brick of other varieties is just as well established as the fact that an inferior brick of other varieties is not better than an inferior sand-lime brick.

The reason that the product of the Monterey Brick and Stone Company is recognized as being first-class, is based alone on the absolute fulfilment of all conditions to be taken into account in the manufacture of a good product. These are: Good raw materials and best character of machinery.

The manufacture of the sand-lime brick is carried on by means of the Schwarz System, which achieved in Germany a very high position on account of its merits and economy. The three conditions to be fulfilled in the manufacture of a first-class product, besides the matter of good raw materials, are unquestionably fulfilled in Monterey, being: Uniformity in the absolute perfection of slaking the calcined lime into hydrated lime, uniformity as to the moisture of the prepared sand-lime mixture to be pressed, uniformity in the percentage of sand and lime.

Of the qualities of the brick produced by the Monterey plant, merely one may be mentioned, aside from the durability, uniformity, sharp edges and corners, namely: the high crushing strength, which is on the average of 3,000 pounds per square inch.

Besides face and common brick of the natural color the Monterey plant produces colored bricks of most beautiful tints, also moulded bricks and blocks of all designs, by the use of special hand presses.

Any information desired on sand-lime brick will be freely given by The Scientific System Brick Company, 79 Adelaide street east, Toronto.

RECREATION ROOM, ELK'S CLUB, TORONTO—DECORATED BY DEECKER AND CARLYLE—CHAS. P. BAND, ARCHITECT.

AWARDED TWO CONTRACTS.

TWO GOOD-SIZED contracts for cement have recently been awarded by the Department of Railways and Canals to the Wm. G. Hartranft Cement Company, Limited, Montreal. One calls for 10,000 barrels and the other for double that number, making 30,000 barrels in all. This cement, which is known as the Vulcan Brand, is to be used by the Government in carrying out construction work on the Lachine Canal. It is made from the best of raw materials, and is especially adapted to meet the most exacting requirement in Government, municipal, railroad and private work.

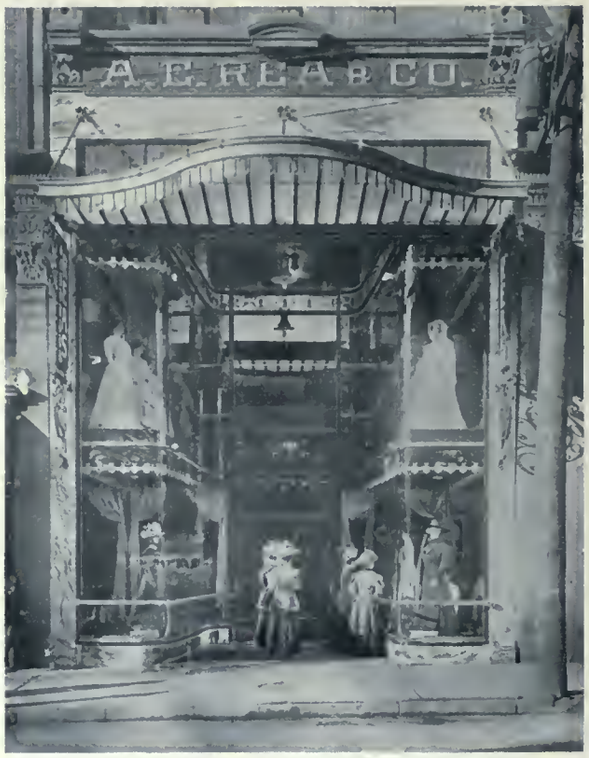
Vulcan cement is the product of a splendidly equipped plant, operated by an experienced staff of engineers, and the company is adequately prepared to execute orders for their product promptly and satisfactorily.

For samples, prices, etc., apply, either in person or by letter, to Wm. Hartranft Cement Company, Bank of Ottawa Building, Montreal.

New Canadian Bank of Commerce Building, Montreal—Darling & Pearson, Architects.

THE MODERN STORE.

MODERNISM along architectural lines is finding greater expression in store fronts and interior fittings of exclusive retail establishments, than in any other form. This is indeed an age when the progressive retailer is seeking the stamp of individuality in



UNIQUE DISPLAY FRONT OF A. E. REA AND COMPANY'S STORE, TORONTO.

his place of business, and the great transformation which has taken place in the shopping districts during the past ten years has carried us through a number of successive changes.

Stock fixtures and fittings of antiquated pattern are being superseded by those of special design, and the old style store with its sash windows and plain interior is fast becoming but a memory. To-day the display windows are more attractive, more alluring in every way, while the interior is far richer in its general tone and more inviting in appearance. In the accompanying illustrations, showing exterior and interior views of the new store of A. E. Rea & Company, Yonge street, Toronto, can be seen the character of the work designers are at the present time accomplishing in this line.

While the attractive front, with its unique display windows and overhanging canopy, stand out in striking contrast with other stores in the shopping district, it does not in any way transcend the splendid character of the interior with its modernly equipped appointments. Here the wall cases and silent salesmen, together with the trying-on cabinets at the rear, show that discrimination and care in detail and arrangement which gives the whole an individual and yet an extremely refined appearance. All the woodwork is of mahogany, highly polished, while the heavy glass of the silent salesmen and wall cases is of the very best quality. In design, detail and workmanship, these fixtures are o fthe very highest type.

The entire contract for this interior was executed by the Toronto Show Case Company, 5-21 Defries street, Toronto, and the despatch and thoroughness with which this firm carried out the work, is certainly a credit to Canadian enterprise and ability. The manner in which the old store of Wanless & Company was converted into this modern establishment, seemed to have an element of the magic of fairyland. At no time has Toronto seen work of this kind carried out in a quicker or more thorough manner, nor has it anything more attractive in general interior appointments. The Toronto Show Case Company's splendid organization makes it possible for them to execute and instal interior fittings and fixtures according to architects' details and specifications, on short notice. Their workshops are excellently equipped and they employ only the best skilled labor.

BAKER & JORDAHL.

MESSRS. BAKER AND JORDAHL, general contractors, Manning Chambers, Toronto, are evidently securing a fair portion of the season's business. They have recently been awarded several contracts for Government improvements, including the construction of a magazine at Toronto, and a rifle range to be built at Niagara-on-the-Lake. While making a specialty of fireproof building construction for factories, mills and warehouses, and also the designing and erection of reinforced concrete buildings and structural steel work, this firm is equipped to carry on general building construction in the full meaning of the term. At the present time they are, in addition to executing other work, making the foundation test pits for the proposed new building which is to be erected in Toronto, for the Bell Telephone Company.

Another contract which has lately been awarded them, is for a residence to be built at Niagara-on-the-Lake for Mr. W. P. Chapman.

INTERIOR OF A. E. REA AND COMPANY'S STORE, TORONTO, SHOWING THE MODERN STORE FIXTURES INSTALLED BY THE TORONTO SHOW CASE COMPANY.

BOSTON ARCHITECT'S DESIGN SELECTED FOR CALGARY LIBRARY—ALBERTA ARCHITECTS UTTERLY IGNORED IN COMPETITION — ANOTHER INSTANCE OF OUTSIDE PREFERENCE. - - - - -

ANOTHER instance of the employment of outside architects to design a Canadian building has been brought to light at Calgary, where at a recent meeting, the architects of that city denounced in no mistakable terms the Calgary Library Board for their action in selecting the plans of a Boston architect for the proposed $50,000 library building, after utterly ignoring the Alberta architects who were asked to submit competitive designs.

The arbitrary manner in which the board made the award certainly justifies this resentment, as the way in which they took it upon themselves to waive all precedent by inviting—under the pretext of seeking advice—a member of the Boston firm to come to Calgary, and then deliberately awarding him the commission for the work, is not only an affront to professional dignity, but a direct contravention of every precept of conventional business practice.

The architects of Alberta were entirely disregarded in the transaction. None of them were invited to meet the committee, nor were they given an opportunity of explaining their plans. What did their time and labor amount to? The board was quite convinced that the Boston architect's plans were the best—he told them so, and he ought to know, being a specialist in library buildings. Had he not elucidated the salient features of his own plan and the shortcomings of the others with which he was kind enough to *familiarize* the board? They were extremely fortunate in securing so able a councillor—quite compensated for the portion of his expenses they offered to bear in coming to Calgary. They needed his services, and therefore had sent for him, and he corroborated their vaguely formed opinion that western Canadian architects were quite incapable of designing even a $50,000 library building. So why bother with explanations from the other architects; it would be useless, a mere waste of time.

The self-imposed delusion was complete, and thus the other competitors were denied the privilege—an inherent right—of being heard regarding the merits of their plans, which the committee had asked them to submit.

It is only reasonable to believe that the board should employ some competent adviser to guide them in the selection of a suitable design—the importance, the cost, and the purpose for which the building is to serve warranted it; but why they should go outside the confines of the Dominion to find one capable of this function, and moreover, nominate one who was a party to the competition, is something that is quite unfathomable. Can it be possible that in the architectural fraternity of Canada, there is no one who can assist in an advisory capacity and pass judgment in a matter of this kind in a fair, disinterested and impartial manner? We answer "No." There are any number of them with a discriminating knowledge of both design and construction, who would gladly lend their co-operation even though it involved to a slight extent a personal sacrifice and made demands upon their time.

In the first place, why should outside architects be invited to compete for work of this kind in Canada? Supposing the Alberta architects who competed did not evolve a plan that would in the eyes of the committee meet their requirements or be suitable for the building in question, does that imply that the architectural resources of Canada have been exhausted and that there is a dearth of native talent? Hardly. It goes without gainsaying that there are a number of practitioners in the Dominion, who have a well-grounded understanding of library design and construction—who have had experience in this class of work, and who have been successful in their creations. Hundreds of municipalities throughout Canada bear witness to the fact, despite the failure of the Calgary Library board to recognize it. Why then were not other Canadian architects given a chance to prove their ability?

If it was necessary for Calgary, in order to conserve her interests to draw upon architects outside the Province of Alberta, why a Boston architect? Why not a Winnipeg architect, a Vancouver architect, a Victoria architect, or one from Toronto or Montreal? It would at least have saved the import duty on the plans, which surely, as a *patriotic, law respecting body,* the board in tends to pay. Or was it that the requirements of Calgary are so exacting that the men who built up Montreal, Toronto, Winnipeg, Victoria, etc., were not equal to the task? It would seem that way, but it was not; and we would dislike very much to believe that the board in any particular has been guilty of nepotism. All deductions of this unheard-of procedure seemingly indicate a predilection for American architects; the effects of a sort of *absent treatment* whose subtle influence has exerted itself in certain public and private instances; a lack of faith in Canadian ability.

There is not one mitigating circumstance that justifies the action of the board. The competition apparently was a competition on the surface and that was all. Behind it there seemed to have been a predetermination to give the work to an outsider, as the shameful manner in which the Alberta architects were treated, indicates.

Yet it is said that some of the members of the board are enthusiastic protectionists—staunch supporters of the policy of high tariff. Surely this is a conspicuous example of their zeal. Of course, there is an exception to every

rule—why not make Calgary the exception this time? Certainly. The Government should in this instance, condescend to exempt American materials from duty and lower the barrier to alien labor. (?) Why not make a good job of it and show the poor Yanks that we are an hospitable nation? It has been done in other exceptions, and now Calgary wants to help sustain the country's reputation.

Even the gentleman from cultured Boston must have a mild contempt for Canadians after the easy manner in which he landed the job. It would be quite unfair to attach the blame to him. He knew the conditions in this country, the lack of stringent tariff laws, the penchant that *some* Canadians have for American architects and had, therefore, only displayed a quality that is quite human. He came, saw more than he expected to see, and conquered —not so much by virtue of his design, but because the board was only too ready to yield; had, in fact, previously decided upon it.

As we said before, we would dislike very much to believe that it was in any way a case of nepotism, nor would we like to believe that there was an emolument in it for the Board. It, however, throws off a malodor, the odor of sacrificed national pride rising from the charnal pile of an unaccountable outside preference.

The Board may have fallaciously reasoned that protection is only necessary for Canadian industries and resources, and not for Canadian art. They may deem the development of building design in Canada a thing quite uncalled for. If so, how can they account for their going abroad for a plan to meet their somewhat fastidious ideas? If Canada needs no art in her buildings, why almost any style of a rectangular structure should have answered the purpose. There is no doubt in our mind that had the Board examined the designs submitted without prejudice, they would have found in the work of the Alberta architects, at least one plan equally as meritorious in design, construction and arrangement as that of the Boston architect.

This is the second happening of its kind in the West, within recent date, that has come to our notice. Regina was the other offender. In her case it was a hospital building, and she too found a specialist—a Chicago architect. In view of the fact that the United States is so prolific in specialists, possibly we could find a few who make an exclusive business of officiating on library boards. Let us try—just make another exception. Surely, the experiment cannot result in anything more disastrous to the integrity of Canada than the two instances to which we refer. In fact, being steeped in the principles of high protection, the instrument of the upbuilding of the United States, Canada might profit from them.

The time is over due when Canada must grapple earnestly with the conditions that confront her. She must protect her interests, not only those of her industries and resources, but of her arts as well. The art of design in building is an important one. The architect works out his design to give expression to his native materials—the materials with which he is familiar, and his protection means the protection of Canadian material firms, contractors and working men. It is up to the architects of Canada to bring this matter before the Dominion Parliament with a view of obtaining legislation and will effectively conserve the interests of Canada. And let those who are exponents of a high protection, such as we learn some of the Calgary Hospital Board are, practice a little more of their creed. It would have a better and more wholesome and beneficial effect in the upbuilding of Canada.

It is gratifying to learn that the Alberta architects are not going to submit meekly to the outrageous treatment accorded them by the Library Board. They have decided to publicly exhibit their plans, and are anxious that the accepted design, which they say has not as yet been seen by anybody but the members of the Library Board, should be exhibited as well. This action on their part will be taken in order that the citizens of Calgary may have an opportunity of judging for themselves as to the merits of the different designs. It is a step in the right direction —one that shows that the Western architects have full confidence in their creation—and, it should bring the people of Calgary and the West to the realization of how Canadian interests are being subverted to the interests of the country across the border.

PROPOSALS TO FEDERATE ALL CANADIAN ARCHITECTURAL BODIES—A SOLUTION OF PRESENT CHAOTIC CONDITIONS.. - - - - - - - - - - - - - -

WE ARE PLEASED to learn that there is a movement on foot to bring about the federation of all the architectural bodies in Canada, with the recently established Canadian Institute at its head.

It has for some time, been recognized that Canada should have a national body of architects, which fact brought about the organization and incorporation of the Architectural Institute of Canada. This Dominion organization must not be looked upon as the creation of any clique of individuals, but to be a success and to successfully accomplish its purpose, it must be a thoroughly Canadian organization, supported, upheld and maintained by not only every individual architect in the Dominion, but by every body of architects. It is true that local bodies may have individual problems which they have to solve, and just as these problems can be more easily dealt with by a local association of architects, rather than by the individual members, so can the common problems of all the provincial architectural bodies be much better solved through a Dominion body which shall be strengthened by all the local bodies throughout the Dominion.

As we understand it, the suggestion at present is about as follows: It proposes to request the five or six provincial bodies now in existence to consent to join the Canadian Institute as a body in each case, at the same time retaining their full identity and all of their educational and examining work, under the name of (for instance, we will say) "The Manitoba Chapter of the Architectural Institute of Canada." All architectural clubs at present existing will be asked to consider the same proposal in each of their individual cases. This would imply an increase in the annual fee paid by the members of the Canadian Institute, and a consequent reduction in the annual fee of the provincial bodies and clubs, so that no greater total fee would be paid for membership in the Canadian bodies than is required under present conditions.

If such a movement should be successfully brought about, the profession of the whole country would be represented by influential bodies in each locality, with a financially solid and powerful institute at the head, the membership of which would reach five hundred or more. tI is further proposed that this Institute should give financial support to the provincial bodies or clubs in their educational and examining work, and, with its extensive membership, it would exercise a influence of considerable power from its headquarters at Ottawa, and represent the profession in Canada with great dignity.

This suggestion should be welcomed by every architectural body in Canada as a solution of the present chaotic conditions existing. The effect of such a movement would be to give the architectural bodies in the different portions of the country an opportunity to thrash out the several problems before them, and arrive at conclusions and policies that would be agreeable and beneficial to all and would eliminate the unfortunate condi-

tion of having organized architectural bodies in various portions of the country, working at cross purposes.

As the provinces are federated under one Dominion Government, so should the architectural bodies be, if they wish to exercise concentrated effort in the raising of the standard of architecture of this country. Local effort, it is true, is beneficial, while scattered effort is futile, but combined effort is the one thing to be desired.

SINS OF THE ARCHITECT AND CONTRACTOR — CONSPIRACY, CARELESSNESS, FOGGISM AND SHARP PRACTICE, THE MOST DANGEROUS EVILS. - - -

THAT THE SINS of the architect and the contractor are many is a regrettable but nevertheless an undeniable fact. Many architects of recent years have adopted very shady methods of soliciting business. Some have entered into business association with contractors, material dealers and manufacturers, and their advice to their clients has been influenced by these business connections.

Instances are not rare where architects have conspired with contractors to hold up the owners for extras, and, in fact, recently some contractors have grown so bold that when putting in a tender on a job they will plainly ask the architect how much must be included in the tender for him. Contractors' combinations have been discovered and some attempt has been made to break them up, but there is still much to be done along this line of reform.

The building and contracting industry is a vast one in Canada, and many millions of money are invested in the industries directly or indirectly connected with building construction, and it should behoove every respectable architect, contractor and manufacturer to discourage in every conceivable manner the growth of the monster "graft."

The following is an interesting confession from a correspondent signing himself "Sinner," recently published in one of our contemporaries in the United States. He seems to speak from experience:

The ethics of the contractor is something to which the average architect and material man should, and in some measure does, pay careful attention. We have said "some" and the reason why we qualify is that it is, occasionally, to say the least, an exception.

Just why an architect does not put forward at all times, the requirement of sterling honesty on the part of a contractor is a question which he will have to answer for himself, but we have our ideas on the subject.

Perhaps there is something to be gained by not scrutinizing the man too closely, or being honest himself (the architect, we mean), he thinks all others are, as well and in this case, he learns, when too late, that the job has been jobbed as well as others. There is another who has been hit, quite hard, and that is the owner, who last of all has to bear the burden of a "mistake" on one part, and infamy on the other.

An honest contractor means an honest job, no heartaches, no quarrels or law suits. It means more than that. It means a good reputation for both the contractor and architect—good enough capital for either.

Give a calf enough rope and he will strangle himself. Give a crooked contractor an opportunity, and he will emigrate to pastures new, at frequent intervals.

If an architect is not a walker in the straight and narrow path, sooner or later he takes a walk also. We know of one who, in "his day and generation," was a peer of them all; recently he finished a sixty days' stunt on the county stone pile.

A contractor who "skins" the job enjoys only a limited spell of prosperity. His song soon becomes "nothing doing."

In this bailiwick we know of contractors who need not "sign up"; they make money, honestly, too.

We know of others with whom a contract as well as a bond is of little use towards completing a strictly honest job.

"Extras" are the bane of the owner; a good architect does not have many extras. Sometimes they are necessary, but as a rule, with an honest architect and an honest contractor, they are mighty scarce. True, even with the best of use, there may be something which should have been included in the original specifications and was not, nevertheless with careful drawing of the articles governing the contract there ought to be nothing wanting on which the contractor could build extra claims.

Many times we have heard of a shrewd contractor who, in making his bid, discovered some important detail which was left out, thus enabling him to make a much closer proposal than some of the less observing competitors, expecting to make up the low figures on the "extras."

We know of one architect who forgot to include a stairway to a second storey in the plans. The sharp contractor discovered this and made an unusually low bid, secured the job and when it came to stairways he held the owner up for a big sum and made considerable money on the contract.

Plumbers are about as questionable in these matters as any, and the owner who gets out without a "hold-up" on their part is a rare one. Perhaps there is some reason why they are the most cordially hated of all the contractors, who have to do with the construction of a building.

Our best, our leading, our successful architects are those who give careful attention to every matter of detail even in the proper selection of the contractor. Those who are careless soon find their business on the wane.

Another class of architects are those who do not progress with the times. You can tell them by noting the last building for which they drew plans and comparing it with the one planned several years since. The style is the same, the construction is the same.

Once in a while we find one who knows it all. He says: "I have used such and such material for years and it is good enough for me."

A little more reading, a little more "absorption," if you will, would do as good, but the matter of progress on the part of all would eliminate the factor of the "has beens."

Sometimes the material man does not receive the recognition he deserves; he is in a position to do the architect a great deal of good, it is his business to keep posted on improvements and if allowed to present the merits of his goods we are quite sure the architect would add to the character of his work without lowering his dignity.

We know of one material man who makes a specialty of a certain kind of furnishings, we will say church furniture, knows a great deal about the most modern methods of construction, especially as regards seating and their arrangement. He offered one architect the benefit of a large list of such plans, and received for his kindness, "No, I thank you; I do only original work, never copy anything, work it out in my head." This architect has one small back room in a cheap building, has been there several years, will be there several more, if he don't get into the county poor house. His clothes look seedy, he looks rather rusty, is both; in fact he was a "has been' before he commenced his profession.

Another class which makes mistakes are those who always have the same contractor do their work. It looks bad; it is bad. Too close "fellowship" means loss for someone; usually, as before, the owner.

Both get careless, both get something else—sometimes. Taken, however, as a whole, the profession, both of the architect, the material men, and the contractor, is far better as to its ethical side than a few years since, and it lies with the two first as to how much better it will be in the future.

VIEW OF COUNTRY HOME AND GROUNDS OF MR. JAMES RYRIE, SITUATED TWO AND ONE-HALF MILES EAST OF OAKVILLE, ONT. BURKE AND HORWOOD, ARCHITECTS.

COUNTRY HOME OF MR. JAMES RYRIE.---Designed to Harmonize with Beautiful Estate Which Surrounds It.---Built Partially of Stone Native to Its Grounds.---Estate Equipped with Private Water Supply, Telephone and Sewerage Systems.

ONE of the fascinating spots where architecture and landscape combine to effect a picturesque consonance in their relationship, is the country home of Mr. James Ryrie.

Situated on the north shore of Lake Ontario, about two and one-half miles east of Oakville, this delightful home, both in design and construction, has seemingly become a very part of the beautiful grounds which surround it. The house which is two stories high, besides the third story formed by the low broad roof with spreading eaves, dormer windows and moss green shingles, presents a most attractive appearance with its simple character, hospitable lines and homelike atmosphere.

At the front of the house is a large spacious verandah

COUNTRY HOME OF MR. JAMES RYRIE, SHOWING THE LARGE RUBBLE STONE AND CLINKER BRICK CHIMNEY AT THE SOUTH-WEST END. BURKE AND HORWOOD, ARCHITECTS.

FRONT ELEVATION, FACING THE LAKE SHORE, COUNTRY HOME OF MR. JAMES RYRIE. BURKE AND HORWOOD, ARCHITECTS.

paved with large red tiles at the level of the adjoining lawn. This splendid feature is formed by massive stone piers two feet square supporting the front portion of the second story. Facing the south-east, it commands a delightful view of the grounds and orchard of cherry, apple and pear trees, and the lake beyond, while two well-placed balconies at the front and the end wings, extending back at angles of about 45 degrees, further add to the picturesque beauty of the whole.

Consistent with its natural surroundings, the masonry walls of the first story of the residence, are built of flat lake stone which was obtained from the shore in front of the property. The upper portion is of solid half timber construction, morticed and fastened with primitive wooden pins in marked contrast to sham half timber work seen in many modern dwellings. The timbers are left rough from the saw, and stained a greyish brown in harmony with grey tones of the stone work; and in keeping with this combination are the chimneys faced with clinker bricks, running from greys to light olives and browns, growing out of and blending with the rubble stone forming their base.

SPACIOUS VERANDAH, COUNTRY HOME OF MR. JAMES RYRIE, SHOWING THE LAKE STONE PIERS SUPPORTING THE UPPER FRONT PORTION OF THE HOUSE. BURKE AND HORWOOD, ARCHITECTS.

Internally the house is characterized by the same simple and inviting appearance which so strongly marks the exterior. A large entrance hall, with staircase leading to the floors above, extends through the building at the centre, and practically separates the living from the service department.

VIEW SHOWING RIGHT WING, COUNTRY HOME OF MR. JAMES RYRIE. BURKE AND HORWOOD, ARCHITECTS.

The living room is on the opposite side of the hall from the dining-room, and adjoining it is the billiard-room, with a built-in brick fireplace at one end and a wall cupboard at the other. These three rooms have timbered ceilings of solid Georgia pine with walls panelled in the same material. The living-room has also a built-in fireplace of brick, while in the dining-room in a niche extending to the right at the front wall is a large cosy ingle-nook.

VIEW SHOWING LEFT WING, COUNTRY HOME OF MR. JAMES RYRIE. BURKE AND HORWOOD, ARCHITECTS.

The right wing of the house in which the kitchen and pantries are located, is used wholly as servants' quarters. It is fitted up in a maner quite in keeping with the whole place, being provided with a verandah, and containing three bedrooms and a bathroom on the second floor.

LIVING ROOM, COUNTRY HOME OF MR. JAMES RYRIE. BURKE AND HORWOOD, ARCHITECTS.

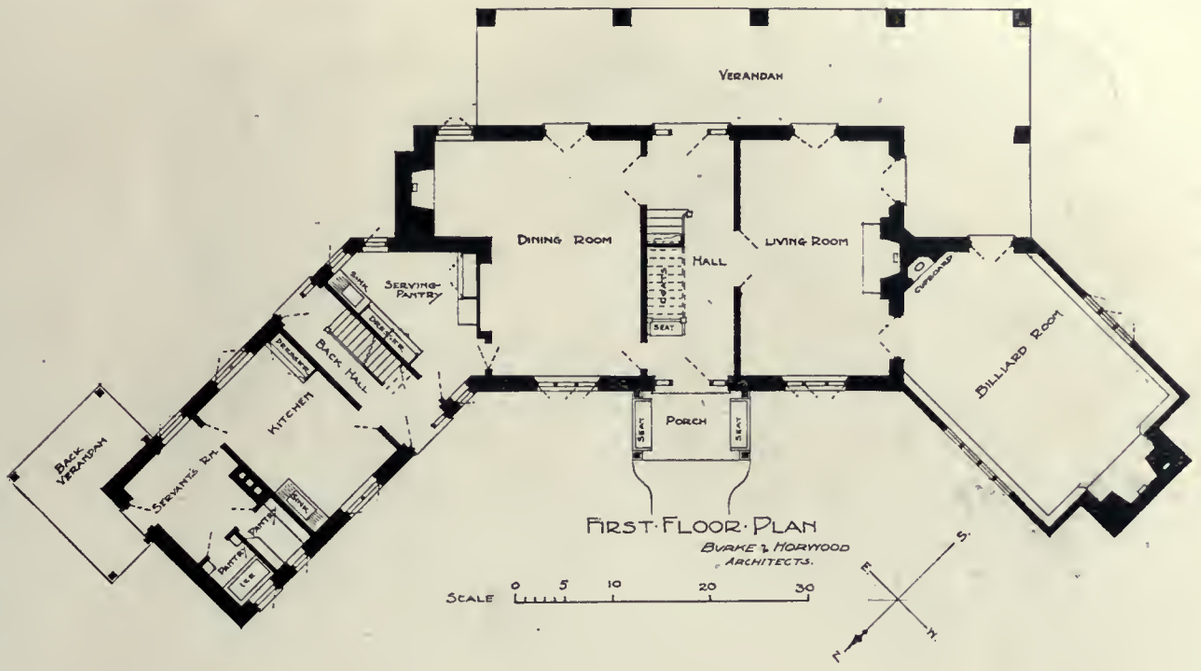
Upstairs, in the family portion of the house is a sewing-room opening on to the balcony, and seven well-placed bedrooms, the two in the left wing being provided for visitors. All bedrooms have been placed convenient to the bathroom, and each has running water and individual clothes closets.

Situated well back on the grounds from the house are the other buildings on the estate. These consist of a man's house or lodge, and the stable and coach-house. As with the residence a great deal of material used in their construction, is native to the lake shore, both buildings being built of flat lake stone for the first story, with half-timbered construction above.

Immediately in front of the stable and coach-house is a large paddock, while adjoining it on the right is a cow barn, with

BILLIARD ROOM, COUNTRY HOME OF MR. JAMES RYRIE. BURKE AND HORWOOD, ARCHITECTS.

INGLE NOOK IN DINING ROOM, COUNTRY HOME OF MR. JAMES RYRIE. BURKE AND HORWOOD, ARCHITECTS.



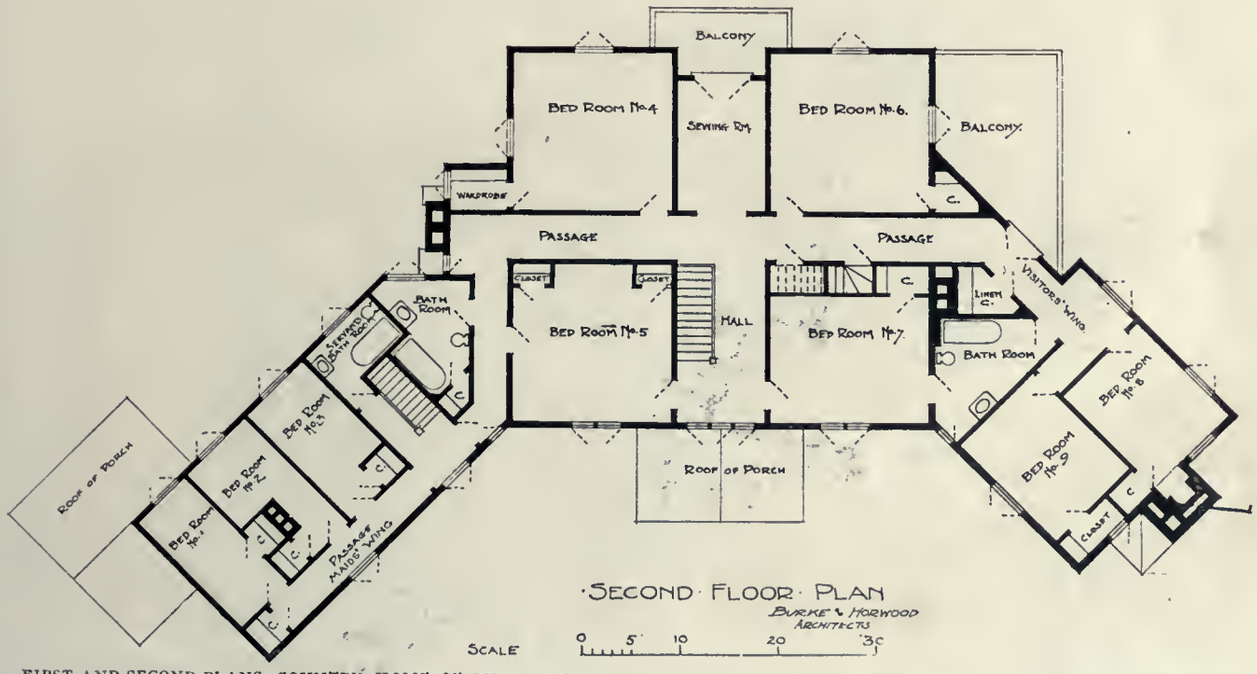
a modernly-fitted hen-house and poultry yard beyond. The lodge is a good-sized six-room dwelling, and extending along its front is a beautiful hedge running parallel with the driveway with lead up from Lake Shore road to the circular carriage path, off of which is located the porch at the rear of the family residence.

All buildings are connected to each other with a private telephone system, and as for sewerage, the estate leaves little to be desired, as six-inch glazed tile pipes carry off the drainage to a septic tank located at the northeast section of the property.

Another exceptional splendid feature in the way of convenience and utility, is the private waterworks system which supplies the various structures and lawn service. This system is operated by a Fairbanks engine, located in the basement of the barn. It has a capacity of 2,000 gallons per hour, and irregardless of the number of fawcets or garden taps in use, is capable of maintaining a strong and steady pressure at all times.

The architects of this admirable group of buildings are Messrs. Burke and Horwood, and they were governed to no little extent in the disposition of the various structures by the existing hedges, magnificent growths of cedars 20 to 30 feet in height.

A COMMITTEE OF THE MINISTRY of Ways of Communication, St. Petersburg, has under advisement the question of introducing in Russia a new electro-turbine engine, invented by an Italian engineer, which requires neither wires nor electric stations. The speed developed exceeds 100 kilometers (62.07 miles) an hour. It is said that this engine, which costs $40,000, can cover a distance equal to that from St. Petersburg to Moscow, 375 miles, without a stop.



FIRST AND SECOND PLANS, COUNTRY HOME OF MR. JAMES RYRIE, SHOWING THE ARRANGEMENT OF THE VARIOUS ROOMS. BURKE AND HORWOOD, ARCHITECTS.

EXTERIOR VIEW AND DETAIL OF MAIN ENTRANCE OF MESSRS. DEBENHAM & FREEBODY'S PREMISES, WIGMORE STREET. A STRIKING EXAMPLE OF THE USE OF CERAMICS IN A MODERN LONDON BUSINESS BUILDING. MESSRS. WILLIAM WALLACE & JAMES T. GIBSON, ARCHITECTS.

PERSPECTIVE OF LARGE MODERN DEPARTMENTAL STORE, NOW BEING ERECTED IN OXFORD STREET, LONDON, FOR SELFRIDGE & COMPANY, LIMITED. THE BUILDING WAS DESIGNED BY MR. R. FRANK ATKINSON, F.R.I.B.A.

MODERN BUSINESS PREMISES IN LONDON.---American Influence on Construction and Design.---Steel-frame and Ferro-Concrete Buildings.---Experiments in the Use of Ceramics.---Greater Dignity and Beauty in Business Architecture.

By HUGH B. PHILPOTT

IF WE WOULD find, in London or any other city, the buildings which most clearly exhibit modern developments in construction and the use of materials, it is naturally to the business premises that we turn. Here, if anywhere, we may expect to find the newest methods exemplified. The business man is not greatly concerned about architectural traditions nor about abstract beauty in building. The building in which he can most comfortably, quickly and effectively do his work is the building which he requires, and if steel or ferro-concrete is found to conduce to this end he is generally ready to adopt these newer methods of construction in preference to the old. And that is precisely what we find in London. If it cannot be said that the owners of business premises are wildly revolutionary in their ideas, it is nevertheless true that their patronage is mainly responsible for some very remarkable building developments which have been seen in London during the last few years.

Of all the changes the most striking and the most far-reaching in effect is the increasing use of structural iron and steel. Steel stanchions and joists are now almost universally employed; the wall has almost lost its structural importance, and is often little more than a screen against the weather, the whole weight of floors and roof being carried on the steel framework.

But while there is this general use of steel in building construction, there does not appear to be as yet any general movement amongst English architects in the direction of adopting in its entirety the American system of steel skeleton construction, the system in which all the structural members are of steel with riveted connections. There are buildings of this character in London, but they are the exception rather than the rule. The Ritz Hotel and the "Morning Post" buildings are probably the best examples we have. I am not dealing with hotels in this article, but the "Morning Post" building, which stands within the area of the great Strand improvement scheme —the most important London street development of modern times—furnishes us with a very good example. The building stands on an irregular site with a sharp angle jutting up into the Strand—a difficult site to deal with by the older methods of construction. By the use of the steel skeleton it has been possible to utilize this projecting portion—the apex of the triangle—to much greater advantage than could have been done if the floors and the domical roof had depended for support entirely upon the masonry. But the determining factor which induced the proprietors to decide upon a steel building was their desire to obtain a large and unbroken area in the basement. This, which would be impossible if the superstructure were supported on brick or masonry piers, is easily accomplished with a steel construction.

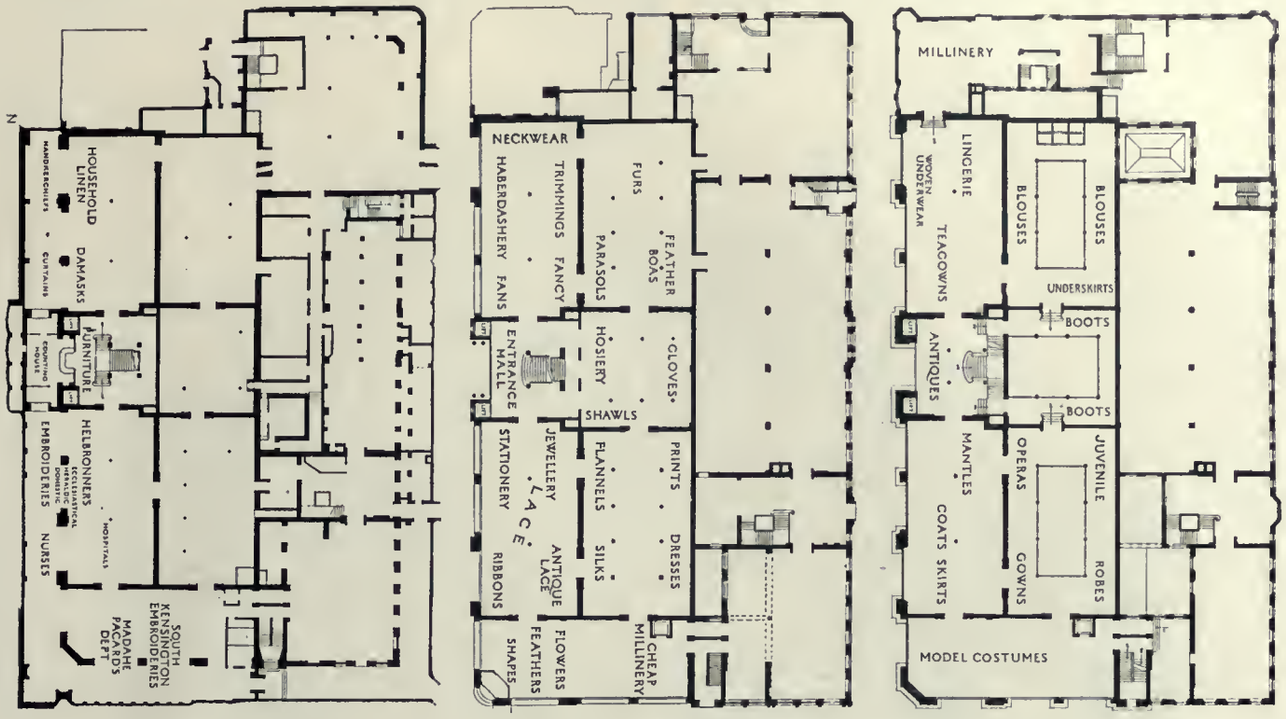
The architects of this building were Messrs. Mewes and Davis, and the contract for the erection was carried out by the Waring White Building Company, their engineer, Mr. S. Bylander, acting as consulting structural engineer. Mr. Bylander has been concerned in the designing of steel skeleton buildings in America and in this instance he was able to carry out almost in its entirety the American system. Architecture and steelwork were designed simultaneously, architects and engineer consulting each other and completing their scheme in every detail before a beginning was made with the building. An immense number of figured drawings were prepared, including special drawings to show the methods of connecting the stone, brick, steel and concrete.

The customary English method, as adopted in most of our recent buildings, is somewhat different. The architect prepares his design independently and then, as a rule, obtains the assistance of an expert constructional engin-

WINCHESTER HOUSE, OLD BROAD STREET, E.C., LONDON. A RECENT BUILDING OF THE OLDER STYLE OF SUBSTANTIAL MASONRY, PLANNED FOR OFFICES AND SHOPS. MR. JOHN BELCHER, A.R.A., ARCHITECT.

MODERN BUSINESS BUILDING OF MAPPIN & WEBB, OXFORD STREET, LONDON. DESIGNED BY MR. JOHN BELCHER, A.R.A.

VIEWS OF ENTRANCE HALL AND A SECTION OF THE THIRD FLOOR, MESSRS. DEBENHAM & FREEBODY'S PREMISES, WIGMORE STREET, SHOWING THE LUXURIOUS APPOINTMENTS OF A MODERN LONDON RETAIL ESTABLISHMENT. MESSRS. WILLIAM WALLACE & JAMES T. GIBSON, ARCHITECTS.



BASEMENT, GROUND AND FIRST FLOOR PLANS OF MESSRS. DEBENHAM AND FREEBODY'S PREMISES.

eer, who indicates on the drawings the positions and sizes of steel stanchions and girders. The quantities are then taken out by a quantity surveyor, and on the basis of the drawings and quantities a number of steel firms submit competitive tenders. It will be seen that we have not as yet in England so close a co-operation between architect and engineer as is customary in America, nor have we adopted steel construction in so complete, thorough-going and scientific a fashion.

A great obstacle to the progress of steel construction, and also of ferro-concrete in England, is presented by our restrictive building regulations, which were devised before the newer forms of construction had been introduced, and have not yet been altered to suit changed conditions. The necessity of building walls, although constructed of steel or ferro-concrete, of the thickness which would be appropriate if they were entirely of brick or stone, involves an immense waste of material and goes far to counterbalance any saving in cost of construction which the newer building methods might otherwise effect. This, however, is only a temporary check. The building regulations throughout the country are certain to be altered at no distant date so as to remove needless restrictions against the use of any serviceable building material.

Another very common difficulty is the fact that, as things now stand, the architect who adopts the steel skeleton system of construction thereby diminishes his own emoluments. It is necessary, of course, in such cases to employ a highly qualified structural engineer; but at present there is no recognized arrangement for the payment of his fees. The present practice seems to be for the architect to pay them out of his 5 per cent. commission. It is hardly to be expected that architects should be greatly enamoured of this system, and the building owner will require a good deal of educating before he can be brought to see that it may really be good economy to pay a substantial fee to a specially qualified engineer in addition to the architect's commission.

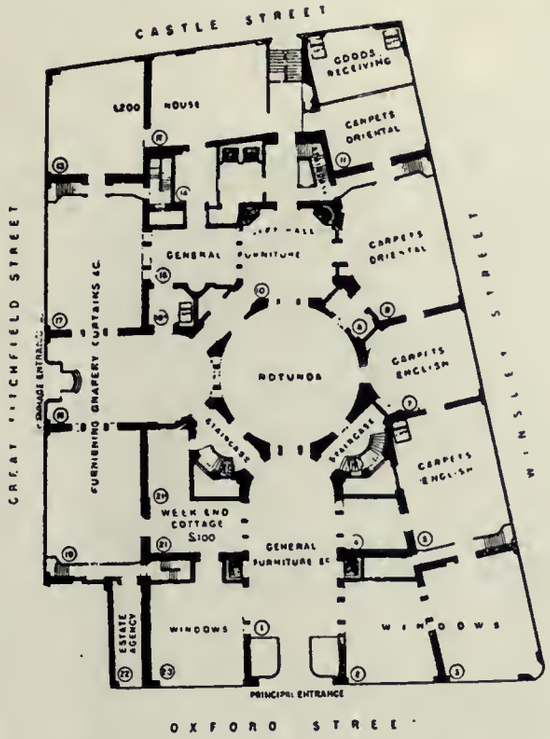
But in spite of obstacles the use of steel in building is steadily increasing and some of the new buildings that are springing up clearly demonstrate the practical value, from the commercial point of view, of the newer methods of construction. Take, for instance, the huge building which is being erected in Oxford Street for the American house of Selfridge & Company, Ltd. The contract is being carried out by the Waring White Company, and Mr. R. Frank Atkinson, F.R.I.B.A. is the architect. The building is not yet completed, but it can be seen from the architect's perspective, which we reproduce, that the design is of extreme simplicity and of a bold impressiveness. Though internally the building is of steel construction the exterior is, as it appears to be, of self-supporting masonry. The piers of the ground floor are of blue brick, the huge columns are of Portland stone and the whole of the facades is faced with the same material. Foundations and walls have been made strong enough to allow of additional storeys being added to the building, if desired at some future time. There are 3,000 tons of steelwork in the building, and the foundations go 60 feet deep into the London clay; the floors are of ferro-concrete, and are built to carry a safe load of 220 lbs. to the square foot. The interior walls are carried on steel, so that they may be removed later when the

BASEMENT FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

MESSRS. WARING & GILLOW'S LARGE GENERAL RETAIL ESTABLISHMENT, OXFORD ST, LONDON, SHOWING THE LAVISHLY DETAILED EXTERIOR, TOGETHER WITH A VIEW OF THE ROTUNDA. MR. R. F. ATKINSON, A.R.I.B.A., ARCHITECT.

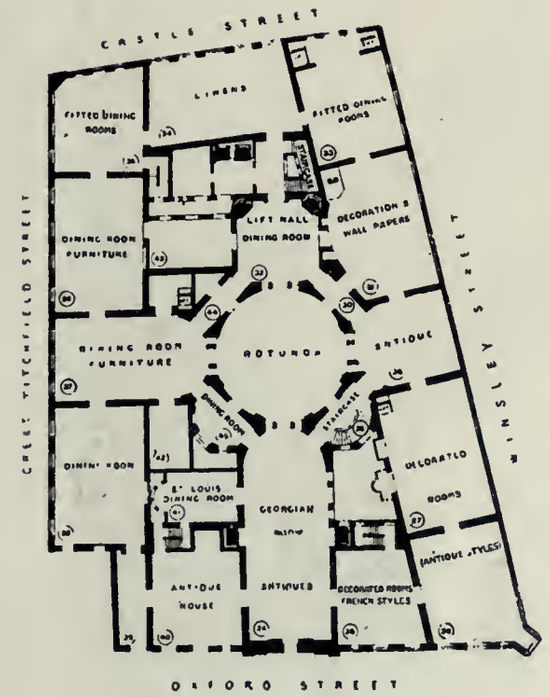
law permits. The building has a floor area of 24,500 square yards, and will be the biggest retail establishment in London.

In respect to cheapness and rapidity of erection Messrs.



GROUND FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

Selfridge's establishment will probably create a record. This result is due in part to the close co-operation between architect and engineer and in part to the rectangular plan-

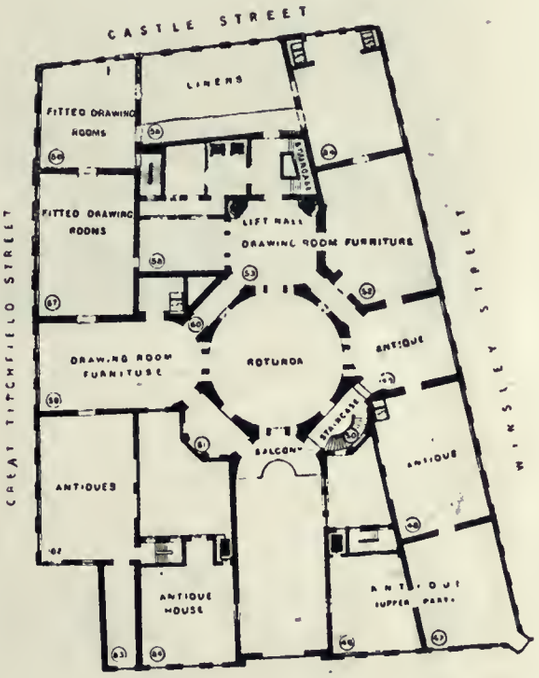


FIRST FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

ning. The total time taken in the erection of the building will prove to be very short, but there have been some delays. The really phenomenal thing is the rate at which the building grew when the work was actually in progress. This is graphically illustrated by the photographs which show the building at two stages in the course of erection. The first of these photographs was taken on September 17, the second on October 2, so that the difference represents only fifteen days' work.

In regard to the use of materials nothing has been more interesting in London building during recent years than the experiments that have been made in the use of glazed ware. The natural desire to find a means of protecting our buildings from the begriming effect of London smoke and fog has led to a greatly increased use of glazed bricks and of a glazed terra cotta. A glazed facade can, of course, be washed, and made to appear after the lapse of many years, as clean and fresh as when first erected. This is regarded by some architects as a defect, inasmuch as the buildings are denied the advantage of the mellowing, harmonizing influence of time. But more, probably, would admit that the gain of having a material which can be readily cleaned without injury to its texture outweighs any loss arising from a too obtrusive newness of appearance.

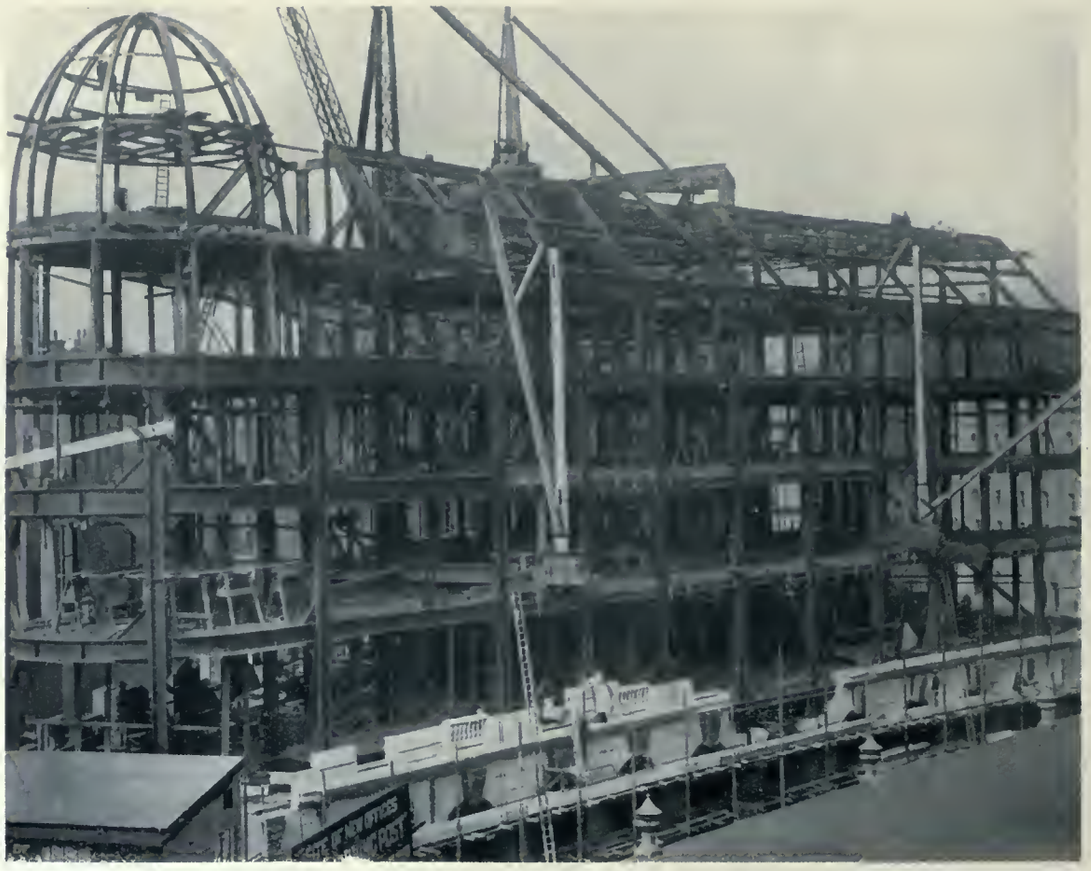
One of the most successful essays yet made in the use



SECOND FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

of this material is in the new premises of Messrs. Debenham & Freebody in Wigmore Street. It is the white glazed blocks which are used exclusively in this building. Touches of color are given to the main facade by the use of green marble columns with gilded capitals, and colored marbles are freely used in the interior. The joint architects, Messrs. William Wallace and James T. Gibson, have shown a nice appreciation of the capacity and the limitations of their material. It is not employed, as has sometimes been done, as a mere facing material; the blocks are bonded into the brickwork and fulfil a structural as well as a decorative function. On the other hand there is a reasonable flatness in the treatment throughout; the material is not built up into columns—a use that is quite possible and is sometimes adopted, but not without some loss of grace and of apparent strength—and the ornament is delicate and refined, with the soft, flowing continuity that suggests a plastic material.

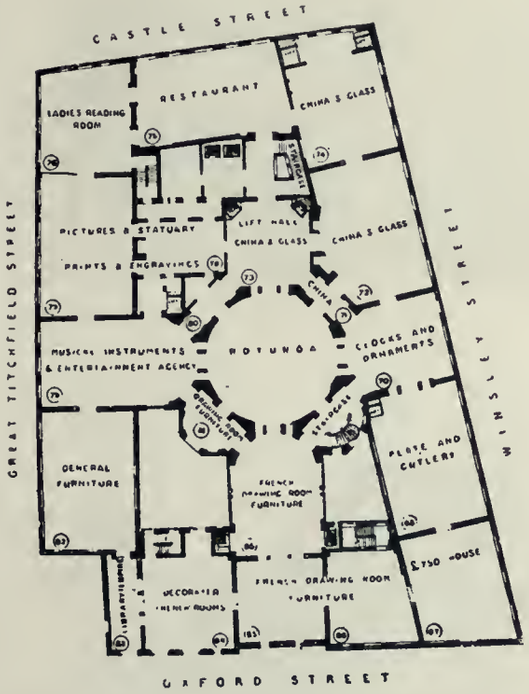
This fine building is distinguished above almost all the retail establishments of London by the high artistic ideal that has been realized in its building and decoration. Nowhere does there appear to be any sacrifice of



FRAME WORK AND COMPLETED BUILDING OF THE MORNING POST ON THE STRAND. THE UPPER VIEW SHOWS TO WHAT EXTENT STRUCTURAL STEEL IS BEING EMPLOYED IN THE ERECTION OF SOME OF THE MODERN BUSINESS BUILDINGS IN LONDON. MESSRS. MEWES & DAVIS, ARCHITECTS.

beauty to commercial exigencies. Every detail has evidently been considered not merely from the point of view of attracting the public but also with a view to achieving an artistic ensemble. Mr. Ernest W. Gimson and Mr. Gilbert Seale are responsible for the enriched plaster ceilings and the Birmingham Guild of Handicrafts supply some admirable decorative metal work, including the lettering in blue and green enamel on the stallboards—a novel and happy feature.

But the great distinction of this building from the architectural point of view lies in the admirable solution it affords to the perplexing problem of the modern shopfront. The shopkeeper has learned that with the aid of plate glass and iron girders builders can give him a huge, unbroken expanse for the display of his goods. And, as a rule, this is his first demand. The architect's problem is how to supply this demand without completely spoiling the architecture. Obviously a building "without visible means of support," as the police charge has it, is an artistic anomaly. But if the client insists on his full extent of advertising space, what is the architect to do? Quite commonly he gives the problem up—hands over the



THIRD FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

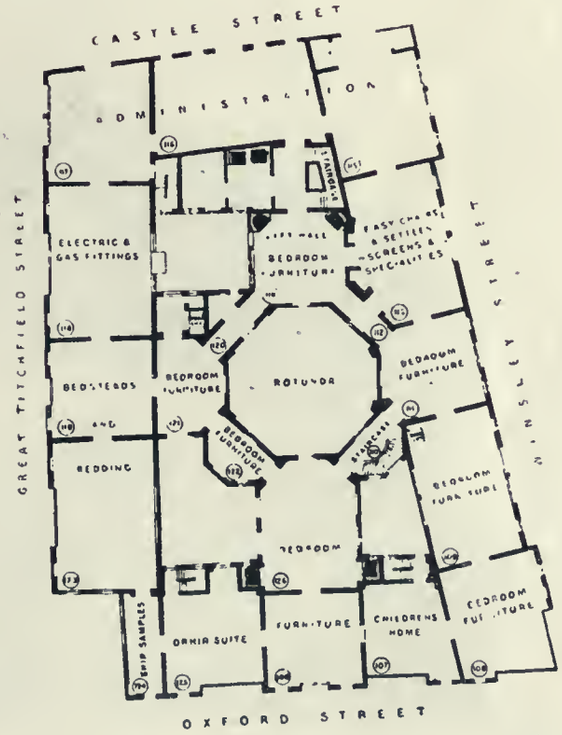
ground floor to the Philistines and starts producing architecture at the first floor level. A curious instance of this may be seen just now in Piccadilly, where an important building just completed for an insurance company shows an elevation, from the first storey upwards, on which the architect has expended much skill and taste; but below is a gaping void with an advertisement board pointing out that the fine frontage 40 ft. by 20 ft. is available for a shop. The first floor has a colonnaded front and the columns rest upon nothing—with a somewhat weird effect.

In the case of Debenham and Freebody's building Messrs. Gibson and Wallace have adopted the expedient of a series of arches extending through two storeys. The arches spring from the first floor level, giving a big semicircular light to the mezzanine floor as well as a wide opening for the ground floor shop. The piers and arches give both an apparent and a real support to the superstructure, which thus forms with the lower storeys a complete and harmonious architectural composition.

A structural relationship once established between the lower and the upper storeys, it becomes possible to treat the shopfronts in a variety of ways. At Messrs. Waring and Gillow's new premises in Oxford Street an interesting and successful device is adopted. Here, instead of an arched construction, we have heavy rusticated piers which, though necessarily helped by concealed girders,

FOURTH FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

take a large share of the weight of the superstructure, and effect the architectural connection between the upper and lower portions of the building, which is such a desideratum. The novel feature is the way in which the



FIFTH FLOOR PLAN, MESSRS. WARING AND GILLOW'S PREMISES.

shopfronts are recessed between these piers. The streets of plate glass, enclosed in bronze frames, are shaped to the curves of the entrances, receding far enough to

VIEWS OF SELFRIDGE & COMPANY'S BUILDING, SHOWING PROGRESS OF CONSTRUCTION ON SEPTEMBER 17 AND OCTOBER 2. AN IDEA AS TO THE RAPIDITY WITH WHICH THE WORK IS BEING CARRIED OUT CAN BE SEEN FROM WHAT HAS BEEN ACCOMPLISHED IN THE SPACE INTERVENING THESE DATES.

form extensive showrooms in which furniture and other goods can be effectively displayed.

This imposing structure, which was designed by Mr. R. F. Atkinson, F.R.I.B.A., presents a bold and striking elevation to Oxford Street. The ground floor is of grey granite, the upper portion of Portland stone and dark red bricks and the roof is of green slate. The ornament is somewhat florid, but no doubt it is one of the functions of the building to call attention to itself, and that it effectually does. Structural steelwork was used to a considerable extent in this building, and the floors and roof are of reinforced concrete. The most notable internal feature is a spacious rotunda, which forms the central feature on every floor. It is about 90 feet high and is covered by a glass dome.

Next to Messrs. Waring and Gillow's premises in Oxford Street there has just been erected a building which in its delicate and rather attenuated grace affords a striking contrast to its robust and massive neighbor. This is the new shop which has been built from the designs of Mr. John Belcher, A.R.A., for Messrs. Mappin and Webb, the silversmiths. Steel construction has been extensively used in this building and ample spaces are provided for the display of goods, both ground floor and mezzanine floor being included in the shopfronts. The tall slender columns have steel stanchions behind them, so that there is no question of their ability to sustain the weight of the superstructure. But they are sufficient to give that appearance of support which the eye demands, and to establish the structural relationship between the upper and the lower parts of the building. The vertical lines are continued upwards in the form of square piers or pilasters on the first floor and graceful twin columns with delicately carved capitals of original design on the second floor. From the broken entablature above the twin columns spring semi-circular arches, affording, with the deep cornice above, a welcome change from the predominantly vertical character of the elevation. The facade is entirely of Pentelic marble—a luxurious experiment, in so far as London buildings are concerned. The roof is of green slate; the bases of the columns are of bronze, and the balustrade on the first floor is of wrought iron with gilt embellishments.

Mr. Belcher's designs are always distinguished for the freedom and originality with which he treats Renaissance forms. This is illustrated among recent London buildings not only by Messrs. Mappin and Webb's premises but also by a very different type of building, Winchester House, London Wall, of which we illustrate the principal facade. London Wall is a very narrow thoroughfare, so that the building is not seen to advantage, and the photograph does much less than justice to a very powerful and original piece of design. The rusticated piers of the ground floor are of grey Cornish granite, the upper portion of the building being of Portland stone. The most striking feature of the elevation is a series of pilasters projecting from the wall at the first and second storeys and boldly sculptured in their upper portions into huge Titans with arms raised supporting a deep cornice. The six figures are all different from each other and are very vigorously modelled. There is variety, too, in the heads above the first floor windows and other minor sculptural work. Ironwork flambeaux stand on the main cornice and above them on the wall of the attic storey are lion's heads with wreaths.

The building which is distinguished by this remarkable elevation is an example of the older style of substantial masonry construction in which steelwork plays comparatively little part. It is planned for offices and shops.

It is only possible in a single article to refer to a few of the recent business premises of London. But a wider survey would reveal even more strikingly the great advances which have been made of late years in imparting dignity and beauty to this class of building. The shops show a new concern in many instances for beauty of building and decoration, and if we include the insurance offices, the hotels and such semi-public buildings as Lloyd's Register of Shipping we find that these buildings present some of the most worthy architecture of recent years combined with some of the finest work of our sculptors, art metal workers and decorative artists.

RUBBER-ASPHALT PAVEMENT---New Type of Pavements in France and the Claims Made for Them.

EXPERIMENTS, covering a period of six years, have been made with rubber-asphalt pavement in several cities throughout France, according to U.S. Consul-General Robert P. Skinner, and as far as can be ascertained have given good results.

In the city of Marseilles a satisfactory experiment was made upon the Prado a number of years ago, and last spring three or four public places were similarly paved, these areas, however, being devoted to pedestrian traffic exclusively.

At the present time most asphalt paving involves the use of costly installations for the heating of the powder, a considerable amount of material, and a special class of laborers, all of which tend to increase the cost. Under the new process it is possible to make cold applications of asphalt, which are said to possess all the advantages of hot compressed asphalt without its drawbacks.

The material under description is a product resulting from the association of asphalt and rubber. Asphalt is a carbonate of lime impregnated with bitumen, with which rubber combines under certain conditions, thus effecting the cohesion of the calcareous molecules. This product is claimed to be more plastic and more adhesive than pure asphalt, and to resist higher temperatures. To obtain the combination of bitumen and rubber they must be energetically mixed in special devices, in which the asphalt, reduced to fine powder, is in the presence of rubber swelled and softened by a solvent. The material thus obtained is a brown powder darker than the original asphalt, and it suffices to compress it in order that it shall set and harden rapidly.

It is alleged that when asphalt is applied hot, the heat of the application coming into contact with a concrete foundation containing more or less humidity vaporizes the water contained therein, and the steam, by its force of expansion, escapes, thus destroying the compactness of the combination. This inconvenience does not present itself in the system under designation, which permits the application of a much thinner layer of asphalt and one which unites itself with the concrete, constituting a solid mass.

Rubber-asphalt must be applied upon a foundation of first-class concrete, consisting of 440 pounds of good Portland cement and 1 cubic meter (35.31 cubic feet) of pebbles and sand, the proportions being one-third of sand to two-thirds of pebbles. The thickness of the foundation should vary from 15 to 20 centimeters (5.90 to 7.87 inches) and it should be rammed with the back of shovels used in this work, and given the exact form which the roadway is intended to have, without the necessity of making later additions of concrete to bring the surface to its proper proportions. The surface of the concrete should be regular, so that the layer of asphalt may have a uniform thickness. This foundation should remain three to five days, according to the season, until it has acquired a sufficient hardness to support the ramming of the layer of asphalt. The surface of concrete having been well cleaned, is covered with a thin coating of special material, which is laid on with a brush upon which the rubber-asphalt powder is lightly sprinkled. Shortly after these preliminary operations the uniform layer of rubber-asphalt powder is spread to a thickness of 3.5 to 4 centimeters (1.37 to 1.57 inches), which is compressed progressively by means of a rammer. This done, the surface may be opened immediately to travel.

PNEUMATIC CAISSONS.---Proper Equipment Important in Economically Carrying Out the Work.---The Type of Men Who Work in the Air Chambers.---Qualifications and Functions of Foremen.---Caisson Disease and Theories as to Its Cause.

By T. KENNARD THOMPSON*

ONE of the best money-saving devices for a contractor who has a number of caissons to build is a saw arbor run by compressed air or electricity. The saving in time in cutting the 12 x 12 timber to the right length, as well as the smaller sizes, pays for the machine in a very short time.

A really good pipe-cutting machine with dies, etc., is also indispensable, as also are pneumatically run augers for boring holes for bolts and drift bolts, and a pneumatic hammer for driving the same. An ample number of the best stiff leg and guy derricks and necessary side tracks, wharves, cement and other buildings will well pay for the outlay, large though it is.

Pneumatic caisson work is sometimes contracted for at below $20 per cubic yard, but there are not many places where a contractor can take the work at this figure and complete his undertaking except at a loss, while in some places the cost runs up to $40 or $50 per cubic yard. As a general rule the cost of caisson work per cubic yard for the foundation of New York skyscrapers is about double what the pneumatic work for a fair-sized bridge outside of the city would cost.

The only proper way to light the air chamber now is by electricity, so where current cannot be purchased readily it is necessary to install a good electric light plant.

Telephone connection from the working chamber is also useful, and in some emergency cases would be invaluable in saving life and property. One of the most unpleasant accidents is to have the bucket stuck in the shaft when the caisson has only one shaft and lock for men and material. This has frequently happened, keeping the men in the air from 10 to 12 hours overtime, sometimes with very dangerous results, for the men have used up their energy and have no food to replenish with, and are, besides, nervous about the outcome—a very disagreeable combination, to say the least, especially as half the time they do not know what has happened, or what is being done to get them out. As an example, last summer the door of the lock got "jammed" and the men in the working chamber kept "rapping" and blowing the whistle (five times) signifying that they wanted to come out. At first the men outside answered back with two raps, which means "hold" or "you will have to wait," but after a while the outside men who were working over the lock got tired of answering, so the sand hogs stopped signaling; and after quite a long silence the outside men signalled below repeatedly without getting any answer whatever, and becoming alarmed for fear that the sand hogs were paralyzed, they took the bull by the horns and took the whole lock off, allowing the surrounding material to enter the working chamber. The minute the lock was off the sand hogs, who had purposely refused to answer the signals, clambered up the ladder and went home. This paper could be filled with equally exciting experiences.

LABORERS' HOURS AND WAGES.

The men who work in the air chamber, better known as sand hogs, are a hardy, reckless set. Until a few years ago they only received $2.50 per day of 8 hours in New York city for pressure up to about 20 lbs. per sq. in. above atmospheric, the price rapidly increasing above that as the pressure increased and the hours of labor decreased, until at about 45 lbs. per sq.in. they only labored 1 1-2 hours per day, and even that was divided into two shifts of three-quarters of an hour each, with a rest of four hours in between. Very few fatalities occur in the lower pressure and long hours, but many occur when the pressure is over 40 lbs. per sq. in.

Now, however, the unions have raised the lowest figure to $3.50 a day, the actual working time being 7 1-2 hours with 1-2 hour for lunch. This requires three shifts a day: from midnight to 8 a.m., from 8 a.m. to 4 p.m., and then to midnight, for once the compressed air is in the working chamber work should not stop until the excavation is completed and the air chamber filled with concrete. For not only do stoppages increase the friction on the sides, but there is always a danger of accidents if there is no one in the air chamber but a watchman, since both the watchman and the gauge tender outside are liable to go to sleep, and they have often done so, allowing the pressure to either go up too high and blow out or fall too low and draw the material in, sometimes allowing the caisson to sink until the working chamber is completely filled with material, which is removed with difficulty.

While the hours laid down by the unions are supposed to be all that the men can ordinarily stand, nevertheless, by taking care of themselves they have occasionally worked twice as long, but not continuously, day after day.

While watching a certain piece of work I went in and out of the air chamber for 86 hours without going to bed, and that, too, in pressures up to 35 lbs. per sq. in. above atmospheric. But I have had the bends twice, and do not propose to take the risk again, even though I only stay down a few minutes at a time.

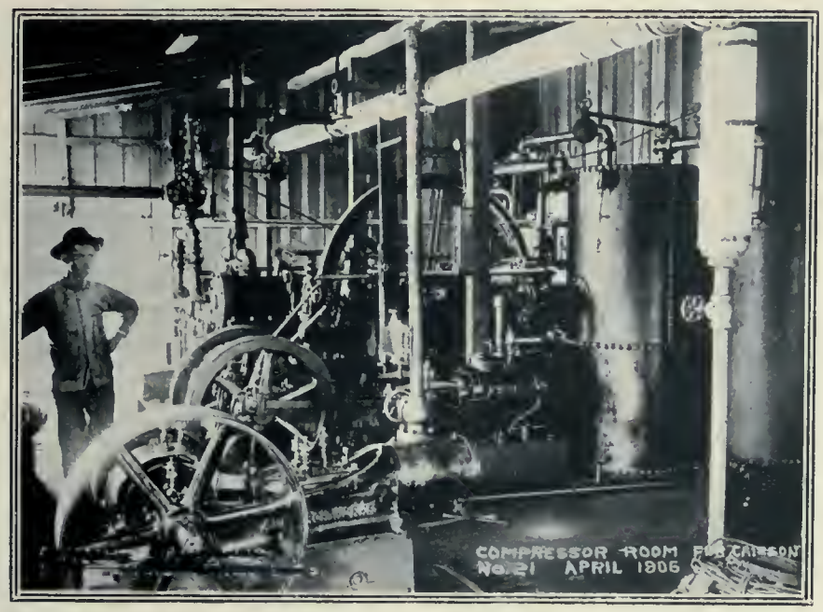
The best sand hogs are Irish and Swedes, two classes that do not like each other very much, calling one another "square" and "round" heads. I have also had some very good colored men. Italians as a rule do not care for the work. Sand hogs cannot be classed under the head of skilled labor, which is the reason why the men are not better paid, for all that is needed is a good constitution and plenty of pluck. With these two qualities the ordinary sand hog can learn all he needs to know in a day, and he will do a big day's work when in the air chamber, using or burning up his energy, which likewise gives him a big appetite, so that we seldom see a lean sand hog, nor do we often see an old one.

MEN IN CHARGE MUST BE EXPERIENCED.

The foremen and superintendents, however, need years of experience and the ability to act quickly and fearlessly in emergencies, lack of which qualities have been fraught with disastrous results to life and property. For instance, in excavating it is customary to dig down in the center about a foot or two at a time, leaving a small bench around the cutting edge and then removing this just before they are ready to let the caisson "drop," which is often accomplished by lowering the air pressure for a few moments. Now, a good foreman will see that he gets an accurate report from the engineers at least twice a day, preferably just before 8 a.m. and 4 p.m., giving the exact position of each of the four corners as regards elevation and location, from which he will determine how much to throw the caisson by undermining one side more than the other, etc., and thus prevent

*Ed. Note.—This is the second and concluding installment of Mr. Thompson's article on Pneumatic Caissons, the first part of which appeared in the November issue.

the caisson getting away from him. For after a caisson has penetrated more than 25 to 30 ft. it is often not only impossible to get it back into its proper position, but it is also impossible to prevent it from getting more and



COMPRESSOR ROOM FOR CAISSON.

more out with every foot of penetration, so that the utmost care and vigilance is required at the start.

A foreman who tries to keep his caisson right by means of a plumb bob or hand level, instead of from levels furnished by the engineers, will find it impossible to keep his caissons vertical and will be very much astonished to find how much he will be out of line and level.

Many accidents have happened to caissons which a little foresight would have avoided, as in numerous cases where the weight has been taken off, or not enough has been added to allow for the rising tide, with the result that the caisson almost completed, has broken away from its bed and risen enough to necessitate its being completely wrecked.

In 1901 a break occurred in the intake caisson for the new Cincinnati waterworks. This was a very expensively designed caisson and one that the writer would not recommend being copied. The following report of the accident was furnished to the Engineering News by the chief engineer of the works at that time:

"The pump pit is on level ground, about 200 ft. from the top of the river bank, and about 1,400 ft. from the channel where the intake pier is located. The caisson rests on clean sand saturated with water, the shoe being at an elevation about 15 ft. below the lowest point in the channel. The chambers of the caisson were filled with the same sharp sand in October, 1899, at a time when the river being low the air pressure required to keep water out of the working chambers was only about 15 lbs. per sq. in., which pressure was in a large measure counterbalanced by the weight of the sand ballast placed on the deck during the sinking process.

"The shaft connecting the pump pit with the tunnel was sunk immediately after the chambers had been filled; the portion of the shaft between the caisson and the rock being a cylindrical steel shell, lined internally with concrete and brick in Portland cement, and the same lining extending through the rock to the tunnel.

"This brick lining was built in November and the beginning of December, 1899, also a period of low water. The first high water after construction of the pit and shaft occurred on December 26, 1899. It reached 25.2 ft. above datum. At the date mentioned an open seam in the brick lining of the shaft made its appearance, which was readily repaired by an injection of Portland cement mortar under compressed air.

"On January 26, 1900, a second freshet in the river to elevation 34.6 ft. was attended with the same effect. A seam appeared again at the same place, and was repaired again in the same manner.

"On the occasion of a third rise, on November 30, 1900, elevation 42.3 ft., the same thing occurred again, but this time the seam showed itself about 10 ft. below the first crack. In the meantime levels taken on the deck of the caisson from time to time had shown a deflection upward co-incident with each period of high water. These deflections were permanent, indicating that the land had followed the roof of the chamber. It is quite evident that the open seams in the brick lining have been caused by the deflection of the caisson deck carrying with it the steel shell and part of the brick work below it, and that the same phenomena will repeat itself with every stage of water higher than those preceding them since the execution of the work and until a sufficient weight has been placed on the deck to neutralize the effect of the highest water. For this reason it was decided not to repair the last crack until the pumping engines have been placed on the deck, as the weight of these engines will be equivalent to that of 25 ft. of water in the pit, and as the last high water (elevation 59.6 ft.) was only 11.4 ft. below the highest water on record, we will then be secure against any further deflection of the deck.

"There is, in fact, no necessity for filling this crack other than the desirability of having a water-tight shaft on the rare occasions when the tunnel will be pumped out for examination.

To be fair, the above report has been copied word for word. Obviously the caisson should have been designed so that it would always be heavy enough to stay down, and this could advantageously have been accomplished by using less wood and more concrete. In fact, the design of this caisson made it an exceedingly expensive one to build, having a timber roof or deck 10 or 12 ft. deep, and of oak, too, yet in spite of this excessive thickness the above report shows that the roof deflected upward. By using a modern thin (say, 3 or 4 ft. thick), yellow pine roof, and by using more concrete, the caisson would have been heavy enough to withstand the water pressure, especially if the working chamber had been filled with concrete instead of with sand.

In 1901, in sinking a crib for the Clevelanu waterworks in Lake Erie, a steel working shaft 11 ft. in diameter was used. The shaft was attached to the bottom

GETTING READY TO ENTER THE LOCK. ON COMING OUT THE MEN LOOK WORN AND TIRED.

of the caisson about 80 ft. from the top, or at about the level of the bottom of the lake, and then extended downward for some 40 ft. more.

During construction the air pressure was from 25 to 30 lbs. per sq. in., but at the time of the accident the pressure was supposed to be less.

Without warning the shaft broke in two at a point just above the bottom of the lake, where it was rigidly attached to the caisson, and the upper 80 ft. shot up into the air, and in falling fell against the side of the crib, being too long to fall flat, which fact permitted the men to be taken out of the shaft uninjured—one man lost his life by falling down the shaft and four who were working below were drowned.

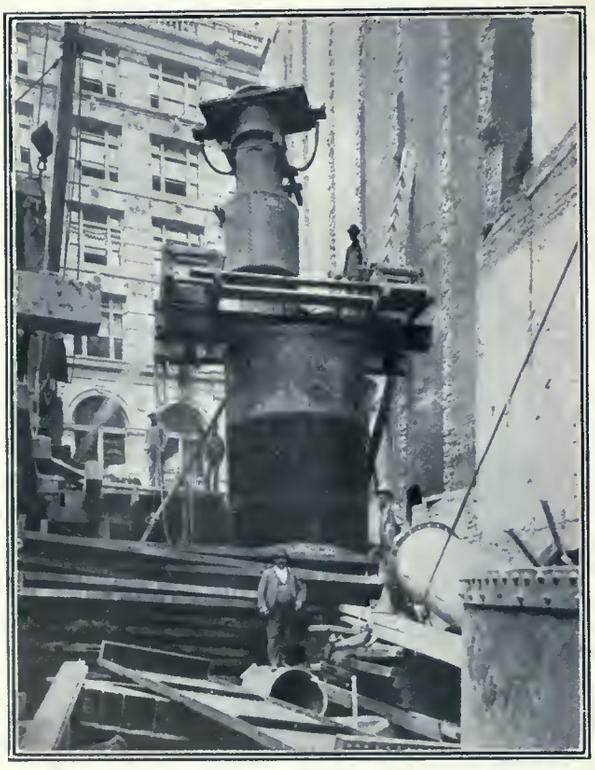
The fact that the shaft broke at what was apparently the bottom of the unsupported length, where the cantilever strain would be the greatest, would make it appear to be the result of a blow at the top, though a heavy wind storm might have had the same effect, and yet there were plenty of means at hand to have braced the shaft properly at little expense.

It is often difficult to make the men put in all the bolts in the flange connections and to see that they are all tightened up. Of course if a few bolts were missing and a slight blow was received at the top of the shaft, aided by a heavy wind, the accident could be easily accounted for.

There have been many causes for many kinds of caisson accidents, most of which could have been prevented with care. For instance, a large iron caisson broke loose off the coast of Nova Scotia and was carried out to sea, where it sank and was never heard of again.

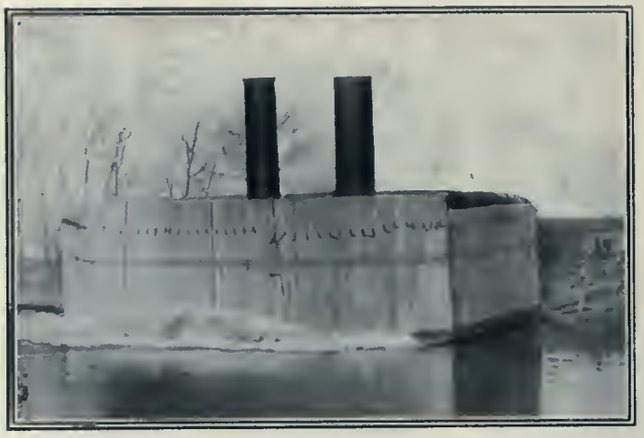
In New York city most of the accidents have caused damage to the adjoining property, as well as to the caissons themselves, where by careless slacking of air, etc., material has been drawn from under the adjacent buildings, very badly wrecking them.

In one case the contractor or owner decided to save money by not using compressed air at all, and tried to



PLACING LOCK ON STEEL CAISSON FOR COMMERCIAL CABLE BUILDING, BROAD AND NEW STREETS, NEW YORK.

sink five open cofferdams alongside of a 20-storey, nearly completed building, with the result that the building was undermined and was thrown 18 in. out of plumb. It was necessary to take out all the terra cotta floors and get a good firm of iron contractors to jack the steel work



LAUNCHING A CAISSON FOR RIVER WORK.

back to place. Needless to say, this cost more than good pneumatic caissons would have cost in the first place.

CAISSON DISEASE.

When a novice enters an air lock the pressure is, of course, at atmospheric, and as soon as the outer door is shut (it is usually held shut by the pressure of the air), the pressure is gradually increased; but no matter how slowly it is increased one has, at first, more or less trouble in equalizing the pressure on both sides of the ear drums. This is usually accomplished by closing the nostrils with a finger and thumb and then blowing the air through the throat into the ear passages. Sometimes beginners cannot do this, and occasionally even an old-timer will get caught this way, if he happens to have a bad cold.

The result of getting "blocked" is that one or both ear drums may be ruptured, causing intense pain, or some blood vessel in the head may burst.

The most common complaint is known as the "bends," which only attacks one after leaving the caisson, sometimes several hours after, and thus tends to bear out the theory that caisson disease is caused by the air forcing the blood away from the surface and the bubbles of air remaining in the system when the person has left the air chamber too quickly.

The bends generally attack the arms or legs, and sometimes the lower part of the body, causing more or less intense neuralgic pains or cramps, which are said to resemble rheumatism, but to be worse. Yet, in spite of the intense pain and suffering, they rarely result in death.

The worse effect, however, is paralysis, which attacks the limbs or body, though generally the legs or lower part of the body. Sometimes the victim becomes paralyzed on the whole of one side. This trouble also, as a rule, attacks the unfortunate man shortly after he has left the compressed air, though sometimes not for several hours after. It is very rare for a man to be paralyzed while in the air chamber, though some have been killed the first time they have entered, and before they could get out.

Occasionally an old-timer, who has always considered himself immune, has been bowled over. When paralyzed, some completely recover after a few hours' treatment; some remain partly maimed for life, while others succumb sooner or later. Some experienced men claim that they can tell when they are going to get the bends or be paralyzed while still under compression, in spite of the assertion of other writers and experimenters that all

forms of caisson disease are contracted during decompression.

Forty-five or 50 lbs. above atmospheric is about the limit in which men have performed actual work, and these high pressures are always attended with great risk and loss of life.

French experimenters have shown that these pressures might be more than doubled safely, under ideal conditions; which, however, have not yet been attained in actual work. One of the chief conditions for thus working under a head of 200 ft. depth is very slow decompression, but it is doubtful if men could do much work under such pressure without running too great a risk.

THEORIES AS TO ITS CAUSE.

Dr. Jaminet, one of the earliest to write on caisson disease, being the medical expert of the Eads bridge of St. Louis in 1871, came to the conclusion that caisson disease was simply the result of exhaustion from too rapid a tissue change caused by the absorption of excess of oxygen. His remedy consisted of a complete rest, with feet in an elevated position, and a supply of stimulants and nourishment.

A second theory, advanced by Dr. Andrew H. Smith, the surgeon in charge of the caisson work for the New York towers of the Brooklyn bridge, was that the superficial pressure of the air upon the body acts to force the blood from the surface to the center, causing internal congestion. The more rapidly one enters and the longer one stays in compression, the worse this congestion, and the more rapidly one leaves the compression, the greater the danger of the blood not returning to its proper distribution, leaving more or less bubbles of air in the system and causing the bends.

A third theory is given by Dr. Wainwright, of the Waterloo & City Railway, London, and is to the effect that the blood and viscera absorb oxygen, nitrogen and carbonic acid—particularly the latter—and that the physiological result of the carbonic acid gas and the mechanical action of all three gases in escaping through the tissues upon the release of pressure cause the bends.

I am inclined to think that there is much in all of these theories, and can set down established facts as follows:

1. The more rapidly one enters the higher pressures, the more rapidly the blood is forced from the surface, and the greater is the risk of bursting blood vessels in the head or of fracturing ear drums.

2. The longer one stays in compression and the more work that is done, the greater the danger of being paralyzed or of getting the bends.

3. The quicker the pressure is reduced on leavnig the caisson, the greater the danger.

4. I have known many cases where foul air did more damage than fresh air, at a much higher pressure. Undoubtedly tallow candles in the early caissons, and gas in the Brooklyn bridge caissons, did much to knock the men out.

5. It is very dangerous to enter a compressed air chamber with an empty stomach.

6. It is advisable to put on warm clothing and take hot coffee on coming out if there is any danger of getting chilled.

BUILDING CAISSON FOR PIVOT PIER, FORDHAM HEIGHTS, HARLEM RIVER BRIDGE, NEW YORK.

7. The more energy expended in compression, the greater the danger. We know that the excess of oxygen in the compressed air renders the men very much more active than when in ordinary atmosphere, with a consequently greater fatigue.

8. It is suicidal for anyone with weak lungs, heart or nerves to enter the lock.

9. Even healthy people cannot be sure what effect compression will have on them until they try it.

10. The most reliable remedy is recompression in a hospital lock.

11. Electrical treatment is sometimes efficacious.

12. Most important of all, as much time as possible should be taken in decompression—the more, the safer.

Mr. Hersant, of the Bordeaux harbor works in France, made some very interesting experiments in 1895, in which he kept a man in a pressure of 768 lbs. per sq. in. for one hour taking 45 minutes to reach this pressure and three hours to reduce it.

From the result of experiments, the French doctors

have suggested allowing 20 minutes for each 15 lbs. of pressure for compression and decompression, which would be very hard to enforce for low pressures, as men are accustomed to only take five minutes, or even much

LAUNCHING A CAISSON AT FORDHAM HEIGHTS, NEW YORK.

less, to enter or leave caissons under pressure up to 30 lbs. per sq. in., in addition to atmospheric.

The risk increases so rapidly for every pound over 30 lbs. that men are more cautions as the pressure approaches 45 lbs.

Another authority recommends 4 minutes for each atmospheric (15) lbs.) for decompression below three atmospheres, and 10 minutes for each additional atmosphere above three atmospheres (45 lbs.), but it is safer to stay out of anything above three atmospheres in addition to the normal.

I know from experience that the same remedy will not always have the same effect even on the same man; for instance, after suffering from the bends for several hours, I found that a hot cup of coffee produced a profuse perspiration and relieved the pain, which, however, quickly returned; so a very hot bath was tried, which also banished the pain until the bath room was left behind. Then complete relief was obtained from a few mild electric shocks. The second time I experienced the bends, a bee-line was made for the electric battery, which, however, did no good.

The first attack mentioned was in the leg and I noticed that every additional trip into the lock made the attack more severe; but on the second occasion, the attack this time being in the arm, it was found that by going in and out frequently but very slowly, the pain was reduced each time until it vanished.

Similar experiences make many think that they must "grin and bear it." But recompression in a hospital lock is now considered imperative.

In both of the above cases the pressure did not exceed 25 lbs. per sq. in., and yet I have experienced 35 lbs. many times, and 45 lbs. occasionally, without any ill effects. Like all diseases, a man is immune some days and liable to contract the ailment on others—and he can't tell which day is which!

In sinking caissons in the Harlem river we found that men suffered severely from the bends while passing through the foul silt and just below the bottom of the river, and that when this material had been passed through and the caisson had entered the clean (no sewage mixture) clay the trouble with the bends disappeared, although the pressure was necessarily very much greater.

In excavating there is always considerable escape of air under the cutting edge, etc., which, of course, has to be replaced by fresh compressed air which keeps the atmosphere in the working chamber in a fairly good condition; whereas, when concreting, after the concrete has covered the bottom above the cutting edge the loss of air is very much less, and hence less fresh air is received from the compressor, and the air becomes more and more contaminated as the concrete proceeds and the working chamber contracts, with greater danger of the bends and paralysis. Sometimes old-timers have gone in to uncouple the bolts in the upper sections of the shaft and in a short time have been taken out dead.

In one case, a rubber pipe caught fire an dthe compressor pumped the stifling fumes of burnt rubber into the working chamber, from which the men were with difficulty rescued.

When blasting in the working chamber, it is usual for the men to go out; but in one case where the working chamber consisted of several compartments the men walked into an adjoining compartment, out of the reach of any flying stones, etc., and after one of the discharges, one of their number was taken out dead.

GASOLINE AND KEROSENE ENGINES for water supply and drawbridge service on railroad systems were discussed at the recent railroad bridge superintendents' convention at Washington, and their use was reported to be steadily increasing, the total cost of operation generally proving considerably cheaper than with steam plants, due to the labor item. The discussion indicated that in the majority of cases the cost of coal for steam plants is somewhat cheaper than the gasoline for gasoline engine plants, but the maintenance charges for the latter are uniformly much less than those for steam plants. In certain cases where continuous pumping is necessary throughout the 24 hours, more favorable costs were shown with steam plant operation, but in practically all cases where the operation is intermittent the showing made by the gasoline engine plant is more favorable. This is also true in the operation of drawbridges and turntables, where for quick and efficient service the gasoline engine plant has been shown to have many advantages over steam. In a number of instances, also, satisfactory results were reported with the use of kerosene fuel in the gasoline engines, with material reductions in fuel costs, the engines being merely started with gasoline and when sufficiently heated for proper vaporization of the kerosene switched over to the latter fuel;

TOWING A CAISSON TO POSITION.

the operation with the latter fuel is, in fact, found quite satisfactory with steady loads if some attention is given to the proper cleaning of the igniters and the jacket flow adjusted for less rapid cooling.—ENGINEERING RECORD.

CONSTRUCTION

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 December, 1908 No. 2

Current Topics

FOUNDATION WORK on the new Parliament building to be erected at Regina, involving the driving of 3,000 concrete piles, has been completed. The piles were driven to an average depth of sixteen feet and each one was tested to carry a load of twenty-five tons.

* * *

THREE RIVERS IS RAPIDLY REBUILDING her burned district. The new buildings going up are almost without exception three stories in height, and many of them show a vast improvement in design over the structures they are replacing. The streets throughout the newly built portion will be wide and no sign boards will be allowed to stretch out over the sidewalks.

* * *

CANADA PRODUCED 2,500,000 barrels of Portland cement in 1907, and imported 1,000,000 barrels more. One-half of all the cement produced in the Dominion is manufactured in the locality of Owen Sound, the daily output in that section being 3,000 barrels. The demand for this material in building the transcontinental railroad has increased the output to the full capacity of the plants during the past year.

* * *

THE THIRD ANNUAL DINNER of the Manitoba Association of Architects, which took place at the Royal Alexandra, Winnipeg, on the evening of December 8, was one of the most successful affairs of its kind in the history of the organization. President Hooper presided, and addresses were made by well-known members of the organization and by the representatives of sister societies. The officers of the association, under whose direction the banquet was held are: President, S. Hooper; vice-presidents, Jos. Greenfield and J. Chisholm; treasurer, L. T. Bristow; secretary, W. Percy Over; directors, S. F. Peters, William Fingland, J. D. Atchinson, H. Matthews, V. W. Horwood.

AMONG THE TECHNICAL SCHOOLS of Spain is the Superior School of Architecture at Barcelona, a municipal institution established for the purpose of developing and maintaining a high standard of design by giving architects and draughtsmen a greater opportunity to educate themselves in their chosen profession.

* * *

A VALUABLE QUARRY of white marble and a large deposit of lime has been discovered on Smith Island, ten miles from Prince Rupert. The property is owned by M. Johnson, formerly a Montana railroad contractor, who will establish workshops at Prince Rupert for the purpose of exploiting his holdings.

* * *

NEW WESTMINSTER, B.C., HAS A NEW FIRM of architects in the persons of William F. Gardiner and T. D. Sheriff, who have recently entered into partnership and taken up quarters in the Guichen Block. Mr. Gardiner comes from Vancouver where he enjoyed a large practice, being successful in both private work and competition, while Mr. Sheriff has been prominently identified in a professional way in Edinburgh, Scotland, for some time, and during the last five months has been with Mr. A. J. Hill, C.E., of New Westminster.

* * *

AN AUTOMATIC LIFT BRIDGE, which is said to be safer and quicker in action and to cost less than any other type of movable bridge, has been invented by L. H. Terrill of Lindsay, Ont. Several engineers, who have seen a working model of the bridge, speak highly of its practicability and simplicity of construction. It is operated by counterbalance weights worked by an ingenious arrangement of "decreasing" pulleys. The present model works on a basis which requires less than three pounds at the crank for every ton of weight raised. This new style of bridge is designed for either power or hand operation, and can be constructed of either wood or steel.

* * *

THE FIFTH ANNUAL CONVENTION of the National Association of Cement Users will be held at Cleveland, Ohio, January 11 to 16, 1909. Chicago will also have a cement show to take place sometime the early part of February. It will be the second event of what is to be a regular annual affair in that city. The underlying idea of the Chicago show, say the promoters, is to teach those who know something about cement construction more, and to teach those who know nothing about cement something. A cement show should not be conducted entirely for the purpose of bringing direct business to the exhibitors, but it should be an industrial demonstration that will create universal interest in cement and its innumerable uses.

* * *

SKYSCRAPERS IN PARIS were recently made the subject of a bitter attack in the Chamber of Deputies by M. Chartenet, a member from Gironde, who contended that the beautiful lines and symmetry of the city were being destroyed and dishonored. A number of cases were cited where the harmonious ensemble of buildings have been marred by modernly designed structures which rise a number of stories above their neighbors. In order to preserve the uniformity and beauty of architecture for which Paris is known, M. Chartenet said that it would be necessary to repeal or modify the law of 1902 which gave countenance to such structures. When asked for an explanation, M. Dryardin-Beaumetz, Minister of Fine Arts, reminded the deputies that such matters belong to the municipal council.

A SWISS ENGINEER, named M. Merian, who in 1849 used asphaltum in laying a portion of the road from Travers to Pontalier, is credited with having been the first to introduce this natural resource into the commercial world. The first pavement of this material, however ,was not laid until 1854, when a small section of a street in Paris was paved.

* * *

A 205-MILE TANGENT is reported to be in operation on the Buenos Ayres & Pacific Railroad. This section of the line, which begins about 158 miles west of Buenos Ayres, formerly had two short curves to pass around a shallow lake, but the latter was drained about one year ago, and the tangent has since been completed directly through the bed of the lake.

* * *

THE MASTER BUILDERS OF HALIFAX at a recent meeting refused to grant the union's request for a reduction of the working time from nine to eight hours a day. On the new science college building, which is being erected for the Nova Scotia government, the eight-hour day prevails, but despite this the employers are as a unit in their determination to maintain the nine-hour schedule for the ensuing year.

* * *

A FOUNDATION of more than usual thickness is used under some of the roads of Gloucester County, England, according to a paper presented at the International Road Congress by its consulting surveyor, Mr. Robert Philipps. After the roadbed has been formed, 12 inches of cinders, clinkers, broken brick or hard ashes is laid, and traffic turned over it or it is steam-rolled until consolidated. On this is spread 6 inches of broken stone and 1 inch of gravel, watered and rolled until consolidated.

* * *

THE USE AND IMPORTANCE of volcanic ash in combination with Portland cement, especially for construction work in salt water, is described in a pamphlet printed in English and issued by a Japanese firm, which has recently been received by the U.S. Department of Commerce and Labor, from Consul George H. Skidmore, of Nagasaki. The advantages claimed for this volcanic ash are that in combination with Portland cement it gives a greater tensile strength than cement mortar alone. It is also claimed that the mortar is denser than cement mortar, and does not permit the percolation of water, thus obviating the injurious action of sea-water salts. This density gives it a superior quality for construction of water reservoirs and reinforced concrete for the protection of iron from oxidation.

* * *

BRICKS WERE FIRST MADE in Mesopotamia, according to an exchange, many thousands of years ago. There were no stones to be found in all that great fertile plain, but there was an abundance of clay, and the primitive people discovered that if the moist clay were molded and then laid in the sun to dry, it would harden into durable building blocks. Samples of these early, shapeless, sun-dried brick have been recently found in the ruins of the very ancient city of Bismya in Mesopotamia. There, also, the first brick burned by fire have been found, dating back several thousand years. People had seen that the moist clay under their campfires had become hard and red, and they gave up sun-dried brick for burned ones. For a long while these crude burned brick were square in shape and very large. But about five thousand years ago the Babylonian masons found that it was necessary to break these square brick in half, in order to build evenly, and from that time dates the oblong brick familiar to us to-day.

AN INTERNATIONAL EXPOSITION of latest inventions will be held in St. Petersburg from May 4 to June 23, 1909 (Russian calendar, April 21 to June 10, 1909) under the management of the Society of Military, Naval, and Rural Economic-Technics of Russia. The Exhibition will comprise six sections, section V. being devoted to improvements in the construction of buildings and plans for municipal buildings. All forcign exhibits will be allowed to enter Russia free of duty under the condition that they will be re-exported within two months after the closing of the Exposition.

* * *

CLEANING OF BRICK FRONTS was the interesting subject of a paper recently read before the German Association of Brick and Terra Cotta Manufacturers. The author protested against the use of sand blast, or other method by which the original face of the brick would be taken away. When sand blast is used, and the face of the brick taken off, the cleaned front will show a good appearance only for a very short time, as the brick with the original face removed will be very much more porous than before, and absorb dirt more readily. The use of steel brushes is also very bad, and will not give a first-class job. The best method is cleaning the brick fronts with a solution of muriatic acid. The strength of the solution can be made to one in twelve. When this solution is too strong for the brick, acetic acid should be used. A good soap solution will, as a rule, take off all thick dirt, and the cleaning with acid solution can then be done easily.

* * *

"MISTAKES ARE SOMETIMES MADE by inexperienced persons in building the fireplaces which are coming into such favor again," said a builder. "The people find that the fireplace smokes and is susceptible to every vagrant breeze that happens to blow down it. The reason for this is a fault in construction, a disregard of a fundamental law and a principle well known to most builders. The fireplace has not been provided with a proper 'throat' and 'smoke shelf.' Some people have the idea that the bigger the chimney the better will be the draft, and they build the chimney large and of the same size throughout. The throat should be a few inches above the arch of the fireplace and should be comparatively narrow. The part of the chimney wall which juts in to form the throat is called the shelf, and when a wind blows down it provides a shelf against the breeze, so that the smoke does not blow out in the room.

* * *

A WORLD'S RECORD for bridge building in a single year, is said to have been established by the Canadian Pacific Railway in the large number of improvements of this nature, undertaken during the past twelve months, at a cost which runs up into the millions. An idea as to the extent of the work that has been carried on this year may be gathered from the fact that between Montreal and Quebec alone forty-four new bridges have been erected or are now in process of completion. In the West the company has not been less active and the long list of new bridges speaks volumes for the company's enterprise in perfecting its system. Of these the large bridge over the Seley River, about half a mile from Lethbridge, stands pre-eminent. It forms part of part of a new loop replacing a section which includes four short bridges. This bridge is nearly a mile long, and for two-thirds of its length is three hundred feet high—a combination of height and length that is rarely met with. Another noteworthy structure is a nine-span steel bridge in British Columbia, that replaces the wooden structure near Mission Junction and the Columbia River bridge at Revelstoke. There are altogether 5,935 bridges on the C.P.R. system, whose combined length is 81.55 miles.

IN THE ATHABASCA DISTRICT, according to the geological survey reports, there are 4,700,000,000 tons of pure bitumen—asphalt in the crude form. A western writer, who has been investigating the possibilities of this great deposit, declares that in the past twenty years the United States alone has spent $120,000,000 on asphalt paving. Of the bitumen used in that country 85 per cent. was imported from Trinidad, which supplied about 80,000 tons a year, and it is contended that the Athabasca country would have prospered had it been put forward as a source from which to receive material of this kind. It is further pointed out that the paving industry is only just in its infancy. Thousands of towns of considerable importance still put up with the muddy lane because paving comes too high. The opening up of this vast source of paving material, right at the doors of our cities and towns, would be of incalculable value and benefit. That a railway to Fort McMurray would result in the development of the industry is conceded. There would result such a boom in the paving business in Canada as has not been witnessed before and the industry alone would doubtless go far toward justifying the road.

* * *

AN INNOVATION in lighthouse construction, particularly in regard to the comforts provided for the keepers, has just been completed on the eastern end of the Harbor of Refuge Breakwater, Delaware Bay. The approximate cost of the building is $50,000, and it is the first off shore station with hot and cold water, bath tub and water closet. The basement of the structure is made of iron and contains an engine room, storeroom for oil and a large coal room. The upper stories of the building, except the lantern, are wood, and the building above the basement is hexagonal. The first story is divided into a kitchen and a dining-room. The kitchen is provided with a large pantry and a storeroom, and the dining-room with a large closet and a china cabinet. On the floor above is the principal keeper's room, the bathroom and a living room, and on the third floor two bedrooms, one for each of the assistant keepers. The beacon, a revolving white light with a red sector, burns a gas generated from kerosene in a manner similar to ordinary house gas, and by means of four or five large Welsbach burners, gives an illumination many times more powerful than is generally furnished by a lamp of its size. The signal service includes the most modern devices in lighthouse equipment.

* * *

A FOUR THOUSAND TON vertical testing machine is now being constructed by the U.S. Geological Survey for use in its structural material laboratories. The machine, which is to be 85 feet high, is designed to receive columns of a maximum length of 60 feet and transverse dimensions of 60 inches by 72 inches. It will be invaluable for testing columns and stanchions of large size and of obtaining data, which, since the Quebec Bridge disaster, will be more than ever required by engineers. The compressive strain will be obtained from a hydraulic ram, and readings will be obtainable with an accuracy of one-third per cent. for any load between forty and four thousand pounds. The manner in which the United States Government is assisting architects and engineers—and the public as well—in placing means at their disposal for determining the relative merits of different materials and broadening their scope of knowledge, affords a splendid example for the Dominion Government to follow. While it is true that Canadian architects and engineers derive a wholesome benefit from experiments made abroad, the lack of proper facilities at home curbs the initiative along lines of scientific research. One or two well equipped testing laboratories would mean much to this country and it would greatly reflect to the enterprise of the Dominion Government.

A NOVEL LIFT BRIDGE will be built across the Mississippi River at Keithsburg, Ill., for the Iowa Central Railroad, in accordance with the plans of Messrs. Waddell & Harrington, of Kansas City. It will have ten 200-foot spans, two 103-foot spans and twenty-two 57-foot spans, the weight of steel being about 4,000 tons. The usual draw-span will be omitted, but a novel lift-span scheme has been substituted for it. With this arrangement there will be two towers connected to the ends of the spans adjoining that to be lifted. Several of the spans are so arranged that these towers can be placed on them and the intermediate span raised, so that as the channel of the river shifts, provision can be made for raising a span which will permit navigation to be continued.—ENGINEERING RECORD.

* * *

A SUCCESSFUL DEMONSTRATION has just been given in Great Britain of a petrol-driven motor fire engine by Messrs. Dennis Brothers, Ltd. It is claimed that the engine can travel at the rate of 30 miles per hour on the level, and 25 miles along average gradients. The motor, which is described by acting Trade Commissioner J. E. Roy of Birmingham, consists of four cylinders of 120 mm. bore by 130 mm. stroke. On arriving at a fire the lever controlling the road gear is thrown into a neutral position, and a special gear, connecting with a Gwynne centrifugal pump, having a capacity of 350 to 400 gallons per minute, is brought into mesh, driving the pump at 1,200 r.p.m. When operated under these conditions the engine is claimed to throw two 7-8 inch or 1 inch jets to a height of 120 feet. At the demonstration a steam fire engine of 300 gallons per minute capacity was invited to compete. The performances of this engine were beaten by the motor-driven appliance, as the latter threw two jets of water slightly higher than the single jet of the steam engine. Messrs. Dennis claim that the pump can throw two jets of water within 14 or 15 seconds after starting the engine. Among other advantages are, no boilers to require attention, no steam to create, and their engine utilizes the pressure from water hydrants instead of allowing it to exhaust itself into a suction tank, as with the ordinary type of steam fire engine.

* * *

IN COMMENTING upon the need for better local supervision in the erection of buildings, a Fernie, B.C., paper says: Several recent occurrences, fortunately carrying in their wake no casualties of a serious nature, have shown that building operations have not been carried on along the most approved and safest lines. In the rush to complete structures within a limited, and often times, too limited, space, we fear that conservative methods are not followed. We do not wish to raise a general alarm, nor do we wish to make any sweeping charges as to negligence and loose methods, but surely it is within the province of the City Council to look after such an important matter. The plumbing that is being done, not only at this time, but at all times, especially as it affects sanitary conditions, should be under rigid inspection. This matter has for some time past received careful attention from the older portions of Canada, and surely western towns can afford to profit by the dearly bought experience of older communities. The wiring of houses for electric lights is a most important matter, yet how often do we read that electric light wiring, exposed or not properly insulated, has been the cause of some costly conflagration. The old adage that an ounce of prevention is worth a pound of cure, still holds good, and we trust that Fernie may not have to purchase her experience and wisdom in the above regards in too dear a market.

VIEWS OF BOARD ROOM AND GENERAL MANAGER'S ROOM, CANADIAN GENERAL ELECTRIC COMPANY' BUILDING, TORONTO. DARLING AND PEARSON, ARCHITECTS.

GENERAL ELECTRIC COMPANY'S NEW BUILDING.---A Highly Commendable Achievement in Commercial Architecture.---Exterior Simple and Dignified in Appearance.---Interior Well Arranged.---Work of Canadian Architects.

THE RECENTLY completed office building of the Canadian General Electric Company, designed by Architects Darling and Pearson, of Toronto, is another notable instance which demonstrates that Canadian architects are quite as capable of solving the problem of combining design, utility of plan and economy in construction, as those to be found in the progressive country at the south.

This building, which is situated on the northeast corner of King and Simcoe streets, Toronto, is without question a particularly striking example of commercial architecture. No attempt has been made to carry out any particular style of architecture and because of this the external elevations bespeak the usages of the building. It could more nearly be classified as regards style as a free treatment of the classic, but the authors have wisely left themselves untramelled by not adhering to any particular style, and the results obtained are of a most dignified and distinctive character.

CANADIAN GENERAL ELECTRIC COMPANY'S BUILDING, CORNER OF KING AND SIMCOE STREETS, TORONTO. DARLING AND PEARSON, ARCHITECTS.

Passing through the portico one enters the inner vestibule, which is simple in treatment, with groined ceiling overhead. This leads into a handsome, spacious hall with the board room and elevator and staircase on the left, while to the right is placed the general manager's and assistant general manager's offices. Proceeding along the hall one enters the space devoted to the general office staff, a room of dignified proportion, 61 by 92 feet, which occupies two-thirds of the ground floor area.

The public is separated from the clerks by handsome quarter-sawed oak counters placed on either side of a broad passageway which continues from the main entrance hall down through the centre of the building. As these counters are not more than four and a half feet high, the public is enabled to get an uninterrupted view of this portion of the first floor. The front part of this section is divided into offices and the remaining portion, as well as all the floors above, with the exception of a large space on the second floor which is taken up with offices, is utilized for storage and display purposes. A freight elevator situated at the northeast corner gives ready access to all floors for the receiving and shipping of goods.

Throughout the entire first floor the supporting columns, walls and ceilings, are covered with cement plaster on expanded metal lath, the use of these materials resulting in the rich uniform panelling overhead, and the monolithic appearance imparted to the columns.

Aside from the pleasing effect it gives to the exterior of the building, the window arrangement admits the maximum degree of outside light on all floors.

The frame of the building is of skeleton steel construction and the roof is of concrete reinforced with expanded metal.

Steam heat is supplied to all parts of the structure from a plant which is located in the basement at the rear, while the plumbing fittings and fixtures throughout are of the most modern type.

The large chimney at the northwest corner of the building is of special construction, having been built by the Alphons Custodis Construction Chimney Company of New York, who make an exclusive business of this kind of work, and who are represented in Canada by Eadie-Douglas Company, of Montreal and Toronto.

The concrete fireproofing of the first floor and the concrete floors in the vault and lavatories was reinforced with "Steelcrete" expanded metal, supplied by the Expanded Metal and Fireproofing Company, of Toronto.

Other contractors who executed the various branches of the work are:

Excavations, Page & Britnell; steel work, ornamental iron work and stairs, Canada Foundry Co.; brick work and masonry, Fred Holmes; rough floors, A. B. Coleman; carpentry and floors, J. C. Scott & Co.; painting, F. E. Phillips; roofing, Douglas Bros.; vault doors, J. & J. Taylor; plastering, W. H. Little; hardware, The Brooks

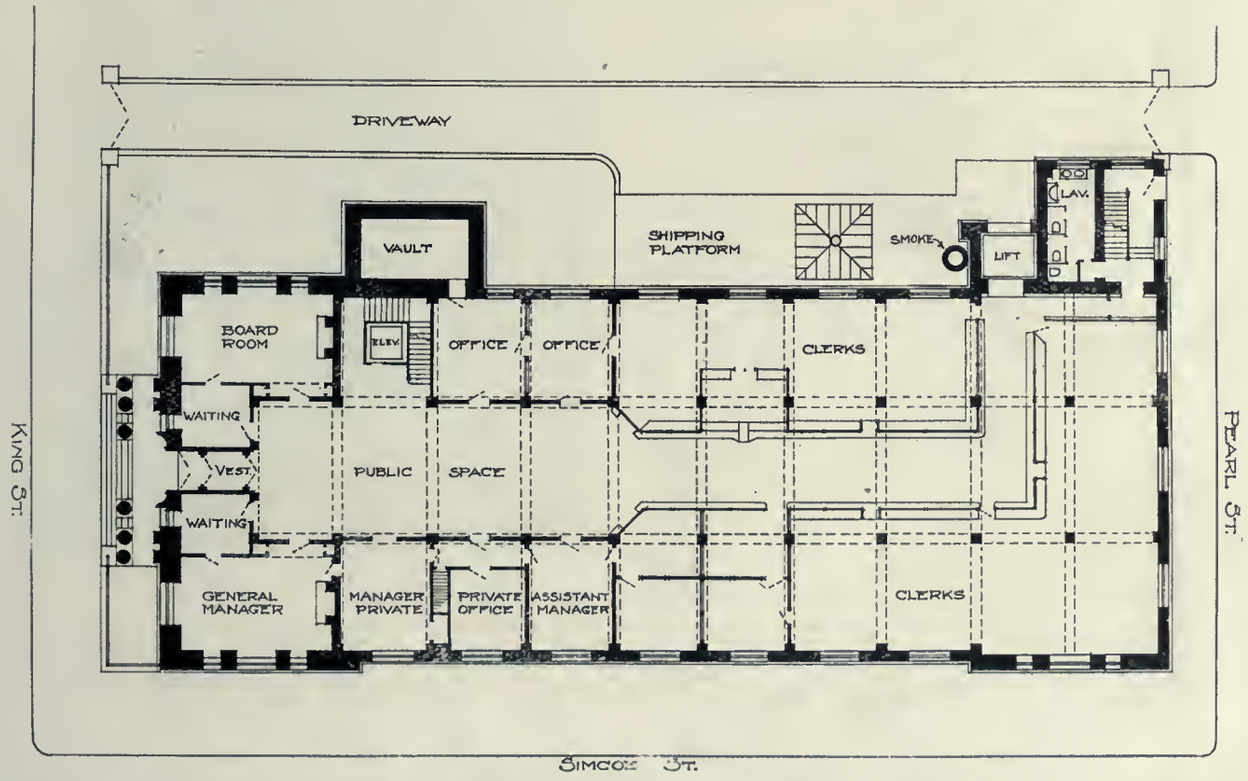
VIEWS SHOWING THE INTERIOR OF GROUND FLOOR LOOKING FROM AND TOWARD MAIN ENTRANCE, CANADIAN GENERAL ELECTRIC COMPANY'S BUILDING. DARLING AND PEARSON, ARCHITECTS.

Sanford Co.; counter, etc. S. Hadley Lumber Co.; elevators, Otis Fensom Co.; boilers, Canada Foundry Co.; plumbing and steamfittings, The Bennett & Wright Co.; firedoors, Ormsby & Co; decorating, Elliott & Son; interior fittings, Wm. Eaton; interior finishing, Hughes & Co.; electric wiring, Canadian General Electric Co.; dust proofing concrete floors, J. L. Wood.

The table in the board room and desk and table in the general manager's office, were furnished by the Library Bureau of Canada, Limited, Ottawa.

RECOGNIZING the fact that good roads are absolutely essential if a state or community is to progress. Pennsylvania has enacted laws designed to promote highway improvement by providing appropriations for work of that character. In developing the good roads movement the Highway Department found that concrete had become an exceedingly important factor, owing to its great economy and durability, says Cement Age, New York. This has been shown by practical experience and observation, and matters have reached the point where the state has deemed it necessary to provide plans and specifications for drains, culverts and bridges. The plans are prepared by competent engineers in order that contractors may use concrete intelligently and economically. Good results are certain to follow this policy. It will mean the standardization of important work heretofore concted on the hit or miss plan.

MAIN ENTRANCE, CANADIAN GENERAL ELECTRIC COMPANY'S BUILDING, TORONTO. DARLING AND PEARSON, ARCHITECTS.



GROUND FLOOR PLAN, CANADIAN GENERAL ELECTRIC COMPANY'S BUILDING, TORONTO. DARLING AND PEARSON, ARCHITECTS.

RAPID WORK ON REINFORCED CONCRETE.---Lyman Sons and Company's New Building, Montreal.---Demonstrates Possibilities of Quick Construction in Reinforced Concrete. ∴ ∴ ∴

THOSE INTERESTED in reinforced concrete have observed with some attention, the erection of the building at the corner of St. Nicholas and St. Paul streets, in Montreal, for Messrs. Lyman Sons & Co. This building is an example of the reinforced concrete type, in which no structural steel is used.

VIEW TAKEN JUNE 1ST, 1908, SHOWING EXCAVATION ALMOST COMPLETED FOR LYMAN SONS AND COMPANY'S NEW REINFORCED CONCRETE BUILDING, MONTREAL. MITCHELL AND CREIGHTON, ARCHITECTS.

At building lines the structure is 113 x 110 feet; the lot is slightly irregular, having only one right angle. In height the building is six stories and a basement. The pent-house rises three stories above the building proper, and from its roof an excellent view of Montreal and the St. Lawrence is obtained.

The columns are laid out on 17 ft. 6 in. centres one way and 18 ft. 6 in. centres the other. Girders span the longer way and beams the shorter, there being one line of beams at the columns and two between, making the beams about 6 feet on centres. This framing obviates the need of a thick slab and thus cuts down the dead load; it also gives a very stiff construction.

The footings, with the exception of those at the party wall, are all pier footings, of the shape of truncated pyramids and have reinforcing steel in both directions in the bottoms. The party wall columns are carried by beam footings.

The columns are rectangular in section, reinforced with round vertical bars, one in each corner and one intermediate in each side, except in the smaller columns, which have only the four corner bars. The columns are all strongly hooped with 1-4 in. square steel.

The steel used in reinforcing the beams, girders and slabs, was the square bar cold twisted. The steel was obtained at one of the local mills and twisted on a special machine of the contractor for the reinforced concrete. (The Ferro Concrete Construction Co.) The bar, before twisting, is the ordinary mild steel bar. The twisting gives a deformed bar with a mechanical grip and a much higher elastic limit and ultimate strength.

The steel bars are all bent without heating, to the required shapes, on the job with special benders. As a rule, there are four longitudinal bars in each beam and each girder. Two of these are usually straight in the bottom; the other two are bent up, the bends beginning near the quarter points of the span and running to the top of the beam or girder, near the supports. The ends of these bars run over into the adjoining beams. This gives continuity, and adds greatly to the strength and stiffness of the structure. In addition to the longitudinal steel in the beams and girders, U-bars or stirrups of smaller sized steel are inserted vertically at frequent intervals along the entire length. The spacing is, of course, closer at the supports.

The steel in the floor slabs is in long lengths. About one-half of the bars are bent up at the supports.

The hoist for delivering the concrete to the different floors, was placed in one of the elevator openings, near the centre of the building. The mixer was placed in the basement, and delivered directly into the large bucket of the hoist. It was fed by wheelbarrows on a down-grade wheel, from the materials piled on the street in the rear. The hoist bucket dumped automatically into a hopper, placed on the floor, that was being run. Large two-wheeled "buggies" holding about six feet of material, were run under the hopper to be filled with the concrete, and deliver it wherever required on the floor

Mitchell & Creighton, of Montreal, are the architects. H. C. Hitch is the general contractor, and the Ferro Concrete Construction Company contractors for the reinforced concrete work.

It may be of interest to know that the contractor for the reinforced concrete, have to their credit the tallest reinforced concrete building in the world (the Ingalls Building in Cincinnati).

VIEW SHOWING STRUCTURE TWO MONTHS AND A HALF AFTER EXCAVATION WAS MADE, FLOORS, ROOF AND STRUCTURAL WORK COMPLETED, LYMAN SONS AND COMPANY'S BUILDING, MONTREAL. MITCHELL AND CREIGHTON, ARCHITECTS.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—Architect Leonard Foulds, 43 Victoria St., Toronto, has prepared plans for five factory buildings, and an engine house, to be erected at Weston, Ont., for the Consolidated Chemical Company. The buildings will be two stories in height, of concrete and brick construction, with concrete foundation, felt and gravel roof, concrete floor, pine interior finish, open plumbing, steam heating, electric lighting, sidewalk lifts, plate glass, electric bells, power and equipment. Estimated cost, $16,000.

Toronto.—Messrs. Whyte & Co., Church street, have been awarded the general contract for a laundry building, to be erected on Bathurst street, below College, for the Toilet Laundry Company. The building will be of brick construction, with brick foundation, with pine and concrete floors, pine interior finish, open plumbing, steam heating, electric lighting, fireproof doors, metal lath, plate glass, power and equipments. Estimated cost, $8,000. Architect, J. M. Cowan prepared the plans for the structure.

Toronto.—The Harvey Quilting Company, 35 Pearl street, has taken out a permit for the reconstruction of second floor of brick factory on Pearl street, near York street. Estimated cost, $4,500. Architect, J. Francis Brown, Board of Trade Building.

Hamilton, Ont.—The Hamilton Cotton Company has taken out a permit for the erection of an addition to their mills.

St. Catharines, Ont.—The Colonial Wood Products Company, Niagara Falls, N.Y., have purchased 20 acres of land at this place for the erection of a pulp mill.

St. Catharines, Ont.—The Welland Vale Manufacturing Company's factory has been destroyed by fire. The total loss is estimated at approximately $50,000, the stock being valued at over $30,000. Loss practically covered by insurance.

Pembroke, Ont.—The Garrie-Brook Manufacturing Company will erect a large cement block factory on Deacon street, for the manufacture of all kinds of gray and malleable iron castings, a number of tools for use in railway construction, and a patent crane.

Listowel, Ont.—The by-law granting a loan of $25,000 to the Morris Piano Company, to assist them in rebuilding their factory, which was recently destroyed by fire, has been carried.

Welland, Ont.—The Dane Manufacturing Company, Ottumwa, Iowa, manufacturers of hay stackers, loaders, rakes, mowers, etc., has purchased a site of one hundred acres of land at Welland, Ont., on which they will erect a plant to employ two hundred men. The Canadian branch is capitalized at $200,000.

Welland, Ont.—The Tin Plate Company, of Swansea, Wales, with paid-up capital of $250,000, have signed an agreement to locate a plant at Welland. The company will employ 250 men. The agreement provides that the company commence the erection of the buildings before April 1st. One of the buildings will be 100 by 300 ft., of steel construction. The agreement also provides that the town build 150 houses which will be needed by the workmen.

Waterford, Ont.—The R. S. Robinson property, and the Chas. Clouse lot, have been purchased for the erection of a factory for the manufacturing of telephone supplies. Mr. Geo. Doughty will superintend the construction of the building. Mr. Overshiner is president of the company.

Murillo, Ont.—McArthur's sawmill and gristmill mill at this place, have been destroyed by fire. Loss not stated.

Pembroke, Ont.—The Pembroke Milling Company will at once rebuild their mill which was recently destroyed by fire. Plans for the building have been prepared.

Port Perry, Ont.—The expanded Metal Company, 108 King street west, Toronto, have been awarded the general contract for a plant to be erected at Port Perry, Ont., for the Weber Gas Company, Janes Building, Toronto.

Winger, Ont.—The Erie Evaporating Company, of Dunnville, Ont., will erect a $10,000 evaporator at this place. The building will be two stories in height, of brick construction, with cement foundation, felt roof, natural gas heating.

Rodney, Ont.—Mr. F. A. McCallum's sawmill at this place has been completely destroyed by fire. Loss estimated at $5,000, with insurance of $2,500.

Sault Ste. Marie, Ont.—Arrangements are now under way for the construction of a large drydock at this place. The Board of Trade, which has taken the matter up, has been assisted by a grant from the council, and private subscriptions, for the purpose of defraying the expenses of H. Calderwood, Consulting Engineer, Toronto, who has been engaged to recommend a site and advise the promoters in this project. Mr. Calderwood will report to the Board of Trade during Christmas week. President Browne, of the Board of Trade, may be addressed regarding this proposition.

Peterboro, Ont.—Mr. Weatherstonne has made application to the City Council for the privilege of purchasing a site of one acre of land on which to erect a new one-storey, 100 by 30 ft. factory. Mr. Weatherstonne's present plant is at the corner of Simcoe and Water Sts.

Kingston, Ont.—The Wormwith Piano Company has applied to the City Council for assistance to re-establish its factory, which was recently destroyed by fire.

Kingston, Ont.—The Wormwith Piano Works and the Wholesale grocery of W. G. Craig & Co., have been damaged by fire to the extent of $120,000. The loss to the piano company is estimated at $90,000; all the machinery was destroyed. Messrs. Craig & Co. estimate their loss at $30,000, with insurance of $26,000.

Fort William, Ont.—The Lennox Furnace Company of Marshalltown, Iowa, is contemplating establishing a Canadian branch at either Winnipeg or Fort William.

Dresden, Ont.—Mr. Wm. Rudd's carriage factory at this place has been completely destroyed by fire. Loss not stated.

Oakville, Ont.—The Oakville Pop Works have been destroyed by fire, including the building, machinery, and stables in the rear.

Thorold, Ont.—The Town Council has made an agreement with the Colonial Wood Products Company, whereby this company will locate a pulp mill at this place. Mr. J. J. Harriman, of Niagara Falls, has been awarded the contract for the erection of the buildings, which it is estimated will cost about $3,000.

Thorold, Ont.—The boiler house at Battle's quarry has been completely wrecked by an explosion.

Montreal, Que.—Architects Finley & Spence, Guardian Building, have awarded to Messrs. D. G. Loomis & Sons, 261 St. James street, the contract for the erection of the new bleacher, and finishing building for the Mount Royal Spinning Company, at Cote St. Paul.

Montreal, Que.—Architect Eric Mann, 30 St. John street, has awarded the following contracts for the erection of a brick tower, for staircase, elevators and sprinkling tower, for the McClary Mfg. Co., King street: General contractor, Shearer, Brown & Wills, Montreal; elevators, Smith Machine Company, London, Ont.

Moose River, N.S.—The Moose River Lumber Company's plant at this place has been badly destroyed by fire, including a large amount of the machinery.

Amherst, N.S.—The Rhodes-Curry Company will at once rebuild the car shops which was recently destroyed by fire. The workman of the company will be employed in the erection of the new building.

Lepreaux, N.B.—Mr. J. A. Gregory, St. John west, N.B., will erect a two-storey saw mill at Lepreaux, to replace the one recently destroyed by fire. The building will be of frame construction, with concrete foundation, shingle roof, arc lights, and will cost $10,000. Tenders for the building will be received from Jan. 1st, to Feb. 1st, 1909. Architect E. L. Hughes, St. John West, N.B. The machinery equipment will include two 125 h.p. tubular boilers; two 125 h.p. high pressure non-condensing engines; machinery for the manufacture of lumber, including rotary, edger, lath-mill, planer, shingle machines, conveying machinery, hangers, pulleys, belting and shafting. Figures on machinery will be received after Jan. 1. The building will be ready for the machinery Apr. 1.

Chatham, N.B.—The Canada Iron Corporation, with mines in Gloucester, are looking for a suitable site for a smelter and steel plant. Messrs. J. J. Drummond and F. C. Parsons, of this firm, have visited Chatham, N.B., and the company will in all probability purchase a site and locate plant at this place, if they are offered proper inducements. The building of the smelter would occupy at least a year's time. The channel in the river would need to be dredged to a depth of 25 ft., for the shipping of the ore. The company would also need a site on the waterfront, for the building of a number of pockets, each with a capacity of 5,000 tons.

Musquash, N.B.—Two cut-up mills, owned and operated by the Englewood Pulp Company, have been destroyed by fire. The mills had a capacity of 150,000 feet per day. Loss placed at $22,000, with insurance of $13,000.

Moncton, N.B.—Dr. Hayes and W. Tabor, representing the White Candy Company, St. John, have made a proposition to the City Council whereby the company offers to remove their industry to this place, providing the city will grant

them free light and water for ten years, and guarantee six per cent. bond for $40,000, redeemable in equal parts in five, ten, fifteen and twenty years.

Winnipeg, Man.—Tenders will be called in the near future, for the construction of the Winnipeg Power Company's electrical works at Point du Bois. The amount of $1,500,000 will be expended on this work next year. Total cost estimated at $3,500,000.

Winnipeg, Man.—The plant of the Prairie City Oil Company on Pine street, near Notre Dame avenue, has been completely destroyed by fire. The loss is estimated at approximately $40,000, with insurance of $14,000. The building was a two-storey and basement frame structure. Mr. Lewis is manager of the company, with offices in the Somerset block.

Vancouver, B.C.—The Canadian General Electric Company, of Peterboro, Ont., will erect a $70,000 building next spring on Pender street, West. Plans for the proposed structure, which will be devoted exclusively to the purposes of the company, have been prepared by architects Honeyman & Curtis, Vancouver.

Vancouver, B.C.—The factory and planing mill of the Royal City Mills, on False Creek, have been destroyed by fire. The loss is estimated at $100,000, partly covered by insurance. The saw mill and dry kilns were not damaged. Mr. E. C. Mahoney, manager of the company, states that the structure will be rebuilt as soon as the insurance is adjusted.

Vancouver, B.C.—The civic authorities propose to place before the electorate at the January elections a by-law authorizing the installation of a second incinerator, for which City Engineer Clement is preparing a report to be presented to the Board of Works at its next session.

Saskatoon, Sask.—The John Deere Company, manufacturers of plows, have secured a site west of the C.N.R. and north of Twenty-third street, on which they will build. The property is 180 by 120 feet.

Regina, Sask.—Mr. A. Bean, who has large milling interests in the United States, with headquarters at New Prague, Minn., has purchased a site at this place on which he will erect a plant including an oatmeal mill with capacity of 100 barrels per day, a flour mill with capacity of 500 barrels per day, and a flax and linseed oil mill, with elevator and storage accommodation. The initial investment in connection with the plant will be about $100,000. Contracts will be let in the near future, and the work of construction will be started in the spring.

Edmonton, Alta.—The Edmonton Steam Laundry has been destroyed by fire. Loss estimated at $22,000, with insurance of $12,000.

Gas Plants, Elevators and Warehouses

London, Ont.—Mr. John Garvey is contemplating the erection of a four or five-storey warehouse on King street between Clarence and Richmond streets.

Montreal, Que.—Architect Eugene Payette, 15 St. James street, has revised plans for the proposed warehouse to be erected for Mr. Carl Rosenberg of the British American Import Company. Tenders will be invited in about Dec. 15th. Estimated cost, $65,000.

Montreal, Que.—John Watterson, 227 Common street, has taken out a permit for the erection of a warehouse on Murray street at cost of $16,200. Architect, J. T. Hyde; Contractor, H. C. Hitch.

Montreal, Que.—Architect J. A. Karch, 17 Place d'Armes Hill, has prepared plans of a warehouse to be erected for the Campbell Mfg. Co. ... ...

Montreal, Que.—The Otis-Fensom Elevator Company has been awarded the contract for supplying and installing elevators in Lyman's new warehouse on St. Paul street. Architects, Mitchell & Creighton, Inglis Building.

Winnipeg, Man.—The T. Eaton Company, Limited, will extend their premises by the erection of a warehouse 100 by 133 feet, which will be connected with the main building by tunnels. Other important extensions to the store are under consideration.

Oakner, Man.—The Scottish Co-operative Society, which has a representative in the Grain Exchange at Winnipeg, will erect an elevator at Oakner, Man.

Saskatoon, Sask.—The Cockshutt Plow Company has had plans prepared for a warehouse which they will build here next spring. Mr. F. Cockshutt, Brantford, is the chief promoter. Mr. E. A. Mott is in charge of the business at Winnipeg, and D. J. Taylor of the Regina branch.

Saskatoon, Sask.—The Grey Carriage Company and the Mansell Campbell Fanning M..l Company, both of Chatham, Ont., have decided to build a joint warehouse at this place.

Saskatoon, Sask.—The John Deere Plow Company has purchased a site at this place on which they will erect a large warehouse.

Vancouver, B.C.—Permit has been issued for a warehouse to be erected on Railway street, for Mr. A. C. Flumerfelt. The building, it is estimated, will cost $25,000.

Electrical Construction

Pembroke, Ont.—A by-law has been passed by the local rate-payers authorizing the expenditure of $10,000, for electric pumps for the waterworks pump house. A 200 h.p. motor, and the necessary trip-valve for the stand-pipe, will be installed.

Glencoe, Ont.—A by-law has been passed by the rate-payers authorizing the installation of an electric plant, to be operated by the municipality.

Windsor, Ont.—In all probability a by-law to authorize the expenditure of from $25,000 to $30,000 to provide a practically new municipal lighting plant will be presented to the rate payers in January. As an alternative proposition they will be given the opportunity to express themselves on the project of purchasing Niagara power from the Hydro-Electric Commission of the Ontario Government, under the Government scheme.

Toronto.—The transforming station, in connection with the new power distribution plant, will be erected on Garrison Common. It is proposed to erect a building that will be in keeping with the general park scheme.

Winnipeg, Man.—Tenders, addressed to the Chairman of the Board of Control, will be received at the office of the undersigned up to 5 p.m., Dec. 28, for the construction of the general works and for the supply and erection of various portions of a transmission line between Point du Bois and Winnipeg. Plans, specifications and forms of tender may be obtained at the office of the Power Engineer, Carnegie Library Building, Winnipeg, and at the offices of Messrs. Smith, Kerry & Chace, Confederation Life Building, Toronto, Ont. Individual tenders will be received for: General works at Point du Bois, erection of transmission line, steel towers, electric transmission cable. Tenders may include one or more of the above items, providing they have also tendered for the individual items of such group. M. Peterson, Secretary, Board of Control Office, Winnipeg.

Bridges, Wharves and Subways

Toronto.—At a meeting of the Civic Works Committee it was decided to submit a by-law to the rate-payers for the purpose of authorizing the expenditure of the sum of $250,000 for the building of a viaduct from Wilton avenue over the Don valley, to Elliott street.

Toronto.—Regarding the proposed new Bathurst street bridge it was proposed, at a meeting of the Board of Control, to pay for this structure out of the taxes, in place of submitting by-law to the people. In this case tenders would be called for at once. Estimated cost of bridge, $135,000.

Toronto.—A proposition has been presented to the Railway Board by Mr. Howard G. Kelley, Chief Engineer of the G. T.R., providing for bridges at Bay, Yonge, Church, Jarvis, Sherbourne and Berkeley streets, which coupled with the removal of the York street bridge and the depression of tracks west of Bathurst street, and including the new Union Depot, would effect a saving of about $5,000,000 in comparison with the cost of the viaduct scheme, as estimated by him. Mr. Kelley placed the cost of the bridges and incidental work at $1,446, 586, which, with $1,380,000 for track depression in the West end, and $2,028,000 for the Union Station, made a total of $4,854,586 for the bridge scheme.

Stratford, Ont.—Plans have been prepared for the erection of a new concrete railroad bridge on the Owen Sound line, near the waterworks at this place. The bridge will in all probability be constructed next year.

Fort William, Ont.—Mayor Murphy, J. T. Horn, President of the Board of Trade, and Geo. A. Graham, all of this place, have waited upon Hon. Messrs. Back and Cochrane and presented a resolution asking for the construction of a dam near the outlet of Dog Lake. By a special act at the last session of the Legislature, $20,000 was set apart for the construction of such a dam, although it was stipulated that the act could not come into force without a proclamation.

Peterboro, Ont.—Plans have been prepared for a new bridge to span the Otonabee River, at Smith street. The plans provide for three spans of ninety-four feet each. A by-law will shortly be submitted to the rate-payers for the purpose of authorizing the expenditure of $49,000 for the erection of this bridge.

Montreal, Que.—Mr. Vanier, town engineer of St. Louis, a suburb of Montreal, was instructed to prepare plans and specifications for the new subway, the cost of which will be shared jointly by the C.P.R., the Montreal Street Railway, and the town.

Sorel, Que.—A portion of the pier at the mouth of the Richelieu River, has given way and fallen into the river. The damage is estimated at $75,000.

Tenders will be received at this office up to 4 p.m., Dec. 28th, for the construction of an extension to wharf at St. Alexis, Ha! Ha! Bay, Chicoutimi County, P. Q., according to plans and specifications on file at the offices of A. Decary, Resident Engineer, Post Office, Quebec; J. C. Tache, Resident Engineer, Chicoutimi, P. Q., and at the Department of Public Works, Ottawa.

St. John, N.B.—At a meeting of the committee appointed by the council to consider the proposal to build a bridge across the harbor, it was decided to ask the council for authority to employ a practical engineer to prepare estimates and plans and to incur whatever preliminary expenses might be necessary in furthering the project. It is understood that the Government has received estimates from Engineer Hildebrand that the cost of a new bridge across the falls would be about $450,000, and that repairs could be made to the present structure for $40,000, which would strengthen it sufficiently to last another twenty-five years.

St. John, N.B.—D. C. Clarke has been awarded the contract for the construction of a new wharf at this place to be known as No. 7. Work of construction will be commenced at once.

Calgary, Alta.—Tenders will be received up to noon, Dec. 15th, for the construction of a steel bridge to span the Elbow River at Ninth avenue, the structure to be 150 feet long by 33 feet wide, with concrete abutments, and to provide for double street railroad tracks. Tenders to include the removal and re-erection of the present bridge, to a point between St. George's Island and the Mainland. Victor Hill, City Engineer.

Strathcona, Alta.—City Engineer McLean has been instructed by the council to prepare plans for a high level bridge over Mill Creek, at the eastern extremity of Whyte avenue, to provide a direct route into Strathcona from the Clover Bar district.

Edmonton, Alta.—A deputation consisting of members of the Edmonton and Strathcona City Councils, will ask the Government to construct a bridge across the Saskatchewan River, similar to the one at Medicine Hat.

New Westminster, B.C. — The City Council has awarded the following contracts for the construction of the proposed Lulu Island bridge: Canada Foundry Company, superstructure, $26,831.25;

The International Contract Company, Seattle, substructure, $29,642.

Saskatoon, Sask.—The City of Saskatoon and the Canadian Northern Railway will erect a foot bridge over the company's tracks at Twentieth street.

Vancouver, B.C. — The Palmer Land Company has taken out a permit for the erection of a wharf and addition on Westminster avenue at an estimated cost of $12,000.

Vancouver, B.C.—A petition will be presented to the City Council requesting that the construction of the Cambie street bridge over False Creek, be at once proceeded with, in conformance with the by-law passed last January when the sum of $250,000 for this purpose, was voted.

Waterworks, Sewers and Canals

Hamilton, Ont.—At the meeting of the Sewers Committee, it was decided to ask the Council to submit a by-law to the people, to authorize the expenditure of $65,000 for the completion of the construction of the East-end disposal works, and to build the Catharine street and Ferguson avenue sewers through the revetment wall.

Hamilton, Ont.—Contractor Geo. F. Webb, of Hamilton, has been awarded the contract for the installation of a sewerage system on the mountain at a contract price of $26,140.

Stratford, Ont.—A sewer will be constructed along William street, across James street, and Walnut street, and up to Idington avenue. It is understood that the work will be carried out in the near future.

Niagara Falls, Ont.—At a meeting of the City Council it was decided to submit a by-law to the rate-payers on Jan. 4th for the purpose of authorizing the expenditure of $7,000 for sewer extensions.

Fort Erie, Ont.—At a meeting of the Citizens' Club a committee consisting of Mr. J. Fitzgibbon, W. E. Hunt, Capt. George Dean, J. J. Foster, and Rev. A. C. MacIntosh, was appointed to ascertain the cost of installing a municipal waterworks system.

St. Thomas, Ont.—A by-law will be submitted to the rate-payers in January for the purpose of authorizing the erection of septic tanks for the city sewage. The by-law will provide for the expenditure of $40,000 for this purpose.

St. Catharines, Ont.—The Board of Trade of this place has decided to co-operate with the Kingston Board in making representation to the Department of Railways and Canals, with a view to having the Welland Canal enlarged and deepened, and the St. Lawrence route improved.

Belleville, Ont—Plans have been prepared by Mr. Henry Carre, C.E., and also by Mr. Lindsay, for a general sewer system for this city. It is estimated that the cost would be about $75,000. The Board of Trade is interested in the proposition.

Moncton, N.B.—The City Water and Light Department Committee purpose shortly to install an additional pumping plant, to comply with the insurance underwriters' request, and are contemplating the installation of an electrical pump.

Public Buildings

Toronto.—At a meeting of the Exhibition Board it was decided to ask the city to expend the sum of $6,000 in repairing the roof and floor of the manufacturer's building, and also to erect a new transportation building.

Toronto.—The Ontario Cabinet has under consideration extensions to the Parliament Buildings. It is proposed to erect a new fire-proof library, and also a delegation hall. Architect Geo. W. Gouinlock, Temple Building, has prepared preliminary plans.

Ottawa, Ont.—The Smith Marble and Construction Company, Montreal, has been awarded the contract for marble, mosaic and tile work in the additions to the Parliament Buildings at Ottawa.

Ottawa.—The Canadian Government will construct a 300 by 150 building at the Alaska-Yukon Pacific Exposition, to be held in Seattle, June 1st to Oct. 16th, 1909, inclusive. Wm. Hutchinson, Canadian Exhibition Commissioner, has been notified by the Canadian Government to leave for Seattle to select a site and make arrangements for the construction of the building.

Mitchell, Ont.—Contracts have been awarded as follows for the new Carnegie Library building to be erected here. Mason work, John Avery, $2,067; painting, Louis Wenzel, $250.

Fergus, Ont.—At a public meeting of local liberals it was decided to recommend to the Dominion Government the purchase of the Munro property, on which to erect the new post office building.

Preston, Ont.—Andrew Carnegie has made an offer to erect a library building here providing the town will supply a suitable site and guarantee its maintenance. In all probability a $10,000 building will be erected.

Montreal, Que.—Architect L. R. Montbrient, 230 St. Andre street, has prepared plans for a new civic building to be located at the corner of Jacques Cartier Square, west of the Chateau de Ramezay. It is proposed that the new building be used to accommodate the Recorders Court, a new central police station and new health offices, and that it be connected with the City Hall by an underground passage. The building will be 126 by 130 feet.

Montreal, Que.—The Smith Marble & Construction Company has been awarded the contract for tile and marble for the new Auditorium Hall on Berthelet street.

Three Rivers, Que.—Contract for the erection of the market building has been awarded to Mr. Bigras at a cost of about $40,000. Theo. Daoust, 103 St. Francois Xavier street, Montreal, is the architect.

Calgary, Alta.—Tenders will be received up to 4 p.m., Dec. 21st, for the construction of Post Office Fittings, etc., at the Calgary Public Building, according to plans and specifications on file at the office of J. J. O'Gara, architect, Calgary, and at the Department of Public Works, Ottawa.

Medicine Hat, Alta.—Tenders will be received up to 4 p.m., Dec. 21st, for the construction of the post office, customs and inland revenue fittings, etc., at Medicine Hat Public Building, according to plans and specifications on file at the office of Mr. W. T. Williams, Supervising Architect, Medicine Hat, Alta., and at the Department of Public Works, Ottawa.

Keilher, Sask.—Mr. C. H. Prest will at once rebuild his hardware store, which was recently destroyed by fire. The new building will be of concrete blocks, with metal roof.

Business Buildings

Toronto.—The T. Eaton Company has taken out a permit for the erection of a two-storey brick and steel addition to departmental store on Yonge street, near Albert street. Estimated cost, $76,000.

Toronto.—The following contracts have been awarded in connection with the $50,000 garage to be erected at Richmond and Church streets for the McLaughlin Automobile Company of Oshawa: General contract, John Stacey & Gale, 121 Queen street east; plumbing and heating, Fred Armstrong Company, Ltd., 277 Queen street West. The following branches have been sublet: Reinforced concrete work, R. A. Rogers, Yonge street Arcade; cut stone, Canadian Art Stone Company, Price street; Fireproofing, Don Valley Brick Company, 36 Toronto street; tinsmithing, galvanized iron work and roofing, Mr. Dillon. Wickson & Gregg are the architects.

Toronto.—The following contracts have been awarded in connection with the $20,000 store and dye house to be erected at 78-80 King street west, for Messrs. Stockwell, Henderson & Co., 103 King street west: Excavating brick and stone work, H. N. Dancy & Son, 184 Howland avenue; carpentry work, Walker & Robinson, 317 Albany avenue; plastering, Taylor & Nesbit, 18 Havelock street; plumbing and heating, Fiddes & Mogarth, 122 King street east; painting and glazing, J. R. Robinson, 139 Amelia street; roofing and sheet metal, Robt. Rennie & Son, 378 Berkeley street.

Toronto.—Messrs. Heintzman & Company, Ltd., who have recently purchased the J. F. Brown Company's store on Yonge street, are having plans prepared for the necessary alterations to the building.

Toronto.—The Vokes Hardware Company has purchased the property at the northwest corner of Queen and Bond sts., on which they will erect a large retail store. The lot has a frontage of 87 feet on Queen street, with depth of 115 feet on Bond street.

Toronto.—Architects Denison & Stephenson, 20 King street west, have prepared plans for five stores and dwellings to be erected on Queen street east, corner Howard street, at cost of $15,000. The buildings will be three stories in height, of brick construction, with concrete foundation, felt and gravel roof, pine and hardwood floors, pine interior finish, open plumbing, steam heating, combination lighting.

Toronto.—It is reported that the Steele-Briggs Company, seedsmen, will acquire possession of Nos. 128-134 King street east where they will erect a large new building, to be used for both wholesale and retail purposes.

Toronto.—Mr. J. Lancaster, 186 Dundas street, has been awarded the general contract for a store and dwelling to be erected on College street near Deleware avenue, for Chas. McGuire, 1196 Queen st. west. The building will be of brick construction, with stone foundation, felt and gravel roof, open plumbing, combination lighting, hot air heating, pine floors and interior finish.

Toronto.—Mr. Geo. Henderson, 103 Yarmouth Road, will erect a Public Hall on Essex street, near Christie street, at cost of $3,600. The building will be two stories in height, of brick construction, with stone foundation, felt and gravel roof, pine floors and interior finish, open plumbing, hot air heating, combination lighting. Architect, W. S. Thompson.

London, Ont.—Tenders will be received up to Dec. 19th, for the installation of a steam heating system in the London Loan Company's building, formerly Odd-fellows' Hall. Plans on file at office of W. G. Murray, Architect.

St. Thomas, Ont.—W. R. Darrach has taken out a permit for the erection of the Engineers' Building on Talbot street at an estimated cost of $26,000.

Ottawa, Ont.—Architect J. P. MacLaren, 104 Sparks street, has prepared plans for a garage and carriage show room, to be erected for Mr. W. D. Morris, Cecil Hotel. The building will be three stories in height, 38 by 201 feet, and will be constructed of steel beams with wood joists and flooring, stone foundation, felt and gravel roof. It will be equipped with steam heating and electric lighting, freight elevator and metal ceiling. The contract for the steel has been awarded to the Canadian Agency and Supply Company.

Pembroke, Ont.—Mrs. J. W. Munro will rebuild her business block, which was recently destroyed by fire.

London, Ont. — Contracts have been awarded as follows for a three-storey and office building, to be erected on Park avenue for the London Loan Company: Mason and cement contractor, Scott Murray, King street; carpenter, Tambling & Jones, 282 Horton street; plasterer, Robert Gash, 13 Kensington street; plumbing, Hunt Plumbing Company, 521 Richmond street; iron work, Fleming & Houghty, 348 Talbot street. Cost of building, $6,000. Architect, Wm. G. Murray, Masonic Temple, London, Ont.

Hamilton, Ont.—P. D. Crerar, K.C., is planning to erect a large building on his property at the corner of James and King William streets.

Port Burwell, Ont.—The building and plant of the Weekly News have been destroyed by fire entailing a loss of $4,000. Mr. C. A. Burnes is the proprietor.

Montreal, Que.—The Dominion Steam Ship Line has rented the offices in the Bell Telephone Building, formerly occupied by the Royal Bank. Extensive al-

terations will be made to partitions, office fixtures, etc., for which architects Hutchison & Wood have prepared plans.

Montreal, Que.—Mr. Jacob A. Jacobs, 171 St. James street, has purchased at cost of $155,000, large block of land on St. Catherine street, corner Alexander street on which he will erect a block of stores.

Montreal, Que.—L. M. Lefebvre, 246 Rachel street, has taken out a permit for the erection of a building containing a store and dwelling to cost $12,000.

Three Rivers, Que.—Contract for the steel work to be used in the erection of a store for Messrs. Bellefeuille & Cirous, has been awarded to the Phoenix Bridge Company, 83 Colborne street, Montreal.

Moncton, N.B.—Mr. R. N. Wyse, Main street, will, next spring, erect a large brick business block at the corner of Main and Robinson streets.

Winnipeg, Man.—The Canada Permanent Mortgage Corporation has purchased the property known as the old Manitoba Club Building, Garry street, for the purpose of erecting a large office building.

Vancouver, B.C.—Dr. H. W. Riggs and Mr. S. Salmon have taken out a permit for a four-storey brick block to be erected on Pender street, between Homer and Hamilton street, at cost of $40,000. The building will have a frontage of 50 feet.

Victoria, B.C.—The B. Wilson Company has taken out a permit for the erection of a two-storey and basement, brick and concrete building on Chatham street. Architects, Hooper & Watkins; contractors, Luney Bros.

Edmonton, Alta.—Mr. A. M. Steward, manager of the local branch of the National Trust Company announces that the company proposes to erect next year a large brick block on the site of their present office. The proposed structure will be six stories in height, the first story of stone and the remainder of brick with stone trimmings. Estimated cost between $[illegible],000 and $80,000. The building would be equipped with two elevators. Plans for the building are now being prepared.

Edmonton, Alta.—Mr. D. W. MacDonald, druggist, will erect a large three-storey brick store and office building on the corner of Jasper avenue and Second street. It is understood that the building will have a frontage of 58 feet and a depth of 150 feet.

Railway Construction

London, Ont.—The Grand Trunk Railway will erect a large station and hotel at this place. It is understood that work on the hotel will be commenced early next spring.

Hamilton, Ont.—The Dominion Power and Transmission Company has taken out a permit for the erection of new car barns and shops, to cost, with equipment, $75,000.

Fort William, Ont.—The Canadian Pacific Railway will erect a large coal handling plant at this place on a site purchased from Messrs. P. J. Manion and J. T. Horne. The proposed plant will have an approximate storage capacity of one million tons.

Ottawa.—A sub-contract for the construction of a section of the Transcontinental Railway has been awarded to Messrs. Fortin & Gravelle, of Hull, at estimated cost of $500,000. This section is ten miles in length, and is situated above Fort William.

Ottawa, Ont.—Messrs. D. G. Loomis & Sons, 261 St. James street, Montreal, have been awarded the contract for the erection of a baggage and passenger building for the Ottawa Terminal Railway Company.

Woodstock, Ont.—It is proposed to construct a radial railway from Woodstock to Guelph, through New Dundee, Plattsville and other towns, connecting at Galt with the T. H. & B. line. The promoters of the scheme, Messrs. Baird and McKee, and other prominent business men in Plattsville, have placed the project with the Central Securities Company of Toronto.

Dunnville, Ont.—The by-law granting a bonus of $15,000 to the Dunnville, Wellandport and Beamsville Electric Railway Company, for a trolley line from Dunnville to connect with the T. H. & B. at either St. Annes or Smithville, has been carried. The contract for the work has been awarded to Wm. Graham, of Toronto.

Quebec, Que.—The Canadian Northern Railway has submitted a proposition to the City Council, whereby the company offers to build repair shops in the suburbs of Quebec. The Quebec and Lake St. John Railway, now a branch of the Canadian Northern Railway, is bound by contract to erect shops inside the city limits, but, owing to the fact that there are no grounds suitable for buildings of this kind, the Company wishes to be relieved of this obligation. Limoilou is suggested as a site, as this municipality is about to be annexed to Quebec. The proposed shop will cost $200,000.

Banks

Toronto.—Sir Edward Clouston, general manager of the Bank of Montreal, has stated that a new bank building will be erected at the corner of Yonge and Queen streets, Toronto.

Toronto.—The Merchants Bank has purchased the corner lots at the junction of Roncesvalles avenue and Dundas street, on which they will erect a branch bank. The property has a frontage of 40 feet on the corner.

St. Catharines, Ont—Contracts have been awarded as follows for alterations to the Imperial Bank building: General contract, Messrs. Newman Bros., St. Catharines; heating, plumbing, and sheet metal work, A. Riddle & Son, St. Catharines; stone work, Canadian Art Stone Company, Price street, Toronto. Architect, A. E. Nicholson, St. Catharines, Ont.

Victoria, B.C.—The Royal Bank of Canada will at once erect a new building on Government street. Mr. T. D. Veitch, local manager has been instructed to at once proceed with the arrangements. The plans for the new building call for a three-storey structure of brick and stone construction, the ground floor to be used for banking purposes, while the two upper stories will be fitted up as offices. An elevator will be installed.

Toronto.—Architects Gordon & Helliwell, 526 Confederation Life Building, has prepared plans for alterations to Y.M.C.A. building at the corner of Yonge and McGill streets. The work includes carpentry work, structural iron work, plastering, painting and glazing, electrical work and brick work.

Clubs and Societies

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for the erection of a three-storey club building at the corner of Adelaide and Bathurst streets, for St. Mary's club. The building will be of brick and stone construction, with brick foundation, felt and gravel roofing, oak floors and interior finish, open plumbing, combination lighting, and steam heating. Specifications include—structural iron, artificial stone, tile, metal lath, plastic relief work, plate glass, deafening paper, electric bells. Tenders will be called about the first of the year. The structure will cost $15,000.

Toronto.—The West End branch of the Y.W.C.A., 237 Dufferin street, proposes in the near future to erect a new building.

Toronto.—Lorne Park, the well known summer resort, about fifteen miles west of Toronto, has been purchased as a site for a country and motor club. The work of preparing the grounds will be commenced at once. The present hotel building will be remodelled as a clubhouse. The committee interested in the deal, consists of W. R. Travers, General Manager of the Farmers' Bank; Richard Cowan, Stock Broker; Chevalier J. Enoch Thompson; C. W. Defoe, Lieut. Col. C. Greville Harston, and others.

Guelph, Ont.—A project has been launched for the erection of a Y.M.C.A. building at this place. Mr. W. E. Buckingham has set forht a subscription scheme to raise the sum of $55,000.

Ottawa, Ont.—The Foresters' Hall on Sussex street has been damaged by fire to the extent of $5,000. The building is owned by the Government.

Montreal, Que.—At the annual meeting of the Royal Montreal Golf Club a proposal will be laid before the meeting regarding the following alterations and improvements to their building: Complete system of waterworks, new quarters for servants, dressing rooms and lockers for members, and the construction of new greens.

New Westminster, B.C.—The Young Men's Christian Association is contemplating the erection of a building at this place.

Asylums and Hospitals

Toronto.—A permit has been issued for the erection of a four-storey brick building, at the corner of Avenue road and St. Clair avenue, for the Deaconess Home. Estimated cost, $125,000. Architects, G. M. Miller & Co., Toronto General Trusts Building.

Welland, Ont.—At a meeting of the Town Council, a deputation consisting of Messrs. McAuliffe, A. O. Beatty, W. M. German, M.P., and A. Griffiths, made a request for a grant of $1,000 towards the erection of the new hospital at this place. It is estimated that the hospital would cost about $23,000.

Montreal, Que.—Messrs. Reid, MacGregor & Reid, general contractors, 1168 St. Hubert street, Montreal, have awarded the following sub-contracts for the erection of the new observation ward for the Alexandra Hospital: Painting and glazing, G. Dumont; electrical work, C. Lapierre, Lindsay Building; roofing, Richardson Simard Co., 8 Prince Arthur street west; plumbing, W. J. Graham, 85 Cathcart street. E. & W. S. Maxwell, 6 Beaver Hall Square, are the architects.

Verdun, Que.—The new annex which is being built at the insane asylum at Verdun, a distance of 1 1-2 miles from Montreal, has been damaged by fire to the extent of approximately $20,000.

Victoria, B.C.—A permit has been issued to the Royal Jubilee Hospital, for a chapel to be erected on the hospital grounds off Mt. Tolmie road. The building will be one storey in height, of brick and stone construction, and will cost $3,500. J. C. M. Keith is the architect.

Vancouver, B.C.—At a meeting of the Vancouver Health Committee plans were submitted by the medical health officer for the proposed new isolation hospital. The plans provide for a building to cost approximately $55,000, exclusive of site.

New Wesminster, B.C.—The Board of Managers expect to be able to commence construction early next year on the proposed new Royal Columbian Hospital. Architect Salt has been instructed to prepare specifications. The plans provide for a three-storey brick and stone building.

Churches

Ottawa.—Plans have been accepted for the new Congregational Church to be erected at Ottawa South. The building will be of solid brick construction, with stone foundation, and will be 30 by 45 feet. The work of construction will be started in the near future.

Deer Park, Ont.—The congregation of Christ's Church will erect a new brick and stone church building at a cost of $35,000 early next spring. Rev. T. W. Paterson, M.A., is rector of the church.

London, Ont.—The congregation of Talbot street Baptist Church will in all probability, either enlarge their present building, or erect a new church. Rev. A. J. Vining is the pastor.

Sudbury, Ont.—The congregation of the Presbyterian church is contemplating the erection of a new church. The proposed building will be erected on the site of the present church, and would have seating capacity of seven or eight hundred. Pastor, Rev. Mr. Logie.

Deseronto, Ont.—St. Andrew's church, on Tendinaga Indian Reserve, near this place, has been destroyed by fire.

Omagh, Ont.—Tenders will be received up to Jan. 1st for the tearing down and rebuilding of Omagh Presbyterian Church. Plans and specifications may be seen at

Messrs. Robertson Bros.' store, Omagh. R. A. Jarvis, Sec'y. Boyne P.O., Ont.

Black Lake, Que.—Contracts have been awarded as follows for interior finishing of church building at Black Lake, Que., for the Roman Catholic congregation, viz.: General contract, Pierre Belanger, Black Lake, Que., $14,055; carving and furnishing, Mr. Jos. St. Hilaire, St. Romuald, Que., $3,000. Ouellet & Levesque, 115 St. John street, Quebec, Que., are the architects.

Victoria, B.C.—The St. Barnabas congregation will erect a new church building to cost approximately $10,000. The present building will be used as a Sunday School room. Rev. E. G. Miller is rector of the church.

Residences and Flats

Toronto.—Architects Smith & Gemmell, Bank of Commerce Building, have prepared plans for a three-storey apartment house to be erected at Bellevue and Oxford streets, for Miss H. Sheppard. The building will be of brick construction, with stone foundation, slate roof, open plumbing, steam heating, electric lighting, hardwood floors, Georgia Pine interior finish, fire escapes, metal ceilings, cornice, metal lath, fireproof doors, electric bells.

Toronto.—Architects Ellis & Connery, Manning Chambers, have prepared plans for a residence, garage and stables to be erected in Mimico for Forbes Godfrey, M.D., M.L.A., Mimico. The residence will be of brick construction, with stone foundation, slate roof, oak floors and interior finish, open plumbing, electric lighting, hot water heating, dumb waiter, plastic relief work, electric bells, refrigerator, four mantels. An automatic water pressure plant will be installed. General contractor, Messrs. Bloxham & Saxton, West Toronto. Estimated cost, $8,000.

Toronto.—Architects Ellis & Connery, Manning Chambers, have prepared plans for a $20,000 apartment house to be erected at the corner of Church and Charles streets, for Mr. J. A. Cleary. The building will be three stories in height, of brick construction, with stone foundation, felt and gravel roof, hardwood floors and interior finish, open plumbing, electric lighting, and steam heating, electric bells and fire escapes.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has prepared plans for a two-storey dwelling to be erected on Sinclair, 193 Keele street, West Toronto. The building will be of concrete and brick construction, with concrete foundation, pine floors, pine interior finish, shingle roof, open plumbing, hot air heating, gas lighting, plate glass and mantels. Estimated cost of building, $2,000.

Toronto.—Mr. S. Shaver, 25 North st., will receive tenders after Nov. 17, for all trades required for a 2 1-2 storey brick residence to be erected at 20 Gloucester street, Toronto, at cost of $3,000. The building will have brick foundation, felt and gravel and slate roof, hardwood and pine floors and interior finish, open plumbing, hot air heating, combination lighting, staved columns, plastic relief work, electric bells, tile work and two mantels. Architect, Leonard Foulds, 43 Victoria street.

Toronto.—Architects Burke, Horwood & Whyte, 28 Toronto street, have prepared plans for an $8,000 residence to be erected on Whitney avenue, near Glen road, for Mr. Geo. Jackson. The building will be two and one-half stories in height, of brick construction, with brick foundation, slate roof, pine and hardwood interior finish, oak and pine floors, open plumbing, combination lighting, hot water heating, electric bells, tile work and mantels.

Toronto. — Architect J. Francis Brown, Board of Trade Building, has prepared plans for a four-storey residence to be erected on Dunvegan, road, for Mrs. J. G. Scott, Alexander Palace, at an estimated cost of $10,000. The building will be of brick construction, with stone foundation, slate roof, oak floors, hardwood interior finish open plumbing, combination lighting, hot water heating, tile work and electric bells. Work on the building will not be commenced until spring.

Toronto.—Architect J. Francis Brown has prepared plans for a two-storey residence to be erected in North Rosedale, for Mr. Mara at an estimated cost of $7,000. The building will be of brick construction, with stone foundation, slate roof, hardwood floors and interior finish, open plumbing, combination lighting, hot water heating, tile work and electric bells.

Toronto.—Architect J. Francis Brown has prepared plans for a two-storey residence to be erected on Howard Park road, for Mr. Arthur Dodd, at an estimated cost of $12,000. The building will be of brick construction, with stone foundation, slate roof, combination lighting, open plumbing, oak floors, hardwood interior finish, tile work and electric bells.

Toronto.—The following contracts have been awarded for a two-storey residence to be erected on Starr avenue, near Dunn avenue, for Mr. F. W. Christie, 19 Classic avenue: Masonry, Chas. Wood & Son, 611 Manning avenue; roofing, Wheeler & Bain, 179 King street east; carpentry work, T. B. Manual; plastering, Taylor & Nesbitt; heating, Parkdale Furnace Co., 1378 Queen street west; painting and glazing, G. Shockleton; electrical work, C. S. Anderson; plumbing, Purdy, Mansell Company, 63 Albert street. The building will be of stucco and brick construction, with stone foundation, slate roof, pine floors and interior finish, open plumbing, hot water heating, combination lighting. Architects, Chadwick & Beckett, 20 Toronto street.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a two and one-half storey residence to be erected on Binscarth road, for Mr. Sim, of Markham street. Estimated cost, $4,500. The building will be of brick construction, with brick foundation, shingle roof, pine and hardwood floors, hardwood interior finish, open plumbing, combination lighting, hot water heating, electric bells and and three mantels.

Toronto.—Mr. A. G. Saunders, 39 Havelock street, will erect a 2 1-2 storey residence at 37 Havelock street, at cost of $5,000. The building will be of brick construction, with stone foundation, shingle roof, pine and hardwood floors, open plumbing, combination lighting and electric bells. The owner will do the excavating and brick and stone work, and will sublet contracts for the other branches of the work. Architects, Edwards & Saunders, 18 Toronto street.

Toronto.—Architects Symons & Rae, 15 Toronto street, have prepared plans for a two and one-half storey dwelling at the corner of Balmoral and Poplar Plains road for Mr. B. S. MacInnes. The building will be of brick construction, with stone foundation, oak floors and interior finish, open plumbing, hot water heating, electric lighting and mantels. Cost of building, $8,000.

Toronto.—Contracts have been awarded as follows for a two and one-half storey residence to be erected on Glen road, Rosedale, for Mr. G. R. MacFarland, viz.: Excavating, brick and stone work, Elgie & Page, 21 Havelock street; painting and glazing, James Kitchener, 418 Spadina avenue; plastering, J. W. Goulding, Davisville, P.O.; tinsmithing A. B. Ormsby Co. Ltd., Queen and George streets; plumbing and heating, J. R. Seager, 799 College street. The building will be of stone construction, with stone foundation, shingle roof, oak floors, pine and hardwood interior finish, open plumbing, hot water heating and electric lighting. Estimated cost, $9,000. Architects, Bond & Smith, 19 Wellington street west.

Toronto.—T. Fussell, 53 Poplar Plains road, has been awarded the contract for the mason work, and Messrs. Woodley Bros., 58 Davenport road, the contract for the carpentry work for the erection of a two and one-half storey residence on Woodlawn avenue, near Yonge street, for Mr. John T. Aggett, 199 Yonge street. The building will be of brick construction, with brick foundation, felt and gravel and shingle roof, oak and pine floors and interior finish, open plumbing, combination lighting, hot water heating, telephone system, and four mantels. Architects, Edon Smith & Son.

Toronto.—Architects Chapman & McGiffin, 59 Yonge street, have prepared plans for a pair of two and one-half storey dwellings to be erected at 216 Poplar Plains road, for Mr. E. G. Long. The building will be of brick construction, with brick and concrete foundation, felt and gravel and shingle roof, open plumbing, hot water heating, electric lighting, oak and pine floors and interior finish, ornamental columns, plastic relief work, plate glass, art glass, electric bells, and mantels. The general contract has been awarded to Messrs. J. Berridge & Company.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for a pair of three-storey stores and dwellings to be erected on the south-west corner of Grace and College streets, for McKinney and Johnson. The building will be of brick construction, with stone foundation, felt and gravel roof, open plumbing, combination lighting, hot air heating, hardwood floors, and hardwood and pine interior finish, metal ceilings, cornice, plate glass, prismatic glass and electric bells. The building will cost $8,000.

Toronto.—Architect P. H. Finney has prepared plans for a two and one-half storey brick residence on Forest Hill road, near Lonsdale avenue, for E. Taylor. The building will have stone foundation, slate roof, oak floors, hardwood interior finish, open plumbing, hot water heating, combination lighting, tile work, electric bells and two mantels. The structure will cost $6,000.

Toronto.—Architect E. G. Wilson, 77 Victoria street, has prepared plans for a pair of semi-detached residences to be erected on Leuty avenue, near Violet avenue, for Mr. Tew, at an estimated cost of $6,500. The building will be of brick construction, with brick foundation, shingle roof, pine floors and interior finish, open plumbing, hot air heating, combination lighting, tile, plate glass, art glass, refrigerator, electric bells and two mantels. The general contractor is A. R. Price, Belle fair avenue.

Toronto.—W. D. Charlton, 140 Close avenue, Toronto, has been awarded the general contract for a $10,000 apartment house to be erected at the corner of Euclid avenue and Ulster street, Toronto. The building will be of brick construction, with slate roof, hardwood and pine floors and interior finish, open plumbing, combination lighting. E. G. Wilson, 77 Victoria street, is the architect.

Toronto.—Architect E. G. Wilson, 77 Victoria street, has prepared plans for a two-storey brick residence to be erected on Heath street, north St. Clair avenue, for Mr. S. B. Hinder, at an estimated cost of $4,500. The building will have stone foundation, slate roof, open plumbing, hot water heating, combination lighting, hardwood and pine floors and interior finish, tile, plastic relief work, electric bells, and three mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and one-half storey residence to be erected on the west side of Poplar Plains rd. for Mr. H. Hutson at an estimated cost of $3,500. It will be of brick construction, with stone foundation, slate roof, pine and hardwood floors' and interior finish, open plumbing, hot water heating, combination lighting, tile, plate glass, art glass, and electric bells.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two-storey dwelling to be erected on Shaw street, north of Bloor street, for Mrs. Scott. The building will be of brick construction, with stone foundation, felt and gravel and shingle roof, pine floors and interior finish, open plumbing, hot air heating, combination lighting, tile plate glass, art glass and electric bells. It will cost $2,500.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and one-half story dwelling to be erected on the east side of Palmerston Boulevard, for J. W. Walker, at cost of $3,500. It will be of brick construction with stone foundation, slate roof, open plumbing, hot water heating, combination lighting, oak and pine floors and interior finish, tile, metal lath, plate glass, art glass, electric bells.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and one-half storey residence to be erected at 350

Palmerston Boulevard, for Mr. J. T. Hutson, at cost of $4,000. It will be of brick construction, with stone foundation, slate roof, hardwood and pine interior finish, open plumbing, hot water heating, combination lighting, tile, metal lath, ornamental columns, plate glass, art glass, electric bells.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and one-half storey residence to be erected on the east side of Palmerston Boulevard, for Mr. J. W. Walker at a cost of about 3,-500. It will be of brick construction, with stone foundation, slate roof, pine and hardwood floors and interior finish, open plumbing, hot water heating, electric and gas lighting, tile, metal lath, plate glass, art glass and electric bells.

Oakville, Ont.—Architect J. Hunt Stanford, Yonge street Arcade, Toronto, has prepared plans for a two-storey summer dwelling to be erected at Oakville for Mr. W. V. Ecclestone, at cost of $3,000. The building will be of frame construction, with pine floors, oak and pine interior finish, felt and gravel and shingle roof, open plumbing, electric lighting, plate glass and electric bells. The general contract has been awarded to Messrs. Farrell & McCarthy, 28 Olive avenue, Toronto.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for a three-storey apartment building to be erected on McCaul street, Toronto, at cost of $10,000. The building will be of brick construction, with felt and gravel roof, hardwood floors and interior finish, hot water heating, combination lighting, open plumbing, tile, cornice, electric bells and six mantels. The structure will be equipped with fire-escapes.

Toronto.—Mr. Jos. Crang, 720 St. Clair avenue, Toronto, will erect a pair of semi-detached dwellings on the west side of Kendal avenue, near Wells street, as cost of $5,000. The building will be two and one-half storeys in height, of brick construction, with brick foundation, slate and felt and gravel roof, pine floors, pine interior finish, open plumbing, hot air heating, combination lighting, electric bells and four tile mantels. Architect, J. M. Cowan, 65 Adelaide street east.

Toronto.—Architect W. G. Hunt, 255 Westmoreland ave., has completed plans and specifications for a $3,000 bungalow to be erected at Lorne Park for Mr. F. Kelk, 54 Macdonnell avenue. It will be of brick construction, with brick foundation, shingle roof, pine floors and interior finish, open plumbing, hot air heating, electric lighting, staved columns, ornamental caps, plastic relief work and electric bells.

Toronto.—Contracts have been awarded as follows for an apartment house to be erected on King street west, Parkdale, for Mr. Wm. Anderson, 68 Cowan avenue, at cost of $7,500: Mason work, Nobes Bros., 121 Amelia street; heating, Taylor & Read, 792 Shaw street; painting and glazing, H. Hayden. The building will be of brick construction, with stone foundation, felt and gravel and slate roof, pine floors and interior finish, open plumbing, hot water heating, combination lighting, plate glass, art glass, telephone system, electric bells and three mantels. J. H. Galloway, 77 Victoria street, is the architect.

Toronto.—Messrs. J. J. McKinney & J. E. Johnson, 632 College street, Toronto, will receive tenders up to Dec. 17th, for the erection of a pair of three-storey stores and dwellings on the corner of Grace and College streets. The building will be of brick construction, with brick foundation, felt and gravel roof, hardwood floors, pine interior finish, open plumbing, hot air heating, combination lighting, structural iron, artificial stone, tile, skylights, weather strips, staved columns, ornamental columns, plate glass art glass, prismatic glass and electric bells.

Toronto.—The following contracts have been awarded for a two and one-half storey residence to be erected on Whitney avenue, near Glen road, for the Rev. G. Jackson, 115 Wellesley Crescent: Mason work, Hamilton & Reid; carpenter work, J. A. Howson, West Toronto; plumbing and heating, Power Bros., 393 Spadina avenue; plastering, Duckworth Bros., 123 Huron street; roofing, A. B. Ormsby, Queen and George streets; painting and glazing, F. C. Davies, 218 Montrose avenue. The building will be of brick construction, with stone foundation, slate roof, oak and pine floors and interior finish, and will cost $7,000.

Toronto.—Mr. Walter Nash, 79 Gore Vale avenue, who has the general contract for the erection of two semi-detached dwellings on Macpherson avenue, near Avenue road, for Mr. H. S. Mara, 5 Toronto street, has sub-let the following work: Brick, stone and excavating work, J. Roberts, 21 Hickman street; heating, Peerless Furnace Co.; plumbing W. H. Benson, 881 Queen street west; tinsmithing, W. H. Smith. The building will be of brick construction, with stone foundation, shingle roof, pine floors, pine interior finish, open plumbing, combination lighting, hot air heating, electric bell, mantels, and will cost $5,000.

Hamilton, Ont.—W. Thakerr has taken out a permit for two brick houses to be erected on Tom street, between Sophia and Davenport, for Mrs. Mitrella, at an estimated cost of $3,000.

Stratford, Ont.—A permit has been issued John Keyes for two houses, one to be erected on Ontario street, and the other on Ballantyne avenue. W. H. Schenck has also been granted a permit for the erection of a residence on St. Vincent street.

Brantford, Ont.—Mr. A. K. Bunnell has taken out a permit for the erection of a brick residence on Dufferin avenue at cost of $5,000. A permit has also been granted to Mr. Chas. Champion for the erection of a residence at the corner of King and Wellington streets.

Ottawa, Ont.—Permits have been granted to J. W. Featherston for the erection of a pair of dwellings on Fourth avenue, at cost of $4,500; Chas. Rupert for the erection of a double brick veneer dwelling on Mutchmor street at a cost of $5,000, and H. La Haise for an $11,000 brick veneer house to be built on Rideau street.

Ottawa, Ont.—V. V. Rogers has taken out a permit for the erection of a pair of brick veneer dwellings on Mutchmor street, at a cost of $5,000. A permit has also been granted to Jas. Trumble for the erection of a brick veneer dwelling on Nelson street, at cost of $2,800.

London, Ont.—Permits have been granted to Geo. Hyatt for a two-storey brick residence on Lorne avenue; J. Fritz Beck for a two-storey brick residence on St. George street; Jas. Wallace for a two and one-half storey brick-veneer residence on St. James street; Chas. Quick for a one and one-half storey brick-veneer residence at 101 Briscoe street; B. A. Fitzmaurice for a brick residence on William street; F. W. Watts for a two-storey brick residence on Quebec street; T. Alison for a brick veneer residence at 13 Regina street; Mrs. Clyde for a one and one-half storey brick-veneer dwelling on Wharmcliffe road.

Montreal.—Architect Joseph Perrault, 17 Place d'Armes Hill, has prepared plans for eight flats to be erected on Park avenue for Mr. J. H. Dorion.

Montreal.—Alex. MacKay, Oldfield ave. has taken out a permit for the erection of an apartment house, containing twelve dwellings, on Oldfield avenue, at cost of $12,000. Architect, J. S. Smith.

Montreal.—Hilds K. Skelton, 83 Mansfield street, has taken out a permit for the erection of a residence at 102 Crescent street at an estimated cost of $10,-320. Architect, Jas. E. Adamson, Coristine Building.

Montreal.—Architect Eric Mann, 30 St. St. John street, has prepared plans for the erection of an apartment house on Pine avenue, for Mr. David Sperber. Estimated cost, $15,000.

Montreal.—Architect L. R. Montbriant, 230a Lafontaine Park, has prepared plans for the erection of an apartment house, containing eighteen flats, on Hutchison street, for Mr. D. Dagenais, 925 Sanguinet street, Montreal. Estimated cost, $20,000.

Montreal.—E. M. Renouf, 260A University street, has taken out a permit for the erection of a $13,000 residence on Pine avenue. Architects, E. & W. S. Maxwell.

Montreal.—Architect Chas. Bernier, 70 St. James street, has awarded the following contracts for the erection of three flats on Berri street, for Mr. N. Deslauriers: Masonry, Perreault & Andy; brickwork, Jos. Larose; painting, A. Viallancourt; plastering, N. Depatie; plumbing, heating and roofing, N. Belanger.

Winnipeg, Man.—S. H. Foster has taken out a permit for the erection of a dwelling on the south side of Broadway, between Spence and Balmoral, at an estimated cost of $5,500.

Edmonton, Alta.—E. A. Lankin will erect a row of houses at an estimated cost of $9,000.

Calgary, Alta.—Mr. J. C. Trotter will erect a solid brick apartment house on Fifth avenue, between Fifth and Sixth streets, at cost of $8,500.

Vancouver, B.C.—Messrs. Harris & Gregg have taken out a permit for the erection of a brick addition to an apartment house on Seymour street at an estimated cost of $8,500.

Vancouver, B.C.—Mr. W. W. Stuart has taken out a permit for the erection of a three-storey apartment house at the south-east corner of Georgia and Chilco streets. Estimated cost, $18,000.

Vancouver, B.C.—Mr. F. Bayliss will erect a $7,000 apartment house on Cornwall street, near Yew street.

Hotels

Saskatoon, Sask.—Messrs. Beaubier and Smyth, proprietors of the Empire Hotel, will erect a brick addition to their hotel, to double the present size. The improvement will be started early in the spring.

Kingston, Ont.—The joint committee of the City Council and the Board of Trade has endorsed the proposition submitted by the Kingston Hotel Company, and accepted the proposal for a cash bonus of $100,000. The Company, which was represented by Dr. Dupuis of Boston, and Mr. V. H. Hilger of Chicago, will be granted exemption for twenty years, from all taxation with the exception of school taxes.

Vancouver, B.C.—At a meeting of the building committee, appointed by the trustees of the Seattle Seamen's Friend Society, it was decided to recommend that the society procure a lot on Western avenue, near the present seamen's home, on which to erect a five or six-storey fireproof hotel. The proposed building would be constructed on the plan of the Mills hotels in New York. It will have about two hundred bedrooms, a gymnasium, reading room, and assembly room.

Opera Houses and Rinks

Winnipeg, Man.—The new Grand Theatre, at the corner of Jarvis and Main streets, has collapsed. The building was just being completed, and had been built at a cost of $30,000. It was built by a company promoted by W. J. Gilman, of New York.

Elgin, Man.—The skating and curling rink at this place has been destroyed by fire.

Edmonton, Alta.—Mr. E. R. Sims, manager of the Calgary Amusement Company, will in all probability erect a new theatre building here on First avenue in the near future.

Edmonton, Alta.—Plans have been prepared for a two-storey solid brick theatre building, to be erected at Edmonton by the Western Co-operative Corporation, Ltd. The building will be 90 by 80 ft., and will, in all probability, be erected on First street, near the King Edward hotel. The work of construction, it is expected, will be commenced next spring. Mr. E. Storie, formerly in charge of the Edmonton Opera House, will be manager of the new amusement house.

Saskatoon, Sask.—G. P. Barrett, Ottawa, is contemplating the erection of a three-storey brick building, 75 by 100 ft. at this place, on Second avenue. The rear part of the building would be used as a playhouse, while the front would be fitted up for rental.

Edmonton, Alta.—Mr. Samuel Nankin, proprietor of the Grand Theatre, is having plans prepared for a new theatre building, to be erected on First street. Mr. Nankin will visit the new theatre buildings in the eastern cities in Canada and the United States, and will erect a thoroughly up-to-date house.

Fire Stations and Jails

Niagara Falls, Ont.—A by-law will be submitted to the rate-payers on Jan. 4th next, for the purpose of authorizing the expenditure of $8,300 for improvements to the three city fire halls at this place.

Montreal, Que.—Architect J. A. Godin, 120a Lafontaine Park, has awarded to F. X. Aube, 690 Laval avenue, the contract for the new Police Station, No. 12, at 1394 St. Lawrence Boulevard.

Montreal, Que.—At a meeting of the Fire and Light Committee a motion was passed asking the Board of Control to arrange for the erection of a new fire hall in Rideau Ward as soon as possible.

Quebec, P.Q.—Tenders, addressed to the Honorable L. A. Taschereau, Minister of Public Works and Labor, will be received at the Parliament Building, Quebec, on Dec. 23rd, for the completion of the new jail of the District of Montreal. Plans and specifications may be seen at the Parliament Buildings, Quebec, and at the office of the Architects, Messrs. Marchand & Bressard, 164 St. James street, Montreal. Alphonse Gagnon, Secretary, Department of Public Works, Quebec, P.Q.

Montreal, Que.—At a meeting of the Fire and Light Committee it was proposed to erect two new fire stations, one in Rosemount and the other in Mount Royal Ward. It is expected that funds for these stations will be asked for in the annual estimates.

Calgary, Alta.—Plans for the new central fire hall have been completed. The proposed building will, in all probability, be erected on the site of the present Central fire hall, and will cover an area of 75 sq. ft. Estimated cost, $42,000.

Meritt, B.C.—Tenders will be received up to Dec. 18th for the erection and completion of a three cell lock-up, office, etc., at Merritt. Plans and specifications may be seen at the office of the Government Agent, Nicalo. F. C. Gambie, Public Works Engineer, Lands and Works Department, Victoria, B.C.

Schools and Colleges

Toronto.—The Toronto Board of Education has taken out a permit for a two-storey brick addition to Howard Park avenue school. Estimated cost, $13,988. Builders, Lucas & Son, 141 Havelock st.

Toronto.—The Board of Education, Toronto, has taken out a permit for the erection of a three-story brick addition to school building on Morse street, near Queen street. Estimated cost, $17,196. Builders, H. Lucas & Son, 141 Havelock street.

Toronto.—The Trustees of Woodgreen Methodist Church have taken out a permit for the erection of a one-storey brick Sunday School building on the west side of Strange street, near Queen street, at cost of $5,000. Architect, R. W. S. Chadney.

Toronto.—At a meeting of the Board of Governors of Toronto University it was decided that only a section of the proposed building for the Faculty of Education, be erected this year. The property committee was instructed to report on the cost of an administration building and lecture room, and the accommodation for 00 high school pupils. The original plans were for a building to accommodate 1,100 pupils in the high and public school departments, and called for an expenditure of $500,000. The building will be erected on Bloor street, between Spadina avenue and Huron street.

Toronto.—Architects Langley & Howland, Continetnal Life Building, have prepared plans for the erection of an addition to school building in Deer Park, for the North Toronto School Board. The building will be of brick construction, with stone foundation, slate roof, pine floors and interior finish, open plumbing, steam heating, electric lighting, and will cost $12,000. The work of construction will not be completed until next spring.

Berlin, Ont.—At a meeting of the Public School Board, the plans prepared by Architect Chas. Knechtel for the proposed addition to the Margaret avenue School, were submitted. Estimated cost, $6,700. This addition will be built next year.

Berlin, Ont.—The two wings of St. Jerome's College, which were recently destroyed by fire, will be rebuilt in the spring. The new structures will be four stories in height, and will be built on the same plan as the present new building.

Welland, Ont.—At a meeting of the Town Council a request was received from the Secretary of the School Board asking for the sum of $15,000 for the purchase of a site and the erection of a new school. A by-law will be submitted to the rate-payers for the purpose of authorizing this expenditure.

St. Mary's Ont.—It is proposed to submit a by-law to the rate-payers in January for the purpose of authorizing the expenditure of $35,000 for the erection of a new public school building. Plans of the proposed building have been prepared.

Chatham, Ont.—Architect Harry J. Rill, of Detroit, has prepared plans for the erection of an auditorium building at this place, for the Ursuline Sisters. The building will be two stories in height, of brick construction with cut stone trimmings. The ground dimensions are 100 by 180 ft.

Davisville, Ont.—Architects Langley & Howland, Continental Life Building, Toronto, have prepared plans for the erection of an addition to school building at Davisville. The building will be of brick construction with stone trimmings, slate roof, pine floors and interior finish, open plumbing, electric lighting, steam heating. The work of construction will not be commenced until next spring. The structure will cost $5,000.

Montreal, Que.—The Longue Pointe Protestant School on Longue Pointe road, west of Dominion Park, has been destroyed by fire.

Montreal, Que.—Architects Gauthier & Daoust have prepared plans for a four-storey school building for higher commercial studies, to be erected at the corner of St. Hubert St. and Place Viger square. The structure will be of brick construction (with stone from the Portneuf quarries). It will be absolutely fireproof and have seven large exits.

Montreal, Que.—Architect Chas. Bernier, 70 St. James street, has prepared plans for the erection of a school for the Catholic School Commissioners. Estimated cost, $60,000.

Outremont, Que.—Architect G. A. Monette, 97 St. James street, Montreal, has awarded to following contracts for the erection of the annex to the Catholic School foor Boys, in Outremont: Masonry, brickwork and carpentry, L. Houle, plumbing, Wm. Pelletier; heating, Cadieux & Briard; all firms of Montreal.

St. Come, Que.—Architects Ouilet & Levesque, 115 St. John street, Quebec, have prepared plans for a $15,000 convent to be erected at this place for the Rev. Elie dut Breton. The building will be three and one-half storeys in height, of frame construction, with stone foundation, galavanized iron roof, hot water heating, open plumbing, plaster interior finish and metal siding.

Halifax, N.S.—Tenders will be received at the Holy Heart Seminary up to 3 p.m., Dec. 21st, for the construction and completion of an additional building. The work includes hot wates heating, plumbing, and gas fitting. Specifications and all information can be obtained on application at the office of Chas. W. West, Architectural Engineer, Halifax.

Halifax, N.S.—Messrs. S. A. Marchall & Sons have been awarded the contract for the erection of the new Chebucto School building in accordance to plans prepared by Architect W. J, Busch, Halifax.

Winnipeg, Man.—The Winnipeg Free Kindergarten Association has taken out a permit for the erection of a school on the south side of Alexander street, opposite Chambers street, at cost of $3,000. Builders, J. McDiarmid Company.

Victoria, B.C.—The School Board has authorizied Architect E. C. Watkins, of the firm of Hooper & Watkins, to call for tenders for the proposed new school building to be erected on the property bounded by Chambers street, Princess street, and Queens avenue. Separate tenders will be called for the different trades. The estimated cost of the building is $60,000, and as $52,000 only has been provided for, contract will not be awarded until provision is made for an additional $15,000.

Vancouver, B.C.—At a meeting of the Board of School Trustees it was decided to submit to the rate-payers of Vancouver in January next, a by-law authorizing the expenditure of $199,000 for school buildings, improvements, and school sites, including the following: High school in east end, $45,000; four-room school building in east end, $25,000; four-room addition to Ninth avenue and Park Drive, $22,000; school board offices, storeroom and equipment, $25,000; school desks, $6,000; heating, Fairview school, $3,000; high school site in east end, $27,000; two school sites in south side of city, $40,000.

Civic Improvements

Toronto.—The City Engineer has recommended the laying of the following pavements: Asphalt, Herrick street from Bathurst street to Euclid aveune, and on Euclid avenue from Queen street to the north side of Robinson street; bitulithic, Brock avenue form the south side of Middleton street to Dundas street, and on Highland avenue from Schofield avenue to a point 336 feet west; vitrified block, Scott street from Front street to Esplanade street, and on Piper street.

North Toronto.—Notice is given that the Municipal Council intends to construct the following local improvement works on sections of undermentioned streets, viz.: (a) Six-inch water main, hydrants, valves, etc., on Bowood avenue. (b) Tar and gravel sidewalk, 4 ft. in width, with necessary grading, on Broadway. William J. Douglas, Town Clerk.

Ottawa, Ont.—The Board of Control has instructed City Engineer Kerr to prepare an estimate of the cost of laying new pavement on Sparks street, between Bank street and the Post Office.

Kingston, Ont.—The City Engineer has submitted a report showing the cost of road paving on sections of the following streets, viz.: Princess street, $8,568.60; Wellington street, $8,779.80; Clarence street, $10,109.40; Brock street, $4,900.80; King street, $9,501; Ontario street, $13,066.80.

Vancouver, B.C.—The Board of Works has endorsed the report of the City Engineer, recommending the laying of block pavements on the following streets, viz.: Westminster avenue, cost, $166,390; Georgia street, from Beatty street to Park bridge, cost, $232,375; Robson street, from Hamilton street to Seymour street, cost, $26,250.

Vancouver, B.C.—The following works as proposed by City Engineer Clement, have been approved by the civic authorities, viz.: block paving Powell street, at an approximate cost of $200,000, and cement sidewalks on a number of streets, estimated cost, $175,000.

Prince Rupert, B.C.—It is understood that the Provincial Government will, in the near future, call for tenders for planking of streets and laying of sidewalks in Prince Rupert, for which $160,000 has been allowed. The sum of $40,000 is available for sewer construction.

Miscellaneous

Toronto.—A two-storey frame boathouse on Lake street, near the foot of Yonge street, has been destroyed by fire. The building was owned by the Toronto Canoe Club; the upper storey was occupied by William Van Winckel, boat builder, and the ground floor was used as a storehouse, by the Gasoline Engine Company of West Toronto. A number of rowboats and valuable launches were destroyed. The oss is estimated at $25,000.

Toronto.—At a meeting of the Board of Control it was decided to have the City Engineer report on the advisability of constructing groynes between Indian road and the Humber, for the purpose of forming a new beach.

Berlin, Ont.—The Town Council has passed the by-law to raise $8,000 for the extension of the gas main system. The by-law will be submitted to the rate-payers at the next municipal elections.

Montreal, Que.—Architects Saxe & Archibald, 59 Beaver Hall Hill, have awarded to C. E. Deakin, 11 St. Sacrament st., Montreal, the contract for the erection of a stable for Mr. Holden.

MONTREAL BUILDERS' EXCHANGE Holds Annual Banquet.---Many Architects Present.---Exceptional Growth Demonstrated.

APART from the social success of the annual banquet of the Montreal Builders' Exchange, which was held at the Windsor Hotel, on the evening of December 10, the toast list and large attendance, demonstrated that this comparatively new organization of builders and contractors has thoroughly established itself among the foremost business organizations that are responsible for the building up and growth of Canada's premier city.

Among those who attended and whose presence bespoke much for the excellent character of the work which the association is doing, were a number of Montreal's leading architects, who expressed their enthusiastic approval of the aims and objects of the Exchange. All spoke in warm terms of the great good the association has already accomplished, and predicted that the spirit of co-operation and better relationship that has already been established between the architect and builder through its agency, will, in the near future, result in immeasurable benefits to all concerned.

Nearly two hundred and fifty members and guests sat down to a sumptuous repast. Principal among the number of distinguished visitors present was Sir Lomer Gouin who, in the course of his speech, made some very significant statements.

Mr. Thomas Forde, president of the Exchange, was in the chair. The menu card departed from the usual joke, but was embellished with quotations from Shakespeare and "other fellows," many of which were timely and appropriate.

The first toast on the list was that of "The Dominion and Our Province," which was answered by Hon. C. J. Doherty, K.C., M.P.

Sir Lomer Gouin thanked the members of the Builders' Exchange for having once again invited him to assist at their annual banquet. He congratulated the association upon having chosen Mr. Quirk for their representative on the Technical Schools Commission. These schools were sure to do good work for the building profession, because they would allow the youth of the province to obtain the best from his energies. They had all thought the time had come for them to give to their sons the means of reaching the highest ranks in the trade or business that they had chosen.

The Prime Minister recalled the efforts that the Provincial Government had made to bring about a better feeling amongst employers and employees. In accordance with the desire of the Builders' Association the Government had proposed a conciliation act when he was Minister of Public Works. Since then the Government had established a Court of Conciliation which had been of the greatest service both to the workman and employers.

Referring to the question of workmen's compensation, he said that the question was likely to come up again. A commission had been appointed to consider the matter, and they had presented a report. Next session he would present a bill to bring a law into effect that would deal with the whole question.

Building contractors, continued Sir Lomer, are considered amongst the principal of the national workers, and we depend on their intelligence and their patriotism to make Montreal one of the most beautiful cities of America. He ventured to prophesy that in fifteen years Montreal would have a population of a million. He advised them to perpetuate their memory by the buildings that they raised.

The Prime Minister also said that there would shortly be another technical school for Quebec, and he hoped that it would be the means of helping the youth of the province to become better acquainted with the work that was before them.

The toast was also replied to by Mr. Charles A. Wilson, M.P., who was assured that Sir Lomer Gouin and his colleagues would do all that was possible to help the Builders' Association in their work.

Mr. W. T. Castle proposed the toast of the "City of Montreal," and said that the city was the centre not only of finance and industry, but of science, of art and of literature, and they should look upon it as the finest city in the Dominion. In the absence of the Mayor the toast was responded to by Ald. Sadler and Ald. Mount.

"Our Guests" was proposed by Mr. J. N. Arcand and replied to by Mr. D. R. Brown, of the Architects' Association of Quebec, Mr. F. C. Larivere, Chambre de Commerce; Mr. Farquhar Robertson, Board of Trade, and Mr. Dunlop, of the Architects' Association.

All the arrangements were excellently carried out by the secretary, Mr. J. H. Lauer, who also acted as accompanist and musical director.

CANADIAN CEMENT AND CONCRETE EXHIBITION---To be Big Event.---Much Space Contracted For.---Canadian Firms Should Be Represented.

THAT the Canadian Cement and Concrete Exhibition will be a success beyond all question, has been evidenced by the large number of firms that already, at this early date, have contracted for space. While the promoters of this Exhibition were very sanguine as to the prospects of making it the greatest of its kind ever held in Canada, it was not expected when the announcement was sent out, that so many firms from distant points should express their desire to procure space. One very interesting feature of the contracts that have come in thus far, is the fact that a very large number have come from the United States, which demonstrates very clearly that the people across the line are about to bid more strenuously than before for Canadian business. It further signifies that the American manufacturers of cement and cement machinery, have found in the large number of Exhibitions that have been held in the United States during the past few years, the advertising value of shows of this character.

It behooves every firm interested either in the manufacture of cement, cement machinery or cement tools or concrete reinforcement, in Canada, to see that they are properly and amply represented at this greatest show of its kind ever held in the Dominion of Canada.

While it may appear that there is considerable time in which to make arrangements, it must be remembered that the earlier the application is made, the better space there is available.

The Cement and Concrete Association has been formed solely and absolutely for the promotion of cement and concrete interests in Canada, and the Exhibition is held in connection with their first convention, only as a means of creating interest and attracting a large number of people to the convention, where the vast amount of machinery and appliances exhibited, will tend to open the eyes of the Canadian building public, to a great extent, as regards the material advances that have been made in the use of this new material in building construction.

Applications for space should be addressed to Mr. R. M. Jaffray, 1 Wellington street west, Toronto.

To give a fair idea of the class of firms that have contracted for space we publish the following who are among those who will exhibit at St. Lawrence Arena from March 1 to 6:

Peerless Brick Machine Co., Minneapolis, Minn.; F. M. Jackson Co., Akron, N.Y.; Thorn Cement Co., Toronto; Wadsworth, Howland & Co., Boston, Mass.; Sun Portland Cement Co., Owen Sound, Ont.; Canadian Art Stone Co., Toronto; Roman Stone Co., Toronto; Trussed

Concrete Steel Co., Toronto; Ideal Concrete Machinery Co., London, Ont.; Industrial Chemical Co., Swansea, Toronto; London Concrete Machinery Co., London, Ont.; Mussens. Limited, Montreal; Multiplex Concrete Block Machinery Co., Toledo, O.; Oneida Community Limited, Oneida, N.Y.; Brantford Roofing Co., Brantford; United States Steel Product Export Co., Buffalo; Expanded Metal Co., Toronto; Koehring Machinery Co., Milwaukee, Wis.; The National Portland Cement Co., Durham, Ont.; Morssen & Co., Montreal; Cement Tile Machinery Co., Waterloo, Iowa; Montreal Rolling Mills Co., Montreal.

BUILDING STATISTICS FOR NOVEMBER.

---Marked Improvement of Past Four Months Continues.---Twelve Cities Reporting Show an Increase of 60 60 per cent. Over Same Month Last Year.---Prospects for 1909 Bright. ∴ ∴ ∴

THE SUBSTANTIAL improvement in building operations, that has been so marked during the past four months, it is gratifying to note, still continues. The comparative figures supplied CONSTRUCTION from twelve representative cities throughout the Dominion, continue to show some increases that appear almost incredible. That we have again entered upon a period of what may prove to be unprecedented prosperity and growth, is evidenced by the rapidly increasing activity in building operations throughout the entire Dominion. In the following table, which gives comparative figures for twelve cities, and figures only for the month of November, for three cities, there are only four decreases shown. Edmonton, Alta., has but a slight decrease of 5.21 per cent. for the month of November, as compared with the same period of 1907, while in the same city $2,504,592 was expended in building operations during the first eleven months of 1908, as compared with $2,239,755 for the same period of 1907.

Regina, Sask., shows the largest decrease (87.01 per cent.), but this falling off can readily be accounted for by the fact that last year's figures were swelled by the issue of a permit for one building which cost $40,000.

Halifax, N.S., shows the next largest decrease (75.07 per cent.). It will be noted that this city in the comparative table issued last month, showed an increase of 26.90 per cent., with the total valuation of buildings for which permits were issued in October, 1908, of $36,155. We note that for November of last year the value of buildings erected was $83,250, which was a very abnormal month, as can be seen by the fact that the aggregate value of buildings erected for the first eleven months of last year was only $581,086. It may be further noted, with regard to Halifax, that the estimated cost of buildings erected for the first eleven months of this year is $715,575, which, on the whole, shows a substantial increase over this period for 1907.

Victoria, B.C., which last month showed an increase of 17.73 per cent., is the fourth city which shows a decrease for the month of November, of 9.14 per cent.

On the other hand, the increases shown are remarkable, to say the least. Brandon, Man., shows an increase of 140.15 per cent; Toronto follows with a very substantial increase of 116.19 per cent. It will further be noted that Toronto is far in the lead in the matter of the aggregate value of buildings for which permits were issued (as compared with other Canadian cities) for the same month of both last year and this.

Vancouver, which is second in the value of buildings for which permits were issued during November, shows an increase of 56.68 per cent.

Montreal, which last month showed a decrease of 61.32 per cent., shows an increase for the month of November, of 61.44 per cent.

Again, Winnipeg shows a very healthy increase of 93.42 per cent. over the month of November, 1907.

Fort William shows an increase of 93.42 per cent., and it will further be noted that during the first eleven months of 1908, 312 permits were issued in this city, for buildings to cost $1,600,710, as compared with 344 permits with an aggregate value of $799,775 for the same period of 1907. Calgary, Alta., and St. John, N.B., show substantial increases.

In the twelve cities for which comparative figures are given it will be found that the aggregate value of buildings for which permits were issued for November, 1908, is $2,584,648, as compared with $1,609,328 for the same cities for November, 1907, showing an increase for the twelve cities of $975,320, or 60.60 per cent.

Kingston, Ont., has had a very good year, with 393 permits issued for buildings to cost $170,000 for the first eleven months of 1908 (figures for 1907 not given).

In London, Ont., 259 permits have been issued, for buildings to cost $823,750, for the first eleven months of 1908 (figures for 1907 not given).

Although comparative figures were not given from St. Thomas, we learn that 136 permits have been issued for the first eleven months of 1908, for buildings to cost $231,536, which is 70 per cent. increase over the same period of 1907.

Reports as to future prospects from the various cities, tend to show that everything points toward excellent prospects for the coming year. Brandon reports "About $10,000 worth of building under way. Permits not issued include new fire-hall, new factory for Hughes & Co., new gas plant and several new residences;" Calgary, "Very good, architects busy preparing plans for next year's work;" Edmonton, "Weather conditions have greatly interfered with building operations;" Fort William, "Quite bright;" London, "Very, very good;" Montreal, "Improving;" Regina, "Building operations for 1909 look bright and we expect a busy year;" St. John, N.B., "Fair;" St. Thomas, "Good;" Toronto, "Prospects for new year were never better;" Winnipeg, "Fair;" Vancouver, "Situation is improving."

	Total cost of buildings for Nov., 1908	Total cost of buildings for Nov., 1907.	Increase per cent.	Decrease per cent.
Brandon, Man.	$ 10,615	4,420	140.15	
Calgary, Alta.	61,700	53,850	14.57	
Edmonton, Alta.	80,505	84,935		5.21
Fort William, Ont.	30,175	15,600	93.42	
Halifax, N. S.	20,750	83,250		75.07
Kingston, Ont.	20,000			
London, Ont.	67,510			
Montreal, Que.	279,068	172,240	61.44	
Regina, Sask.	9,276	71,433		87.01
St. John, N. B.	17,200	10,400	65.38	
St. Thomas, Ont.	35,600			
Toronto, Ont.	1,379,649	638,150	116.19	
Vancouver, B. C.	346 900	221,400	56.58	
Victoria, B. C.	104,710	115,250		9.14
Winnipeg, Man.	244,100	138,409	76.37	
	2,584,648	1,609,328	60.60 p c.	

AT A MEETING of the Cement Section of the Canadian Manufacturers' Association, held within recent date, the following officers were elected for the ensuing year: Chairman—A. W. Thorn, Lehigh Portland Cement Company, Ltd. Vice-Chairman—R. H. McWilliams, National Portland Cement Company, Ltd. Executive Committee—C. A. Lingham, Canadian Portland Cement Company; W. H. Ford, Vulcan Portland Cement Company; W. D. E. Strickland, Lakefield Portland Cement Company; J. G. Lind, Grey & Bruce Portland Cement Company; C. A. Irwin, International Portland Cement Company; G. S. Kilbourn, Owen Sound Portland Cement Company; John A. Colter.

VAGRANT TENDENCIES IN ARCHITECTURE.---A Few Observations on the Growth of Veneering in Construction Work. ∴ ∴

WHILE MUCH of it is not entirely new there is to be observed a more persistent following after what might be termed some vagrant tendencies in architecture, especially in connection with modest cost houses. Among these tendencies is a disposition to make frame houses veneered on the outside either with brick one layer thick or with terra cotta or tiling. Last year and this year there has been quite a lot of this in one form and another, so much, in fact, that the subject suggests the need of closer looking into to point out more clearly the merits and limitations of this class of work.

It may be said at the outset that that is false architecture, just like using half-length brick in the facing of a brick wall to give the appearance of a header, and the whole thing is false in that it suggests a brick building in appearance whereas it is only veneered. We find that frequently some of these things we term false ideas prevail in cabinet work, especially in furniture and in mill work. The veneer idea is also frequently a good one and is made use of in the higher grade mill work, including doors, to quite an extent, and it is claimed they are superior to solid wood. These claims are well supported, too, and it is possible that we may develop out of this veneering of frame structures and the facing of the outer wall with brick or tiling some desirable features that will on occasions outweigh the objectionable ones. Anyway people are playing peculiar pranks in architectural ideas. We find concrete walls veneered on the outside with brick to get a better apearance. We find steel frames filled in with face brick and terra cotta and occasionally we find a rough brick wall plastered over with cement or some combination of cement and crushed tile so that it looks like a concrete wall where in fact it is brick. These things are just as false in a certain architectural sense as the idea of building a frame house and facing it on the outside with brick.

It is difficult to account for what it is that leads to the peculiar wanderings of architectural ideas unless it is the desire for something new. We can understand why a man would take an old brick building that has become dingy with age and go over and plaster the outside with cement or something of the kind, but when we see a man building a new brick wall, immediately plastering it over with something, we begin to wonder. Yet an example of this very style of architecture was noted this summer—a somewhat pretentious one, too. Every wall was built of brick—that is, common brick without any facing or pointing of joints, stone trimmings were added and then the body of the wall was plastered over with a mixture of concrete and crushed tile of various colors. It looked bad at first, but after the entire structure was completed, which included gray stone and dark green trimmings, and the whole was topped over with red clay roofing tile, the effect was rather pleasing. Also it was discovered that the purpose was simply that of having something new and original in the architectural line as well as a substantial building.

Some modest houses and some more pretentious buildings, and even apartment houses, have been erected just as if they were to be frame structures with bevel siding on the outside. Then the storm sheathing was put on the frame houses and instead of finishing with weather boarding the whole is covered over with brick. This makes a wall from the outside brick face to the inside plastering approximately ten inches, a little over four inches of brick outside, an inch of plank wall, four inches of studding and about three-quarters of an inch of plaster and lath. Now the question is whether this wall will really not stand up as well as any other? If the building is well framed together the framing will give it strength to stand against almost any storm. The studding space gives a hollow wall effect, and this prevents the moisture from finding its way through the wall. Of course, brick on the outside naturally furnishes better protection against the weather than a thin covering of lumber lapped over like the regulation bevel siding is laid. The inside plastering is done on lath instead of on brick. There, of course, is some danger of fire, but for that matter there is danger of fire in any brick building having joists, floors, etc., made of wood. The outside brick walls furnish some protection against fire from the outside, and, altogether, while the house is not a brick one, it may answer certain purposes and have advantages enough to make it quite popular. It would seem to make a better house than the hollow concrete block house, and it would help out considerably if the subject were carefully investigated and various points brought out, including that of cost as compared to solid brick walls, and to concrete block walls, and as compared to regular frame structures.

In addition to building new houses in this way and also in addition to using brick there is some tendency to use tile and terra cotta on frame buildings. Sometimes an old building is remodelled, especially in the front, and a tile and terra cotta facing put on, this facing being made up of glazed tiling and ornamental terra cotta. It is not new—this idea of making a veneered front and the application of this class of veneer to frame buildings has been in use several years, but it seems to have been coming to the front more lately than ever before. And when we come to look at it right it is not surprising. Even in brick buildings and steel frame buildings there has been for many years a general practice of making the front and exposed part of special brick or terra cotta, or something to give ornamental effect, and this ornamentation, as it did not extend back into or make properly a part of the sustaining wall, is just as much a veneer in the true sense as it is to fasten on with spike and special holders a thin covering of tiling and ornamental terra cotta to a frame building. The question of most interest about the old thing is, however, one of the future, that is, to just what extent will these things develop?—CLAY WORKER.

BUILDING MATERIALS AND FIXTURES are in demand in China, and Canadian dealers who are seeking foreign market should be able to secure a large portion of the business to be had there. The report of Sir Alexander Hoise, Acting Commercial Attache to H. B. M. Legation at Pekin, recently published by the Department of Trade and Commerce, Ottawa, states that building still proceeds on an extensive scale at the great commercial centres of China, and the imported materials and fittings connected therewith continue to increase. Their value is given as £212,152, as compared with £82,670 in 1906, but there are many other articles in the import list required in the building trade, such as asbestos, electrical materials and fittings, felt and felt sheathing, stoves and grates, cement, glue and timber, all of which showed substantial increases. Asbestos rose in value from £6,-704 to £8,106, electrical materials and fittings from £150,-484 to £189,871, felt and felt sheathing from £4,042 to £5,855; cement in weight from 54,364 to 94,771 tons, and timber (soft wood) increased by over 50,000,000 square feet, with a total import of 220,220,898 square feet. Hardwood also rose from 3,090,573 to 3,215,737 cubic feet. One would have expected that window glass would have increased with other building materials, but it actually fell off by 83,367 boxes, the obvious reason being that the import in 1906 amounted to 277,512 boxes, or more than 100,000 boxes over the 1905 import, which was well ahead of the average of the previous five years.

MACHINERY AND TRADE

MARBLE INTERIORS. ∴ ∴ ∴

THERE IS no material, either natural or artificial, used in building construction that has a more legitimate and aesthetic value than has marble. As with all countries at that period which is characterized by a higher development in building art, Canada is beginning to employ this material quite extensively. Especially is this to be observed in public, semi-public and the better class of business buildings, where marble of both domestic and foreign nature is being widely used for interior work. When intelligently executed in this capacity, marble produces a richness of effect, strength of character and vigor of beauty which is quite peculiar to itself, and not obtained by the use of other materials.

An idea as to the class of work that is being executed can be seen in the four splendid interiors of Toronto buildings shown in the accompanying group. All of these are marked with a rich and striking individuality, and each shows a variety of marble and character of workmanship that are unsurpassed. The handsomely wrought interior of the Traders' Bank Building, with its entrance hall and corridor of Vermont marble and main staircase of Istrian, is something with which hundreds of people are familiar. It is regarded as one of the most striking interiors of its kind to be found anywhere. The extent to which marble has been used in this building can be imagined from the fact that the work cost approximately $80,000, and both in texture of materials and workmanship it is of the very highest order.

Another particularly good example is the Customs House, finished in Grecian and French marbles. This interior is spoken of by experts as a most excellent piece of work, the dado especially being particularly fine.

In the Continental Life Building a most pleasing and vigorous effect has been brought out by the use of Grecian, Skyros and Verde Antique; while in the recently completed Royal Bank Building is to be found an exceptionally fine entrance hall, executed in Canadian marble. The columns and pilasters are graceful monoliths and the general effect and dignity of the whole has

FOUR MARBLE INTERIORS, TORONTO, EXECUTED BY THE HOIDGE MARBLE COMPANY, TORONTO. 1. CUSTOMS HOUSE. 2. TRADERS BANK BUILDING. 3. CONTINENTAL LIFE BUILDING. 4. ROYAL BANK.

been highly commented upon. Considerable marble work has also been used in the two banking rooms, where the base and counters are finished in Royal Jasper.

It is most gratifying to know in this connection that the above mentioned interiors are representative of Canadian skill and workmanship. All of them were executed by the Hoidge Marble Company, of Toronto, and the highly creditable manner in which they nave been installed is perhaps the best attest as to the firms ability along this line, and the extensive variety of first-class marble which they handle. Their plant is one of the most modernly equipped institutions of its kind in the Dominion and their facilities to promptly carry out marble work for any purpose are the very best. In addition to the most modern types of sawing, cutting and polishing machines, they have an especial moulding machine of their own patent, which gives them an additional advantage in turning out this class of work. Last year the company erected a large addition, which is used jointly for cutting and for storing fine grades and finished marbles; while this year they have built an office on price street, adjoining their factory, to further facilitate their work.

The company has just complete a very fine job in the vestibule and rotunda of the general offices of the electrical development work at Niagara Falls, which was done in Jaune Fleuri, Rouge Jasper and Breche Violete marbles. The rotunda is 18 feet in diameter and the heavy caps and large panels were cut to fit this radius. The door heads are quite heavy and the floor is of marble tile worked out also to this radius in pretty color designs. Another contract which they are just finishing is in the Land Bank and Loan Building, Hamilton, at which place they have also executed the work on Dominion Bank.

Among other buildings in which this firm has done the marble work are: Dominion Bank, Avenue road, Toronto; Farmers Bank, Bay and Adelaide streets, Toronto; Standard Bank, Melville, Ont.; Standard Bank and Bank of Hamilton buildings, Brantford.

The Hoidge Marble Company's aim is to cater to the requirement of the architect, and develop the taste for high class marbles. Their facilities permits them to carry out all specifications in a thorough and artistic manner, assuring the very best results.

As the taste for marble mantels is being revived, the company has installed a number of them in the better class of homes. At present they are engaged on the marble work for the Bank of Nova Scotia at Kingston, Jamaica.

CALORIFIC WARM AIR FURNACE.

ONE OF THE MANY progressive firms in the Far East, who have, through the excellence of their ware and progressive business methods, established a market in the Far West, is the Record Foundry and Machine Company, of Moncton, N.B., and Montreal, whose Calorific warm air heat producer has established a reputation in the Dominion from coast to coast.

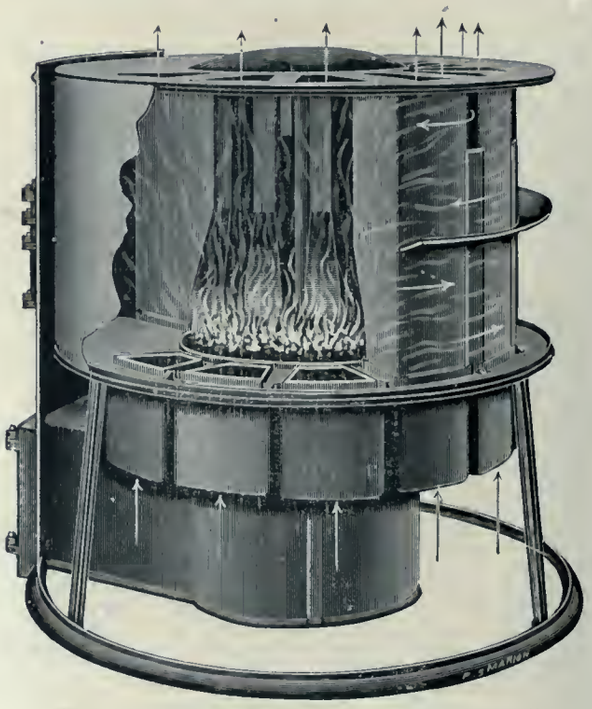
To those who contemplate the installation of warm air furnaces, it will be interesting to note the many individual features of this furnace, one of which is that it has two air courses, either directly up through the hot air columns or between the inner and outer casing, the air taken through the course being warmed by hot air columns, the latter by the radiation from the inner casing, which renders this furnace an extremely powerful heat producer.

The accompanying illustration shows the interior of the combustion chamber, position of hot air columns, and the direction of fire travel. The hot air columns shown above have immense fire surfaces which overhang the fire, this bringing all products of combustion in direct contact with them, as well as completely surrounding them. This arrangement produces a large amount of heating surface to each square foot of grate surface, yet produced in a warm air heater.

The columns are 31 inches high, and with the extensions, are 41 1-2 inches in height, thus assuring a very rapid circulation of air through the warm air columns of the furnace.

The Calorific, it may be stated, is especially noted for its combustible, non-radiation of heat in the cellar and the coolness of the smoke pipe, just enough heat escaping to insure a good draught. It does not require any especial room, as, if properly installed, the volume of heat radiated from it, in the room can be fully controlled in the plan of the installment. Calorific heaters are lined with tin, and the warm air pipes covered with asbestos sheathing.

A most interesting hand-book, known as the "Record Furnace Hand-Book," is issued by this firm, who have branch offices at Quebec, Toronto, Winnipeg, Vancouver, Calgary, and St. John's, Nfld. This book, which may be had upon application by architects, plumbers and steamfitters, is a most useful work of reference upon the subject of warm air furnace installation.



SECTIONAL DIAGRAM, SHOWING INTERIOR OF COMBUSTION CHAMBER, POSITION OF HOT AIR COLUMNS AND DIRECTION OF FIRE TRAVEL. RECORD CALORIFIC WARM AIR HEAT PRODUCER.

In this book vague statements have been carefully and successfully avoided. It gives clear, definite, positive data and directions, which can be applied to any job of furnace heating or ventilation, by any furnace man who has sufficient ability as a mechanic to properly carry out the work of installation.

It contains, further, a vast amount of information that is invaluable to the architect when specifying warm air heating systems.

Every size and style of the Record Furnace is rated for a definite heating capacity, and a simple, and at the same time a strictly safe and correct rule, is furnished for ascertaining the proper size of Record Furnace to use in heating any given residence or other building. Definite rules and tables are provided to determine the proper size of warm air pipe and warm air register, to use for each room; the proper size of ventilating duct and ventilating register to use for each room, where the system of ventilation is installed; the proper size of cold air duct, ventilating shaft and chimney flue to use with any given job, and, in fact, all information which is neces-

sary or helpful for the installation of an adequate, correct and satisfactory warm air heating and ventilating plant.

This hand-book may be had by addressing the above firm at Montreal or Moncton, or any of their branch offices.

A DESTROYED "FIREPROOF" BUILDING.

IT IS RARELY that we can photographically reproduce such striking evidences of the destructive effects to solid steel and iron of supposedly fireproof structures, when subjected to the fury of intense heat and flames as we do in the accompanying illustrations.

One particular point of timely interest in the illustrations, which are of a modern twelve-story office building that was destroyed by fire, not long ago, is the great good that can be obtained from their study, especially so in view of the fact that we are at the present time entering upon what might be called a "fireproof era."

These photos show the warping and twisting effect of the intense heat to which the structural members were subjected, and thorough and complete was the fire in its work. One in particular is most interesting, as it gives a view showing a great hole burned clean through, from the basement to the top of the structure. It was photographed by the artist while standing in the basement and pointing the camera upwards towards the hole in the roof.

The complete gutting of such a building causes one to ponder as to whether this condition is due to faulty construction or whether a really "fireproof building" is an unknown quantity. This much is certain, that when a modern steel building whose members are not properly protected, is attacked by fire, the heat temperature reaches a greater degree than in the older styles of building, except the wooden structure, which generates a severely intense heat and quickly succumbs.

The intense heat which has been recorded in so-called fireproof structures is found to be due to the great strength in our modern construction. The outer walls being held firmly together by the steel frame forms a perfect flue (confining the flames and causing them to increase in intensity), which forces the fire upwards and through the weaker portions until the building is eventually destroyed.

The heat temperature rarely is less than 3800 deg. F. in a building of this class, while the maximum has never been registered.

VIEW OF DESTROYED BUILDING, SHOWING HOLE BURNED FROM BASEMENT TO THE ROOF.

The photographs used in this article were taken specially for the Herring-Hall-Marvin Safe Company, who had installed in the destroyed building twenty-seven of their standard safes. These were used by such well known firms as the Encyclopedia Britannica Company, Collier's Weekly, Brunswick-Balke-Callender Company and many others of the forty-three occupants.

All of the twenty-seven safes were subjected to the terrific fire and heat which destroyed the building, a number of them falling from the tenth and twelfth floor to the basement. Yet despite the severe ordeal through which they passed, and the tremendous shock experienced in a number of instances, the twenty-seven safes when opened showed their contents to be as perfect as though they had not gone through one of the most disastrous fires in history.

The uniform success of the Herring-Hall-Marvin

safes in the many conflagrations of the past decade, is due to the fact that they are constructed of steel instead of iron, and embody the most perfect fireproof composition known to science. The company is represented in Canada by the Canadian Fairbanks Company, Limited, Montreal, St. John, Toronto, Winnipeg, and Calgary.

Among some of the recent installations of the Herring-Hall-Marvin safes and vaults, by the Canadian Fairbanks Company, might be mentioned the Molsons Bank, St. Catherine St. Branch, Montreal, which has been equipped with safety deposit vaults; the Dominion Bank of Hamilton, in which safety deposit vaults are now being installed; and the Bank of New Brunswick, which has been equipped with burglar-proof bankers' safes.

In view of the short time which the Canadian Fairbanks Company have been handling these world-renowned

ANOTHER VIEW OF DESTROYED BUILDING, SHOWING HOW COMPLETELY THE STRUCTURE WAS WRECKED. THE TWO SAFES WHICH ARE SEEN FELL FROM THE UPPER STORIES.

safes and vaults, their success in securing these installations speaks much for both the aggressiveness of the Canadian Fairbanks Company, and the excellent reputation of Herring-Hall-Marvin safes and vaults.

ROOFING AND BUILDING FELTS.

THERE ARE FEW buildings within which it is not desirable to secure an even temperature and to be able to easily maintain it. When one considers the comfort and economy afforded by such a condition, it is quite obvious that good insulation is essentially an important part of every well constructed building.

It is well known that the warmer a house is in the winter the easier it is to keep cool in summer. There is a reason for this. Take for example a good refrigerator, it offers a striking analogy, and probable serves to better illustrate what may be accomplished by scientific house construction than anything else. It is a recognized fact that it is not the thickness of the wood that secures the desirable results, but the method of construction and the use of the right quality of paper, which serves to create "dead air spaces." These "dead air" form an insulation that is more impervious to varying temperatures than any solid body.

In the construction of a building, therefore, the liberal use of tarred felt and paper in providing "dead air" spaces in the wall and floor area—especially where strict attention is paid to close fitting joints, windows and eaves—approaches in principle, at least, the plan of a refrigerator.

It will not only render the building impervious to heat and cold, and greatly lessen the transmission of sound, but also prevents moisture from wet weather and dampness, occasioned by the heat within striking against the frozen outside surface, from permeating the walls.

However, the right quality of paper and roofing is at all times a prime factor in bringing about this condition, and as to expense, is but a trifle in the total cost of a building. When these materials are carefully selected, and due study is given to the plan of construction and the materials to be used, the results are certain. It means a protection to the building, comfort and economy for the occupants, and a normal temperature at all times.

Prominent among roofings and building papers known for their dependable quality, are the "Black Diamond" brand of felt—made also in two and three ply ready roof-

ings—the "Cyclone" fibre and "Joliette" sheathing, tarred and dry. All of these brands are manufactured and guaranteed by Alex. McArthur & Company, Limited, 85 McGill street, Montreal. Perhaps the best proof as to their merits, is the fact that they have been used for the past twenty-seven years, and to-day are being specified extensively throughout Canada. Architects and builders will find this firm's products of a uniform and durable character, and they will do well to compare their qualities with other materials of a similar nature in specifying roofing and sheathing papers.

A CONCRETE BLOCK DWELLING.

THE ARTISTIC possibilities of concrete blocks in economic construction of residential structures, is well exemplified in the accompanying illustration. This is one of the many attractive homes of this material which has been erected in Ontario within the past few years, and whose character of construction is seemingly becoming decidedly more popular. It is built entirely of concrete blocks and with its concrete columns and slate roof, results in not only a most satisfactory and substantial structure, but one that is strongly characterized from a standpoint of design. When the cost of this dwelling, which is approximately $2,400, is taken into consideration, the advantages of concrete blocks for moderate-priced homes is apparent.

In this particular building, the blocks in the foundation are 10 inches thick, while those of the first and second storey are 9 inches and 8 inches respectively.

These are bonded so as to have a two and one-half-inch core opennig throughout, thus insuring a dry and even temperature on the interior.

All of the blocks were made on the London Face-Down Adjustable Concrete Block Machine, manufactured by the London Concrete Machinery Company, of London, Ont.

It may be of interest to our readers, who are contemplating attending the convention of the Canadian Cement and Concrete Association to be held at Toronto in the early part of March, to learn that this company is to be one of the Canadian exhibitors, a fact which will give the architects, contractors and public an opportunity of acquainting themselves with the splendid quality of blocks this firm's machine manufactures.

Two good examples in church work of block manufactured by the company's machine, are to be seen in the Hyatt Avenue Methodist Church, London, and the Salem Church, just outside the city, the latter structure having just been completed.

A $2,400 RESIDENCE. ALL THE BLOCKS USED WERE MADE ON THE CONCRETE BLOCK MACHINE MANUFACTURED BY THE LONDON CONCRETE MACHINERY COMPANY, LONDON, ONT.

REMOVAL NOTICE.

BAKER AND JORDAHL, engineers and contractors, Toronto, have removed their offices from the Manning Chambers to the Confederation Life Building.

RADIATOR VALVES, ETC.

IN SPECIFYING valves for any purpose whatsoever, architects will find an inestimable medium of reference in the new revised catalogue of the Kerr Engine Company, Limited, of Walkerville, Ont. The company has within the past few years made a number of important improvements to their valves, and have also added several new styles with which they would like to have the architect familiarize himself.

The many excellent features of this company's valves have obtained for them universal recognition throughout Canada. In design and construction, in materials used and workmanship displayed, they are the very best products of their kind procurable.

In this catalogue, which is illustrated throughout, will be found those valves generally called for, together with descriptive matter and price lists. Of especial interest to architects are the valves for heating work (both hot water and steam) and valve equipment for stand-pipes, sprinklers and fire service systems in factories, warehouses and large buildings. All these valves are tested and guaranteed and are representative of the very best quality of materials and workmanship.

The company's radiator valves are modern in design, perfectly fitted and polished and mounted with the best quality of wood hand wheels. They are handsome in appearance as well as durable, and both the brass disc and composition disc valves have extra full opening, insuring full circulation.

The company were the first to introduce in Canada the quick-opening radiator valve, which it is claimed, is the best valve for hot water on the market to-day. The valve opens or closes with a quarter of a turn, and its construction is such that there is no obstruction, the full area of the pipe being maintained. A special advantage of this valve is that it can be packed while water is in system, and being simple in construction there is nothing to get out of order.

The Kerr Engine Company also make special valves for special purposes, and will quote prices on application.

A copy of the company's catalogue will be sent to any address upon request.

Chimney Built by Us at Rochester, N. Y., for the Eastman Kodak Co.—366 Feet High.

ALPHONS CUSTODIS CHIMNEY CONSTRUCTION COMPANY....

Perforated Radial
Brick Chimneys

Main Office, Bennett Building
NEW YORK

Eadie-Douglas Company

Representaties for
Eastern Canada

22 St. John St.
MONTREAL

77 Victortia St.
TORONTO

Chimneys Built in Canada for:

J. R. Booth, Ottawa.

Frost & Wood Co., Ltd., Smiths Falls.

Walker Bros., Walkerville.

Canada Car Company, Montreal.

Canadian Rubber Co., Ltd., Montreal.

Montreal Street Railway, Montreal.

Warden-King & Son, Montreal.

Northern Electric & Mfg. Co., Montreal.

Montreal Water Works, Montreal.

Dominion Coal Co., Ltd., Glace Bay.

We also built the largest chimney in the world, at Great Falls, Montana, 506 feet and 50 feet inside diameter at the top.

SUMMARY OF BUILDING OPERATIONS IN CANADA FOR 1908—FALLING OFF MUCH LESS THAN ANTICIPATED EARLIER IN THE YEAR—OPERATIONS IN DECEMBER UNUSUALLY ACTIVE. - - - - - - -

A REVIEW of the building operations for both the month of December and the year 1908, shows a much more wholesome and satisfactory condition throughout Canada, than even the most sanguine had anticipated. Comparative figures as supplied CONSTRUCTION from fifteen representative cities, and which can be accepted as a reliable basis for estimating the amount of work carried on in various sections of the Dominion, while placing the loss for the year at 14.03 per cent., records a substantial gain in ten cities submitting comparative figures for December, over the corresponding month of 1907.

In view of the unprecedented activity of the preceding year, and considering the uncertain prospects early in the season, when, owing to the depressed condition of the money market, much proposed work was either abandoned or laid over, these figures speak volumes for the building progress of Canada; and had Kingston and London supplied figures for 1907, to permit of ascertaining their relative gains, the loss per cent. on the year, as given, would have been materially reduced, as both of these places prospered to an unusual degree in the past twelve months.

The largest decrease noted for the year's work is in the case of Stratford, where the falling off amounted to 78.71 per cent., and the next largest decrease that of Brandon, which is given as 58.55 per cent.

Toronto, while suffering a decrease of 12.50 per cent., the smallest loss recorded, still bears the palm for the greatest volume of business, having issued permits for new buildings for $12,447,467, as against $14,225,800 for 1907.

On the other hand, the phenomenal growth of Fort William is strikingly reflected in a gain of 95.09 per cent., which places this city at the head of the list for increased building operations during the year. Not only has this city virtually doubled her total, but the amount of work in prospect at the present time, indicates that 1909 will see another record breaking total.

Halifax has also finished the year with a substantial total, having an increase of 25.80 per cent. to her credit, while the only other two cities reporting, which have exceeded their figures for 1907, are Edmonton and Vancouver, the gain in each case being 11.82 per cent., and 5.83 per cent. respectively.

Montreal, despite the favorable condition prevalent during the latter part of the summer and throughout the fall, was unable to overcome the slump experienced earlier in the season, and records a loss on the year of 29.77 per cent.; while Victoria fell short of equalling the preceding year's figures by only 12.66 per cent.

It is, however, in a recapitulation of statistics for the month of December that we find the most gratifying results as regards the present building situation throughout the country, and more especially so in view of the fact that they not only indicated that business confidence in general has been fully restored, but because they point out in an unmistakeable manner the vast amount of work that is being carried on in the very midst of winter when everything in the building line is supposed to be at its lowest ebb.

Of the ten cities supplying comparative figures, only two suffer losses, Regina and Vancouver, the decreases in each case being 50.67 and 60.38 per cent. respectively. Vancouver, however, it will be noted, is ahead on the year's work, and the figures in general show the West to be in a most flourishing condition, several of the places having more than doubled and trebled the amount of work done in the same period of 1907.

Calgary's phenomenal gain of 515.61 per cent., places

	No. of Permits for December, 1908.	No. of Permits for December, 1907.	Total Cost of Bldgs. for December, 1908.	Total Cost of Bldgs. for December, 1907.	Increase Per Cent.	Decrease Per Cent.	Permits for Year 1908.	Permits for Year 1907.	Total Cost of Bldgs. for 1908.	Total Cost of Bldgs. for 1907.	Increase Per Cent.	Decrease Per Cent.
Brantford, Ont.	.....	.....	.....	.....	.....	.....	306	391	289,855	509,945	.....	43.15
Brandon, Man.	.....	.....	.....	.....	.....	.....	137	254	291,864	704,290	.....	58.55
Calgary, Alta.	38	10	71,750	11,655	515.61	.....	423	605	836,950	1,745,220	.....	51.47
Edmonton, Alta.	35	24	45,255	40,455	11.86	.....	689	910	2,549,847	2,280,210	11.82	.....
Fort William, Ont.	5	9	8,100	5,225	55.02	.....	319	353	1,560,735	800,000	95.09	.....
Halifax, N.S.	32	22	33,550	14,400	132.98	.....	636	496	749,125	595,486	25.80	.....
Kingston, Ont.	.....	.....	.....	.....	.....	.....	396	.....	170,600	.....	.....	.....
London, Ont.	27	.....	44,870	.....	.....	.....	242	.....	801,170	.....	.....	.....
Montreal, Que.	51	60	501,000	203,420	141.37	.....	1807	1987	5,062,326	8,406,229	.....	39.77
Regina, Sask.	7	17	1,465	2,970	.....	50.67	253	480	516,646	1,177,840	.....	56.13
Stratford, Ont.	.....	.....	.....	.....	.....	.....	77	114	136,545	641,485	.....	78.71
Toronto, Ont.	.....	.....	707,000	607,015	16.47	.....	.....	.....	12,447,467	14,225,800	.....	12.50
Vancouver, B.C.	141	93	314,408	793,724	.....	60.38	1699	1773	5,950,923	5,622,744	5.83	.....
Victoria, B.C.	40	19	196,525	33,720	482.81	.....	.....	.....	1,214,240	1,390,250	.....	12.66
Winnipeg, Man.	31	41	89,000	37,050	140.26	.....	1546	2433	5,500,000	6,309,950	.....	12.83
TOTALS	407	295	2,012,923	1,749,634	15.04	.....	8530	9796	38,078,293	44,409,449	.....	14.03

her in the premier position, with Victoria a close second with an increase of 482.81 per cent. in her favor. Winnipeg also registers a handsome advance of 140.26 per cent., while Edmonton and Fort William are ahead of the month of December, 1907, by 11.86 per cent. and 55.02 per cent. in order named.

In the Eastern portion of Canada, Halifax still continues to add to the monthly increases made throughout the summer and fall, by recording a gain of 132.98 per cent., while the increase shown by Montreal's figures, that of 141.37 per cent., make plain that the building condition in the Canadian metropolis is not only satisfactory, but most encouraging.

Toronto also shows a healthy increase of 16.47 per cent. for the month, and there is every assurance that operations in the building line in that city, during the coming year ,will be carried on most actively.

The monthly and yearly report of St. John, N.B., which was received too late to be inserted in the following table, while showing a decrease of 41.21 per cent. for the year and a loss for December of 88.46 per cent., states the outlook as being "fair."

Reports from the other cities, as regards future prospects, and which strongly presage a record-breaking year, are: Brandon, "Cannot say with any degree of assurance;" Calgary, "Very promising;" Edmonton, "Look for a very brisk season in the spring;" Fort William, "Very bright and promising;" Kingston, "Fair;" London, "Very fine;" Montreal, "Building operations are expected to open up very good in the spring;" Regina, "Better than for year just passed;" Vancouver, "Were never better; looking for an exceptionally good year;" Winnipeg, "Bright."

ARCHITECTS' LICENSE LAW MAKES ARCHITECT RESPONSIBLE TO PUBLIC AS WELL AS HIS CLIENT—MANY ARCHITECTS IN FAVOR OF SUCH LAW. - -

SOME FEW ARCHITECTS are inclined to oppose more or less strenuously the idea of licensing architects. Their opposition is prompted by one of three reasons. Some are, more or less disposed to look with disfavor upon the increased responsibilities it will fasten upon the architect, and do not like the idea of being forced to comply with a code of regulations, to secure and maintain a license to permit them to practice their profession.

Other architects seem to be under the false impression, that a law providing for Government examination will tend to cause students to devote too much time and attention to building construction and sanitation, at the expense of the æsthetic branch of architecture, and will, therefore, result in producing building engineers instead of architects.

They argue that no practical Government examination could ever be devised such as would test the applicant's knowledge of design and that the real function of a standard of qualifications would be lost by producing false standards in the practice of the profession.

It is further argued, by these highly æsthetic members of the profession, that an examination covering the applicant's knowledge of design and rendering in a perfunctory way, and the science of building construction, strength of materials, laws of sanitation and merit of investment in a thorough manner, would be grossly unfair to the truly artistic student whose stock and trade is his ability to design and not construct.

These gentlemen base their arguments upon an entirely false conception of what society demands of an architect. An architect cannot be just what his own inclinations would lead him to be. He occupies a place in our social and industrial life and he must, the same as those in any other walk of life, fill this place in society, just as society dictates.

There are still other groundless objections raised by architects, who, because of their associations and their supreme contempt for anything that would tend to hamper the free and untrammeled liberty of their bohemian conception of the profession, would oppose any measure that would have the effect of injecting business principles into the practice of architecture.

With regard to the first objection, we would point out that any such law would not require any architect practicing at the time of its passage, to pass the required examination. A license would be issued simply upon proof that the applicant was practicing at the time of the passage of the law. As to the increased responsibilities involved, no architect who has practiced his profession along legitimate, honest and efficient lines, would find any difficulty in complying with the regulations of such an act. A license would be revoked, only upon satisfactory proof being produced, before the Licensing Board, of gross incompetence, negligence, or dishonest practice. No architect would surely wish to place himself on record as opposed to such a law upon these grounds.

As to the second objection, it is very evident that this opposition is based purely and absolutely upon a misconception of the real functions of the architect. Architecture, as we all know, is the science and art of designing and constructing buildings or other structures. The Greek term "architektonia" originally applied to the position of the chief worker in wood; carpenter, craftsman.

We know that the ancients regarded architecture as the chief art, the architect being director of works and responsible for whatever sculpture or painting was used in connection with the building, and it was not until the Renaissance period in the fifteenth century, that architecture lost its right to govern other arts.

Architecture was one of the earliest and most constant expressions of civilization and was fundamentally effected on one side by the religious and social elements of society, and on the other by the material elements, such as the influences of climate, of materials of construction and decoration, which limit, or in certain directions stimulate artistic originality.

So we find that architecture in every age is a faithful mirror of contemporary society. To-day we have the commercial age and society demands that our buildings be more of the utilitarian and mechanical type than those erected in the earlier ages. Present day structures must be more economically and scientifically built. Architects of former ages were free to design independent of mathematical calculations of floor stresses, wind stresses, etc. They designed their buildings and built them so substantially that it was impossible for them to fail. They were influenced by the demands of society and the materials they had at hand.

In this commercial age, society demands a type of building in which mathematical calculations form a most important part. Society insists that the architect should satisfy these demands, without the useless waste of materials that have no utilitarian function in the building. Architectural elaboration seems almost to be superseded by utility of plan and economy in construction.

The architect of to-day may be able to create a beautiful design, but society demands that he shall be capable of scientifically and economically adapting that design to the material with which it is most practical to build. To do this, the architect must have practical knowledge of the scientific branch of building construction. Each individual builder may choose the architect who is enabled to render the most acceptable design, but society has a right to insist upon knowing that this architect is capable of safely and honestly erecting a building according to that design, and in accordance with approved methods of construction.

This is the function of an Architects' License Law. It is purely a just demand of society upon the architect that he be made responsible to the community as well as

his client, for the safe and honest reproduction of his design into the building, "de facto."

The argument that a government examination on building design and construction would have a tendency to cause the student to neglect the æsthetic branch of architecture, is a fallacy on the face of it. It is as reasonable to say that it is unwise to teach a boy arithmetic because it will interfere with his history; or that it is ill-advised for an intending law student to take an arts course for fear it will interfere with his law studies; or that it is injudicious for an arts student to take French because it may interfere with his English.

THREE OBJECTIONS TO LICENSING LAW—THE FUNCTION OF THE ARCHITECT IS THAT WHICH SOCIETY DICTATES. - - - - - - -

OBJECTION to the adoption of a measure providing for provincial registration of architects, are few and far-fetched. No real practical reason why an architect should not be required to qualify before a provincial board of competent examiners, can be set forth.

The public is justified in demanding that the men, to whom are intrusted the design, plan and construction of their buildings, should prove their practical knowledge of the basic principles of their profession before a body of men competent to judge.

Architects who are practical in their knowledge of building design and construction and who are competent and successful in their application of this knowledge, concede this, the public's inherent right and are highly in favor of such legislation as will tend to fasten increased responsibilities upon the profession; legislation that will protect the building public against the unscrupulous, inefficient operations of the incompetent; legislation that will discriminate between the capable and practical architect and the incapable and impractical so-called architect; legislation that will tend to raise the standard of architecture by demanding that the producer of beautiful pictures shall possess sufficient practical knowledge of building construction, the strength of materials, the laws of building sanitation and merit of investment, to be able to successfully reproduce his artistic conception in brick and stone.

It is not sufficient that the architect of to-day should simply be a student of art in architecture. While it is true that all architects should develop to some marked degree the æsthetic in architecture, it is also essential that he has a thorough and practical knowledge of the science of building construction and sanitation.

An architect is successful in the practice of his profession only in so far as he is capable of combining art and utility in design.

The man who hopes to be successful should not undertake the study of architecture if he has not the inherent taste for the artistic and beautiful, but this artistic talent is only the ground work upon which he must build the practical knowledge which will make him an architect. The architect who is unable to design to suit the tastes of the prospective builder, soon finds it necessary to pull down his shingle, as an architect. The building public will employ the services of the architect who is best able to satisfy in his design. In the ordinary process of securing a client design comes first and construction after. It matters not how capable the architect may be as a building engineer. His knowledge of building construction will not secure for him a single client unless he is able to create a satisfactory design.

So we see it is to the individual advantage of every architect to develop his knowledge of design and rendering, for he will be successful in securing a lucrative practice just in-so-far as his conceptions in design are acceptable to his clientele.

But it is after the prospective builder has been suited with a design, which as a rule is rendered in bright water colors, that the all important questions arise: has this designer the practical knowledge required to successfully reproduce this beautiful conception in brick and stone? Will a structure erected according to his design be practicable from a utilitarian standpoint? Can it be so planned as to economically and successfully fulfil the purpose for which it is to be erected? Can it be erected for the sum the owner is prepared to expend, or will it have to be trimmed here and "skinned" there, and cut elsewhere before it is completed, to make it come within 25 per cent. of the cost originally intended? Is the architect capable and honest in his methods of awarding contracts and superintending, or will the owner be made a victim of sharp practice, shoddy construction methods, and incompetent supervision? And last, but not least, is the building capable of withstanding the usage to which it is to be subjected; is it safe, or will it stand as a menace to lives and property it contains and to the community in which it has been erected? It is for the protection of the owner and the public at large against these ugly possibilities, that an Architects' License Law should be enacted in the province of Ontario.

The owner (as we have often repeated), with his lack of knowledge of construction methods and details, is unable to protect himself against the dishonest and incompetent reproduction of an attractive design, into a completed structure. The plans and design satisfy, yes, possibly please him, but he cannot judge the adaptability of materials or adequacy of ventilation. He can only criticize the perspective and floor plans; the rest he must leave entirely and absolutely to his architect. An Architects' License Law will make the architect responsible to the people of the province of Ontario, as well as his client, for the faithful, honest and intelligent performance of his duties as an architect and superintendent of every building he erects. The penalty for gross incompetence or dishonest procedure, will be the forfeit of his license to practice the profession in the province.

CONVENTION OF O. A. A.—ARCHITECTURAL REGISTRATION CHIEF QUESTION OF DISCUSSION — MEMBERS WIDELY DIFFER IN THEIR VIEWS. - -

THE ANNUAL convention of the Ontario Association of Architects was held in Toronto from January 11 to 14, and with an unusually good attendance. The chief topic under discussion was that of architectural registration upon which subject the members present seem to have widely different views. Some were inclined to adhere to the original policy of making further application to the Ontario Legislature with a view of having their present charter amended, which would make the O. A. A. a close corporation.

Others seemed to favor the licensing idea as in vogue in the State of Illinois. They were, however, not of the opinion that it was the function of the association to ask for such legislation; that insofar as legislation of the kind would be enacted pirnciple in the public's interest, some other body than the architects should approach the Government upon this question. There were others who still strenuously opposed any form of legislation that would tend to require architects to pass any sort of an official examination. This contention was based thoroughly and absolutely upon their view in the matter from the standpoint of the architect.

Mr. G. W. Gouinlock, of Toronto, was honored with the presidency for the year 1909.

We regret that we are unable in this issue to further review the proceedings, but the February number will contain a complete account of the entire convention.

LICENSE LAW STRONGLY OPPOSED.—Mr. J. C. B. Horwood of Toronto, in Letter to "Construction" Gives a Thorough Review of All the Arguments Advanced Against the Licensing of Architects

EDITOR CONSTRUCTION:

I take strong exception to many statements, as well as the conclusions, of both editorials in your issue of November last entitled "Architectural Registration the Public's Only Possible Protection Against the Incompetent or Dishonest Practitioner," etc., and "Provincial Board of Examiners Responsible Only to Government the Correct Solution," etc.

While agreeing with the author of the article, that improvement in architecture in the province of Ontario is exceedingly desirable, and that something ought to be done, and that speedily, to obtain the desired end, I am nevertheless, convinced your writer has given not only an exaggerated account of the real situation, but he has also made a totally wrong diagnosis of the case, and has accordingly suggested an altogether inappropriate remedy.

He has given an exaggerated account of the real situation when he infers that "negligence," "sharp practice," "dishonesty," etc., on the part of the architect exist because of the non-existence of a license law, whereas these evils exist in every profession because of the presence in them of unregenerate human beings. Much, and even more, which he attributes to present conditions without a license law, can be as truly applied to another profession, having not only a license law, but also a committee of professional men of undoubted integrity to look after the conduct of their members. For instance, instead of architect let us read "lawyer" into a portion of his article. Then, by substituting and quoting we have "What happens if his (the client's) confidence has been misplaced and in his selection he has employed a 'lawyer' who is not a 'lawyer'?—but a scamp. What happens if he has placed (his case) in the hands of a man entirely unequal to the task imposed upon him? What happens if he has commissioned a dishonest practitioner (a lawyer) to spend his money in the erection of his building; one who operates and succeeds by the aid of 'sharp practice' rather than through his competency?" "The answer is simple enough, and all too apparent in object lessons that come before us every day."

It is, therefore, clear that these ills do not proceed from the absence of a license law.

He has made a wrong diagnosis of the case when he states the province is suffering from architectural degeneration caused by lack of a compulsory law. He says: "The practice of architecture in the province of Ontario . . . . has degenerated to a very low point, for the sole reason that any one is free to declare himself an architect." This statement is an entire misconception as to the actual conditions. Before your writer can substantiate his statement he will have to show there was a time in the history of the province when the architectural work of the province, taken as a whole, was better than at present. This he cannot do, for the constant trend of the work has been, and is, upward. Moreover, our reputation in architectural work is relatively high as will be seen by quoting from an editorial in the London, England, Builder of September 26, 1908, evidently written by an English architect. He says of Canadian architecture (and your writer will admit that the work of our province is at least equal to the general standard of work throughout Canada): "It must be apparent to all observers that Canada is a well-built country, whose buildings reflect the intelligence and good taste of its people. There is neither extravagant display nor neglect of interesting features."

While we are not suffering in any degree from architectural degeneration yet the undersigned is of the opinion, that though we are making good progress, we are not making the progress which is possible because there exists a lack of educational facilities to teach the rising generation to express itself architecturally. These special educational facilities are particularly needed because being a comparatively new land, we have as yet few architectural monuments, compared with older countries, to inspire the younger generation to high attainments in their profession.

A license law would never give or develop this inspiration, but a thoroughgoing architectural school would do so, wherein would be taught the principles of architectural composition deduced from the noted monuments of the ages; combined with a well-equipped architectural museum, where the eye of the student would become attuned to models of the best work the world has produced—a museum which would be well worth a pilgrimage from any part of the province for purpose of study.

He has suggested the wrong remedy, because he fails to see the situation as it really exists. His panacea might be worth a trial if the cause of the trouble was refusal on the part of the younger generation to make use of the opportunities of study at hand; but the fact is, willingness to study already exists side by side with lack of the special opportunities absolutely needed in the training of an architect.

Your writer's whole argument is founded on the time worn fallacy that what is needed for the rising generation is a rod to drive them. He fails to see that what is needed is leaders to guide them.

Why are hundreds of thousands of dollars sent out of the province every year to correspondence schools by the rising generation to improve their education? Are they obliged to do this by reason of a compulsory law? Is it because they wish to avoid opportunities for study?

Why do the brightest young men, in even our best architects' offices in Toronto, invariably leave them as soon as their apprenticeship is over and go across the border, having had no systematic instruction in architectural design? Why do these same young men burn midnight oil in the ateliers of New York and become so active and enthusiastic in their work over there?

Does not one answer suit all of these queries?—Because at home we lack the special educational facilities needed to properly develop our youth.

Is not, therefore, the obvious remedy, additional educational facilities?

Is it not really absurd in the extreme to be persistently advocating a compulsory law to force young men to study architecture when they are already willing to do so, and when at the same time we possess neither the needed equipment to study nor the special kind of instructors necessary to properly teach them?

A Board of Examiners under a license law, such as that suggested, cannot give us additional educational facilities as their function properly begins and ends, not with giving instruction but with examining. Such a board would not only fail to supply this great and urgent need of the community, but they also would unwittingly become a huge obstacle blocking the highway of progress in that direction because they would be forced to set up a false standard for an architect with its attendant evils, as is done by the oft-quoted and much praised license law of Illinois.

For, given a board of the best men obtainable, they

(Continued on page 78.)

A MODERN WESTERN BUILDING.---Imperial Bank Building, Edmonton, a Recent Aquisition of a Substantial Character,---Designed in Greek Ionic and Planned for Banking and Office Purposes.---Upper Floor Devoted to Quarters for Banking Staff. ∴ ∴

IF THERE is any one thing in the cities and towns in the Canadian West that is more pronounced than their rapid growth, it is their substantial growth. No other country in the early stages of its development has seen as great an expenditure in the construction of individual buildings, or the laws of building design applied to a more marked degree.

While in some instances, as will be found even in the more advanced sections of fully settled countries, the architectural treatment is not all that could be desired, yet on the whole enough has been accomplished to make the awakening of Western Canada pre-eminently distinctive in this respect, and to show beyond all doubt that the importance of design in building construction is being fully taken into consideration.

This exceptional development in both construction and design is due to many reasons, one of which is the unbounded faith reposed in the future of the country. The knowledge of its great natural resources, its stability of character, its commercial and industrial possibilities, the readiness with which outside capital is advanced for its exploitation, has led owners in erecting new buildings, to feel absolutely safe in their investment, and to build along permanent lines.

The fact that a large number of capable architects have found it expedient to locate there and to identify themselves with the growth of the country, has also had a most wholesome and beneficial influence, and again there is another condition which has been conducive to stability in construction and a higher expression in building design. The West is rapidly recognizing the evils of unsafe methods in building construction and the different municipalities are either revising their by-laws in this regard, or enacting new ones to conform with the safest measures that have been adopted for that purpose, thus in most cases making the services of an experienced architect necessary.

An idea as to the substantial character of some of the Western building, can be gathered from the accompanying illustration of the new building of the Imperial Bank of Canada at Edmonton. This building, which occupies a commanding position at the corner of Jasper and McDougall avenues, was erected in 1907, and is the work of Architect R. Percy Barnes of that city. It is of solid masonry construction with fireproof floors and partitions, and cost when completed about $100,000.

IMPERIAL BANK OF CANADA BUILDING, COR. JASPER AND McDOUGALL AVES., EDMONTON. R. PERCY BARNES, ARCHITECT.

The exterior of the building is of Greek Ionic character, worked out in Calgary stone, over foundation walls of Tyndall sandstone. The principal facade overlooking Jasper avenue has as its main feature a large portico formed by four massive Ionic columns running through the entire height of the building and supporting the base of a projecting pediment of simple design.

In the centre, flanked on either side by the plinths of the inner columns and having electroliers at the street line, are broad easy ascending stone steps leading to the entrance of the vestibule.

On the McDougall avenue side the same architectural motif is repeated with Ionic capped pilaster instead of columns, the back of the lot towards the street being fenced with a heavy railing of special design, carried out in wrought iron.

In addition to three floors, the building contains a high basement, the front portion of which is occupied by the Canada Permanent Loan Company.

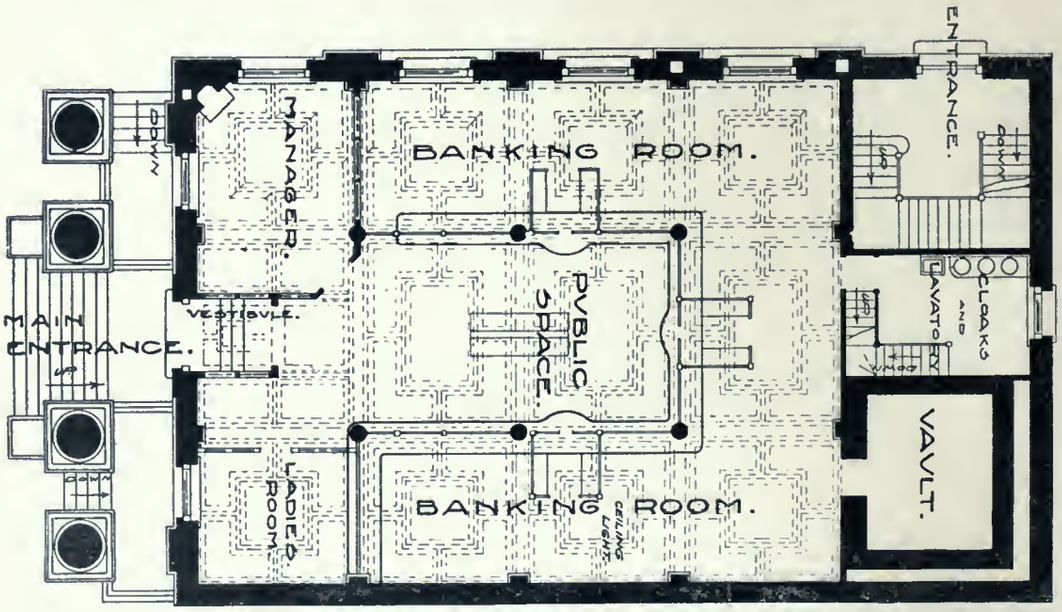
The whole of the ground floor is taken up by the banking room of the Imperial Bank, access to which is obtained from the main entrance, through a richly pannelled vestibule in quarter-sawed oak.

To the left and right on entering are the manager's room and ladies' waiting room, also finished in quarter-

VIEW OF BANKING ROOM, IMPERIAL BANK OF CANADA BUILDING, EDMONTON. R. PERCY BARNES, ARCHITECT.

sawed oak, and extending along the sides and the rear, forming the public space, are the banking counters of Rouge Royal and Tennessee marbles. These are surmounted by screens and electric fixtures done in statuary bronze, while in the centre of the public space is a large double oak desk provided for the use of the bank's patrons.

The ceiling, which is coffered and pannelled, is supported by columns finished in Scagliola in imitation of Verde antique, and the floor of the public space is of white mosaic marble with a rich colored border. At the rear, centrally located back of the end counter, is a cloak room and lavatory facilities for the staff, while to the right is a large modern fireproof vault. In addition to



GROUND FLOOR PLAN, IMPERIAL BANK OF CANADA BUILDING, EDMONTON, SHOWING THE ARRANGEMENT OF THE BANKING COUNTERS, AND THE LOCATION OF THE MANAGER'S OFFICE, LADIES' ROOM, VAULT AND ENTRANCE. R. PERCY BARNES, ARCHITECT.

the windows on the Jasper and McDougall avenues sides, light is also furnished the banking room from a well placed skylight.

The second floor of the building consists entirely of office suites, while on the top floor accommodations are found for the banking staff, consisting of comfortable and inviting bedrooms, living room, billiard rooms, etc., furnished in a manner consistent with the character of the building.

The upper floors are reached through an entrance at the rear of the building on the McDougall avenue side, which also gives access to the basement in addition to the entrance leading in from the street, between the right hand columns at the front of the building.

The building is heated throughout by low pressure steam, and the plumbing is of the most modern type. The general contractor for the building was W. H. Gardner, of Edmonton, while the sub-contracts were executed as follows: Bronze work, The Robert Mitchell Co., Montreal; marble work, Drake Marble Co., St. Pauls; oak fittings, Canadian School and Furniture Co.; plumbing and heating, J. A. Lockerbie, Edmonton.

FUTURE OF CEMENT.---Production will be Influenced by General Business Conditions ---Poorly Managed Plants a Menace.

AT THE SECOND DAY'S session of the annual meeting of the Association of American Portland Cement Manufacturers, held at the Hotel Knickerbocker, New York, on December 8, Edwin C. Eckel, one of the leading experts in the industry and until recently in charge of the cement work for the United States Geological Survey, stated that while the actual annual output of Portland cement may be expected to increase as population increases and as new uses are found for the product, it cannot be expected that this increase will, in the future, be as steady as it has been in the past. The astounding growth of the industry, from 42,000 barrels in 1880 to more than 46,000,000 barrels in 1907, has now ceased, the production for 1908 being estimated at about 47,000,000 barrels, or two-thirds of the capacity of the existing plants. Two of the three business depressions that the industry has passed through left it unscathed, but the third one, that of last year, brought the fact home to the cement manufacturers that henceforth the course of the trade will be marked by successive periods of high and low output, corresponding to the condition of general business at the time. Mr. Eckel also stated that prices will, if left to absolutely unrestricted competition, tend to fall to a point which will yield a fair profit only to the largest and best mills. The future decrease in prices, however cannot be comparable in amount to that which has already been experienced, since manufacturing costs show little prospect of marked decrease.

In reviewing the growth of the manufacture of Portland cement in the United States, Mr. Eckel made the following statement:

"Up to 1907, the American cement industry had shown practically uninterrupted progress so far as annual output was concerned, and many manufacturers seemed to expect that this pleasant condition would continue indefinitely. The number of plants under construction or in course of promotion increased rapidly, and heavy increases in productive capacity were indicated.

"In January, 1907, the speaker, as cement expert of the United States Geological Survey, in discussing conditions in the cement industry of 1906 called attention to an impending change in these conditions in the following statement:

" 'The cement output, as yet, has not suffered markedly from financial depression. Prices have fallen off in poor years, it is true, but the annual output has always increased. The rise in yearly output from 1885 to 1906 has not only been continuous, but has even shown a tendency to increase its rate of increase. Of course such a condition of the industry cannot be expected to continue indefinitely. Within a few years we must expect to see the rate of increase lowered and finally, in some period of business depression, some year will show a lower output than the preceding year. This will mark the end of the youth of the cement industry, and the beginning of its period of maturity. Though the present condition of the industry is as prosperous as might be desired, it is possible that the change in rate of growth may be quite near at hand. New construction in 1906, and plans for 1907, will provide a great increase in mill capacity. If the succeeding years are generally good, this increase will be taken up without difficulty; but a general financial depression in 1908 would probably result in a temporary check to the cement industry. So far as can be estimated now, the plants which will be in operation before the end of 1907 will turn out cement at the rate of 50,000,000 barrels per annum, and it is doubtful whether such an output could be absorbed if the United States were not generally prosperous.'

"When this statement was published, several cement-trade journals commented on it in interesting fashion. As one editor noted: 'The absurdity of such gloomy prophecy, at a time like this, is obvious to any one acquainted with the true condition of the cement business. The rush for cement never was greater than it is now. All mills are working to full capacity and the managers only wish that they were bigger.'

"Later in 1907 the humor of the situation did not seem quite so obvious, and now, near the close of 1908, it seems fairly safe to say that the American cement industry reached a distinct turning point in the latter part of 1907, and that from now on the matter of output must be handled differently. Hereafter we may expect that the cement production will be related very closely to general business conditions; that in times of prosperity we may temporarily fall behind in capacity, but that the approach of business depression will be marked either by radical decrease in cement output or by its alternative—which is general demoralization in the trade. The cement industry has no longer room for poorly managed plants or for weakly financed companies, for in times of industrial stress such plants and companies become a menace to the entire industry."

A NEW AND UNDOUBTEDLY LARGE FIELD for the consumption of metal lath and cement is about to be opened by the growing popularity of the cemented, or what is commonly called "stuccoed," house, says a contemporary. This has proved an important influence in the development of a rapid and more economical method for making metal lath, which has come about coincidently with the excellence and cheapness of the Portland cements. The scarcity and advancing price of lumber also have much to do with stimulating this form of exterior finish which is now well established as a fashion for new construction, but there is a much wider field for its use in the covering of the old frame houses now standing. The fact that, at a comparatively small cost, the appearance of such houses can be greatly improved and the comfort of the occupants, both in winter and summer, considerably increased appeals strongly in favor of the undertaking. It is said that the saving in fuel and repairs will in most cases run from 10 to 20 per cent. on the cost of the improvement, making it attractive from an investment standpoint. It would be impossible to estimate the great tonnage of sheet steel and cement likely to be required for this purpose, but beyond that it is certain that the wide distribution of demand and more general acquaintance of the public with the possibilities of these materials for reconstruction work will extend the use to stables and out-houses for animal protection.

CANADIAN EXPRESS COMPANY'S BUILDING, MONTREAL, SHOWING DETAIL OF COLONNADE OF MAIN FACADE.
MESSRS. HUTCHINSON & WOOD, ARCHITECTS.

CANADIAN EXPRESS COMPANY'S BUILDING.---One of the Recent Additions to Montreal's Business Architecture.---A Noteworthy Design in Modified French Renaissance.---Massive Colonnade a Feature.---Building of Fireproof Construction. ∴ ∴

WHATEVER may be said for or against tall business buildings, the fact still remains that they mirror in no mistakable manner the growing importance as a business centre, of the community in which they are located.

In Montreal, as in other cities of first magnitude, the marked tendency toward the centralization of business, the steady increase in trade, and the demand for better business and office accommodation, has, of necessity, in districts where available ground space is limited, led in a number of instances within the past few years, to the erection of buildings above the usual height.

While as yet there has been no attempt to approach the extreme altitude that has been attained in tall building construction, it is nevertheless impossible to lose sight of the fact that the gradual growth of structures of a greater height is coming to have an important bearing on the architecture of the business district.

One of Montreal's most noteworthy additions of recent date in this respect is the new office building of the Canadian Express Company —a structure which lifts itself several stories above its neighbors.

CANADIAN EXPRESS COMPANY'S NEW BUILDING, MONTREAL.
MESSRS. HUTCHINSON & WOOD, ARCHITECT.

This building has a frontage on three streets, St. Paul, Place d'Youville and McGill street, with the principal facade on McGill street, where it has a frontage of 113 feet, while it extends back about 80 feet on the other two streets. It is ten stories high above the basement, of skeleton steel construction, and faced on the principal elevations with Grey Canyon Ohio sand stone. All floors and the roof are of concrete and the building is as thoroughly fireproof as modern building science has made possible.

The style of architecture is a modified French Renaissance; the lines are graceful and the general treatment is such as to impart a well-balanced, stable and dignified aspect to the whole.

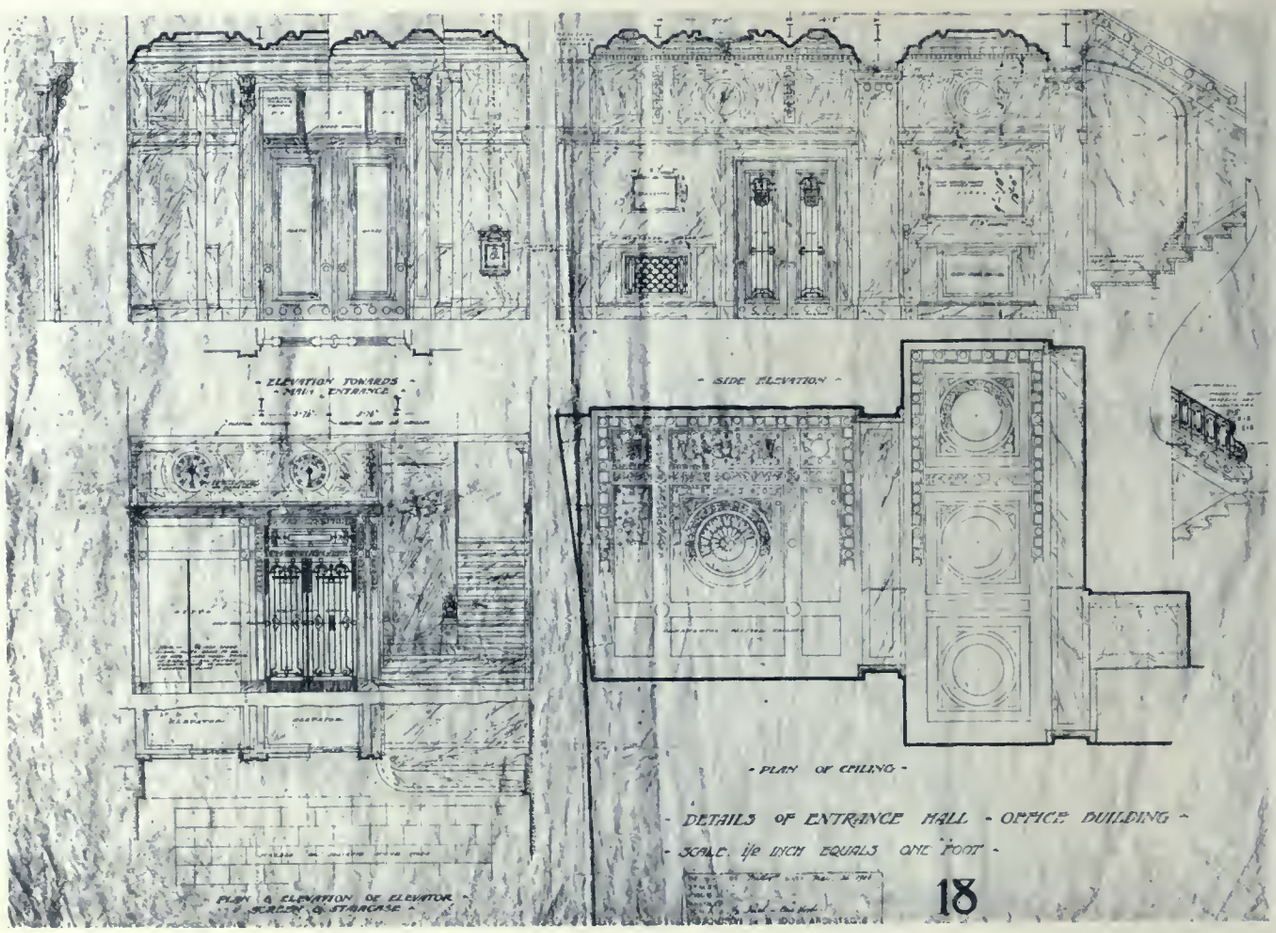
The first two floors and a part of the third and the basement are occupied by the Canadian Express Company, the money order and shipping departments on the ground floor being practically separated from each other by the main entrance hall, which is reached through the centre of the colonnade forming the principal feature of the lower portion of the McGill street facade. Both of these departments have individual entrances leading from this street, while at the rear, connecting the two is a large shipping room where all express goods are received and delivered.

In the main entrance hall which also gives additional access to the Money Order and Shipping departments, the walls are finished in marble, the lower ten feet in a strongly veined Skyros, and the upper four in Sienna inlaid with light colored Skyros. The floor is tiled in a light grey marble from the Phillipsburg quarries, and the ceiling is richly decorated in plaster work, pannelled and finished in old silver.

Immediately opposite the doorway are two high-speed hydraulic passenger elevators and a staircase leading to the several floors, and back of the elevator, by which it is screened, is a large modern vault, connecting directly with the money order department.

The stairs throughout have marble treads supported upon iron carriages and the sides of the stairs, from the first to the second floor, are finished with a dado of Skyros marble and the walls of the staircases in all the other floors with a dado of blue Vermont marble. The elevator halls and corridors in the second and third floors also have dados of blue Vermont marble and floors of terraza with marble borders. All doors and trimmings in

CANADIAN EXPRESS COMPANY'S BUILDING, MONTREAL, SHOWING THE COLONNADE OF MAIN FACADE AND CANOPIED ENTRANCES OF SHIPPING AND MONEY ORDER DEPARTMENTS. MESSRS. HUTCHINSON & WOOD, ARCHITECTS.



DETAILS OF ENTRANCE HALL, CANADIAN EXPRESS COMPANY'S BUILDING, MONTREAL. MESSRS. HUTCHINSON & WOOD, ARCHITECTS

DETAILS OF FRONT ELEVATION, CANADIAN EXPRESS COMPANY'S BUILDING, MONTREAL. MESSRS. HUTCHINSON & WOOD, ARCHITECTS.

the entire building are of quartered white oak.

Heat is supplied by low pressure steam, generated in the Grand Trunk office building, on the opposite side of McGill street, the pipes being carried across the street in a concrete tunnel.

The light for the inside rooms of the building is obtained from a large light well, which is faced with enamelled white bricks, and in this well is placed a fire escape, access to which is had from the north and south half of the building on each floor.

All toilet rooms are conveniently situated off the landing of the stairs between each floor. They are equipped with the most modern fixtures and have partitions and other parts of Phillipsburg marble.

The fittings for the Express Company on the ground floor are of very simple character, the fronts of the several counters and walls being lined with strongly marked Phillipsburg marble; and the general arrangement has produced a plain but yet decidedly rich effect.

The building was erected under the supervision of and after plans by Architects Hutchinson & Wood.

The various branches of the work were executed by the following firms: Mason and brickwork, J. H. Hutchinson; structural steel work, Locomotive & Machine Company, Ltd.; fireproofing, Clinton Fireproofing Co.; carpenter work, Simpson & Peel; painting and glazing, Henry Mogan Company, Ltd.; plaster work, John Morrison & son; roofing work, Campbell & Gilday; passenger elevators, Otis-Fensom Elevator Company, Limited; plumbing and heating, W. J. McGuire & Co.; marble work, C. Mariotti; office fittings, Toronto-Waterloo Office Fixture Company; electric light wiring, Collyer & Brock; ornamental iron work, H. R. Ives Company, Limited.

WORLD'S LUMBER CONSUMPTION.

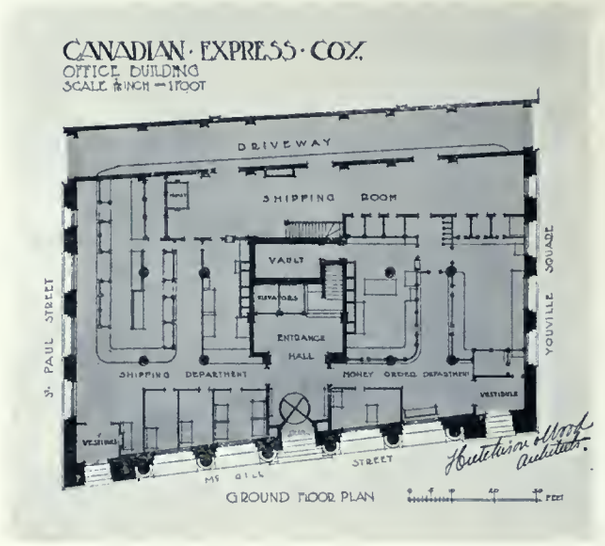
IN A RECENT address before the Canadian Club, in Guelph, Ont., Dr. Judson Clark, head of the Forestry Department of British Columbia, spoke of the present timber problem throughout the world, stating that the limit of production had been reached, and predicting that the prices would

now advance to a figure prohibiting its use to a large extent.

Throughout his address the speaker showed the great increase in the use of timber in this manufacturing epoch of the world's history; how each and every continent, including South America, is importing timber. The demand is increasing until at the present time North Ameirca will not long be able to withstand the onslaughts upon the forests.

Canada and the United States were now called upon to supply the world with timber, in a practical sense, but the United States was at present using half of the sawn timber of the world, and at that rate within a couple of decades she too would have to import. It, therefore, devolved upon Canada to settle the timber problem of the world with her acreage, which could not be estimated, and which was put all the way at from 250,000,000 to 550,000,000 acres. In the Eastern States a second growth was springing up, but it could not be considered as a factor in the world's timber problems, and the greatest belt that the earth had ever known, Michigan and Minnesota, had been wiped out by the axe and fire until at the present day the conditions resembled those of the prehistoric East, where the forests were wiped out and the deserts now mark where the waving trees stood. In the Southern States and on the Pacific coast there was a big supply, but it would not last long.

Canada, therefore, and particularly the great north, Ontario and British Columbia, must meet the demand, and



GROUND FLOOR PLAN CANADIAN EXPRESS COMPANY'S BUILDING, MONTREAL. HUTCHINSON AND WOOD, ARCHITECTS.

at that Ontario with her 30,000,000,000 feet of white pine played a small part, as this would stand but for six years of the onslaught that was made in Michigan, and only some years longer stand the present rate of use. The great north and the Pacific coast with its Douglas fir, would have to deal with the whole world. Transportation was the great problem, but in a few years with increased railway facilities the timber would come out in large quantities. Later, too, the Panama Canal would permit of steamship routes with all ports of the world, whereas now only sailing vessels could afford to make the trip around the Horn.

Another phase of the problem as dealt with by Dr. Clark was the preservation of the supply. He told of the inroads being made in the north by the fires, and called upon the Government to first consider this fire problem, the most important of the preservation of forest wealth campaign. In Michigan this year alone $400,000,000 worth of timber had been destroyed.

Then there was the other side of the question. A new growth. Reforestry was a part of this phase of the question, but, in the opinion of the speaker, reforestry was not so important as the careful selection of the timber and the allowing of the smaller trees to mature after the good stuff is taken out.

ACCURATE CALCULATION OF ENGLISH ENGINEER.---Makes Connection of Girders of Sunderland Bridge with the Action of the Sun's Heat.

A STRIKING illustration of the influence of the sun's heat on steel bridges, says Engineering, London, was afforded in the course of the junction recently made of the two ends of the central girder which have been in process of erection from the sides of the River Wear at Sunderland during the past seven months. This centre girder, 353¾ feet long, had to be 42 feet deep in the centre to carry a double line of railway on the top platform and a roadway on the lower platform, and thus the weight of each girder complete is 960 tons, and the weight of the span 2,600 tons, exclusive of the temporary works. This equals 7½ tons per lineal foot. The length is exceeded by only one or two spans in this country, and the weight for the length is greater than in the case of any existing independent span in Britain. The clear height above high-water level is 85 feet. The River Wear Commissioners would not allow any staging in the river piers. On account of this great weight, erection by protrusion or bracketing was out of the question; and, after a very full and careful consideration of various schemes, it was decided by Sir William Arrol & Co., Limited, Glasgow, whose tender and scheme of erection were accepted, to temporarily convert the main girders into cantilevers, and erect the span by overhang from each pier. When the two projecting ends were nearing each other the closing lengths were measured with length rods and these were sent to the works at Glasgow, where the various plates and angles forming the closing lengths were cut and drilled and forwarded to the site. These units were connected to one end only; the other was free, the gap being about 1¼ inches. By noon on Thursday, Dec. 15, the temperature had risen sufficiently to cause the steel work to expand and the gap to be closed. The holes in the cover plates were then opposite the holes in the projecting end, and barrel drifts were immediately driven into a large proportion of the holes to retain the ends in position. These were replaced rapidly by bolts. Following upon this the whole joint was permanently riveted up. As this operation was being completed, the rocker bearings for the river pier at one end, were released, so that the 350-foot span was free to move longitudinally according to temperature changes. During the following night, with a drop in temperature of about 13 deg. Fahr., the movement on the rockers was 5-16 inch. It will be understood that before the connection at the centre had been made the bearings were locked on the river piers, and all expansion and contraction took effect at the gap in the centre. During the last week of construction, measurements were taken and these showed a temperature variation of about ⅜-inch in the length of 350 feet. During the recent spell of hot weather the projecting ends of the girders moved about 1¼-inch westward from the forenoon sun, and again eastward to the same extent in the afternoon. The projecting ends also rose and fell daily about ⅜-inch. It will thus be recognized that the question of temperature was an important factor in the success of the closing of the ends. The parts of the structure were designed with absolute precision to ensure accurate meeting when the temperature was 60 deg. Fahr. But hydraulic jacks were provided at the shore ends, so that had Thursday been abnormally cold or hot the whole structure could have been tilted or moved longitudinally until the ends met. The day, however, was of suitable temperature, and these jacks were not applied.

PANORAMIC VIEW OF NEW PLANT OF WOOD PRODUCT COMPANY, DYSART, ONT., TAKEN FROM THE WEST, DEC. 15TH, '08, SHOWING THE PLANT COMPLETED WITH THE EXCEPTION OF THE WATER TOWER, WHICH REMAIN ONLY TO BE STRIPPED. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

REINFORCED CONCRETE CHEMICAL PLANT.---New Plant of Wood Products Company Just Completed at Dysart, Ont.---Chain Fabric and Plain and Twisted Bar Reinforcement Used Throughout.---Many Novel Features, Including Concrete Dam, Water Tower and Tank.

By E. D. PITT*

AN INTERESTING piece of reinforced concrete work, introducing several new features in structural engineering, and in which the constructive cost has been minimized by the use of aggregates common to its vicinity, has just been completed in the erection of the new plant of the Woods Products Company, Ltd., of Canada, at Dysart, Haliburton County, Ontario, about one hundred and fourteen miles on the line of the Grand Trunk, north of Toronto.

The purpose of this plant is for the production of wood alcohol and acetate of lime with by-product of charcoal by a process of treating birch, beach and maple, which are found in large quantities in the adjacent territory.

In general, this industrial comprises four buildings, an oven house, still house, charcoal house and boiler house, together with two auxiliary features consisting of a 50,000 gal. reinforced concrete water tower and a small concrete storage dam. All buildings are constructed of reinforced concrete, with brick curtain walls in the main, the intention being at the time the work was undertaken, to build as entirely a fireproof plant as the limit of economy would make possible.

It was found advantageous, early in the period of construction, to use sand from the site of the mill as a component part of the concrete; the concrete being composed, in addition to its essential aggregate, of crushed limestone, and in part of limestone sand and quartz sand. Careful analysis made during the process of construction showed the results from these materials to have been exceedingly good. The concrete for the foundations was composed of 1:3:5 parts of cement, sand and stone respectively, while for a large portion of the superstructure the proportions were 1:2:5 and 1 1-4.2:4 cement, sand and stone in order named. In the construction of the dam, the concrete used consisted of 4 1-2 parts of stone to 1 part of cement and 2 1-2 of sand.

The reinforcement for the beams throughout the entire job consisted of Niagara bar, formed from commercial squares and flats, with an attached flat steel shear member, this form of reinforcement affording a high

*Ed. Note.—Mr. Pitt was the designing engineer of the entire works with the exception of the chemical plant, and was also in entire charge of the construction as general manager of the firm of Pitt & Company, Niagara Falls, Ont., who were the general contractors.

NEW PLANT OF WOOD PRODUCTS COMPANY—PANORAMIC VIEW TAKEN FROM THE WEST, SHOWING THE ENTIRE PLANT DURING PROCESS OF CONSTRUCTION. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

PLANT OF WOOD PRODUCTS COMPANY—REAR VIEW OF OVEN HOUSE AND BOILER HOUSE, SHOWING THE STILL HOUSE IN THE DISTANCE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

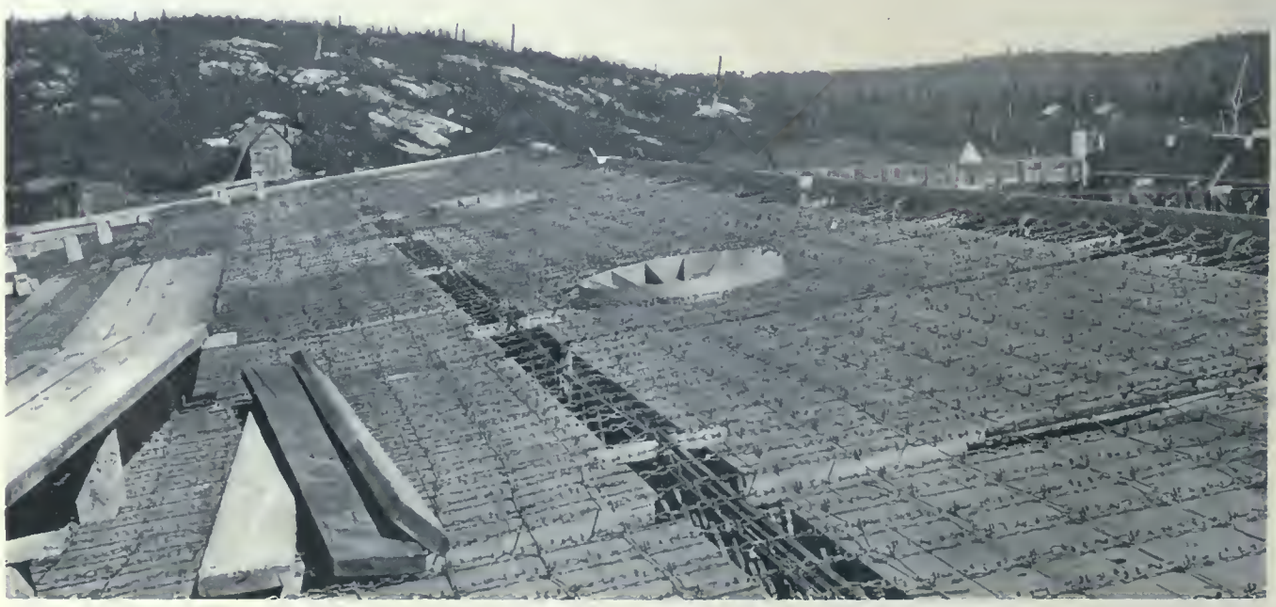
shear resistance and sufficient elasticity in its application to meet all of the requirements of the work. All the floor and roof slabs in the entire plant are reinforced with Community chain fabric, with 6-inch spacing of chains for the floors and 8-inch spacing for the roofs; while the columns throughout are square in form, with square hooped plain round rods as reinforcements, the hooping in all cases being formed of annealed steel wire, usually of a pitch equal to one-sixth the diameter of the column.

In the construction of the curtain walls and fire walls, bricks of the standard sand-lime variety were employed, the quality of the brick being satisfactory and giving promise of developing a greater crushing strength with time.

During the early part of the construction work, a coarse sand gravel was used in connection with the stone, from a pit about forty miles down the line on the Grand Trunk Railway, at Fenelon Falls. Later experiment and analysis indicated that the grade of sand found on the site would answer equally as well for use with the stone in making the concrete. This, therefore, was done, although an additional percentage of cement was used and proved up very satisfactory in every way.

The stone used for foundation work, etc., was that equivalent to a 2 1-2-inch mesh screen, while for all structural work two grades were employed—one passing through a 1-2 or 5-8-inch screen and the other a 1-inch screen—the combination of these two grades in connection with the sand used, producing an exceedingly dense concrete. The crushed stone was peculiar in its fracture, in that it was a semi-conchoidal, semi-splintered fracture, with very little dust, and more in the nature of a flint limestone than anything else.

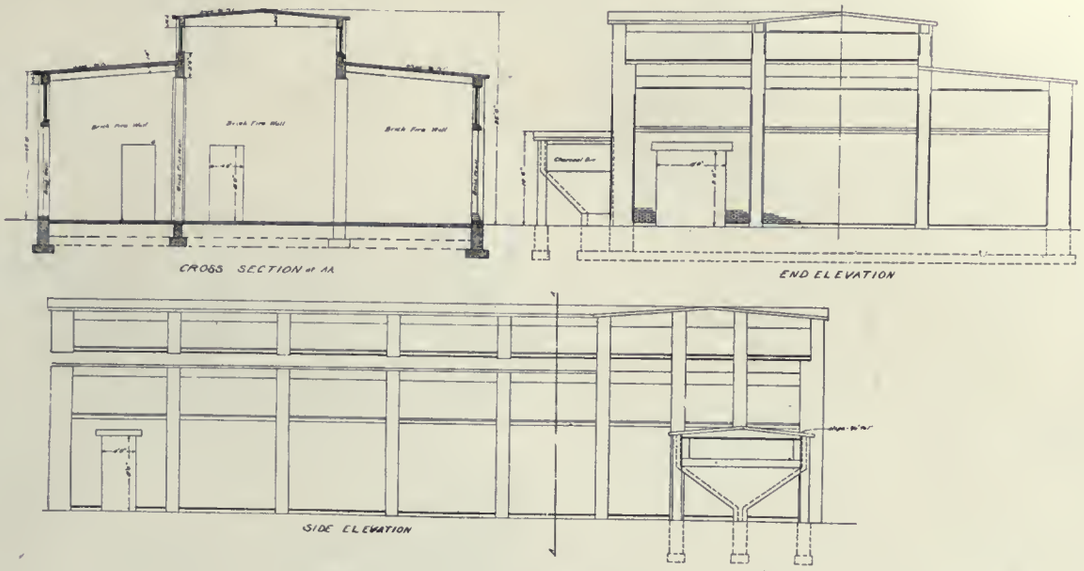
The boiler house is approximately 52 by 90 feet, one



PLANT OF WOOD PRODUCTS COMPANY—ROOM OF OVEN HOUSE SHOWING CHAIN FABRIC REINFORCEMENT READY FOR THE POURING OF THE CONCRETE. NOTE THE OPENINGS FOR VENTILATING STACKS OVER OVEN. E. D. PITT, DESIGNING AND CONTRACTING ENGINEER.

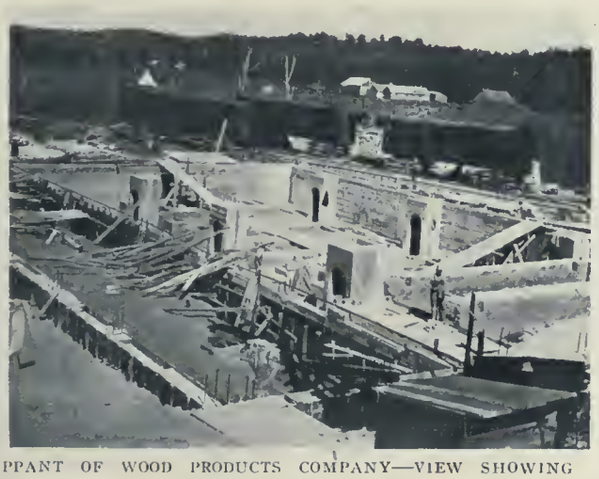
storey high, with a monitor roof which is characteristic of all the buildings. It contains a battery of four boilers of 150 h.-p capacity each, which are estimated as being amply capable of supplying all the steam required for the distillation process. This charcoal braise is stored ready for use, in a reinforced concrete bin at the side of the room.

To the north of the boiler house stands the oven



PLANT OF WOOD PRODUCTS COMPANY—CROSS SECTION AND END AND SIDE ELEVATION OF BOILER HOUSE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

various processes in connection with the working of the plant. The fuel used is the soft and refuse hardwood



PPANT OF WOOD PRODUCTS COMPANY—VIEW SHOWING FOUNDATION OF OVEN HOUSE WITH DIVIDED FOOTING FOR THE SIX CENTRE COLUMNS. THE DIVIDED FOOTING WERE MADE NECESSARY TO PROVIDE A PASSAGE FROM ONE SIDE OF THE OVEN HOUSE TO THE OTHER. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

from the adjacent limits, and the large quantities of marsh gas and wood tar which are by-products from the destructive distillation process. The boilers are located in the north end of the building and immediately in front of them is a large wood storage capacity with wide openings closed off with Ormsby rolling steel shutters. Adjoining the boiler compartment is the producer gas and power room, in which are installed a 125 h.-p. gas engine ,a large triple-action pump, and a 1,000-gallon duplex Underwriters' pump. The vertical triple acting pump is driven hy a belt from the gas engine, which is also directly connected to a generator for supplying the entire plant with electric light and current for operating small motors used in connection with the pumps and other light machinery. The gas engine is driven by producer gas, the fuel used being refuse charcoal braise which is accumulated during the handling of the charcoal in the ovens and other handling as a result of the destructive

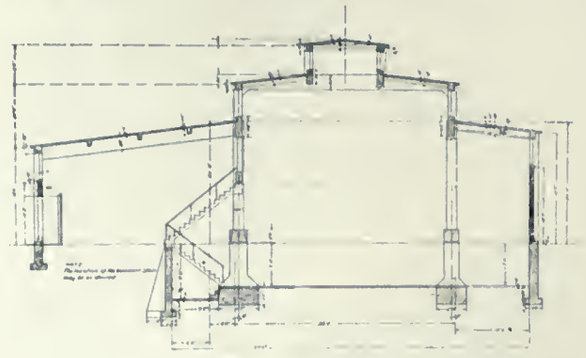
house, approximately 78 by 109 feet, with a battery of four pair of twelve cord ovens—six cords to each retort—installed therein. The arrangement of the retorts, ovens, trackage, turntables and coolers follows the usual lay-out for single ended retort oven used in the majority of wood chemical plants. This building offers some interesting features of the structural side of the work. The entire roof work is carried by six large reinforced concrete columns resting on a divided footing. This divided footing was rendered necessary in order to provide a passageway for the workmen from one side of the building to the other, between the ovens.

At the line of the first roof, the beams providing for a 32-foot span, have been handled in a novel manner, owing to the fact that the ventilating stacks standing over the front of the ovens centered on the division line between the pairs of retorts. In order to develop a struc-

PLANT OF WOOD PRODUCTS COMPANY—ACETATE ROOM OF OVEN HOUSE WHICH STANDS OVER THE TOPS OF FOUR PAIR OF 12 CORD RETORTS AND IS USED FOR DRYING MOISTURE FROM ACETATE OF LIME. ENTIRE ROOM SYSTEM IS CARRILD ON THREE GREAT GIRDERS SHOWN IN THE FOREGROUND. DIMENSIONS 33 FT. x 107 FT. x16 FT. HIGH. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER..

tural system in which the beams would have practically a uniform loading, the main girders for the roof are carried on alternate pairs of beams diverging from single

exterior columns. (See oven top and roof plan.) On the opposite side of the building a modification of the



PLANT OF WOODS PRODUCTS COMPANY—TRANSVERSE SECTION OF OVEN HOUSE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

roof system was necessitated as the stacks leading from the ovens are also centered on the same central lines as the ventilating stacks at the front of the ovens. By this arrangement the upper central portion of the building is provided with a span of about 35 feet on centres, which is carried by three large girders resting upon six concrete columns. This makes a room over the ovens of about 32 feet wide by 107 feet long, absolutely clear of any supports interfering with the use of the oven floor. The floor of this room gives access to an acetate storage house of galvanized iron at the north thereof, and is connected by stairways with the lower levels of the oven house.

At the end of the destructive distillation process occurring once in 24 hours, the charcoal is pulled from the retorts and carried by stages of twenty-four each, through steel coolers which are hermetically closed in order that the charcoal may cool off without burning. After having stayed for 48 hours in these coolers, the charcoal stands for another period in the open air, to be absolutely sure no traces of fire remain. The trackage from the columns extends into the charcoal house through doors leading therein, and the charcoal is unloaded from the

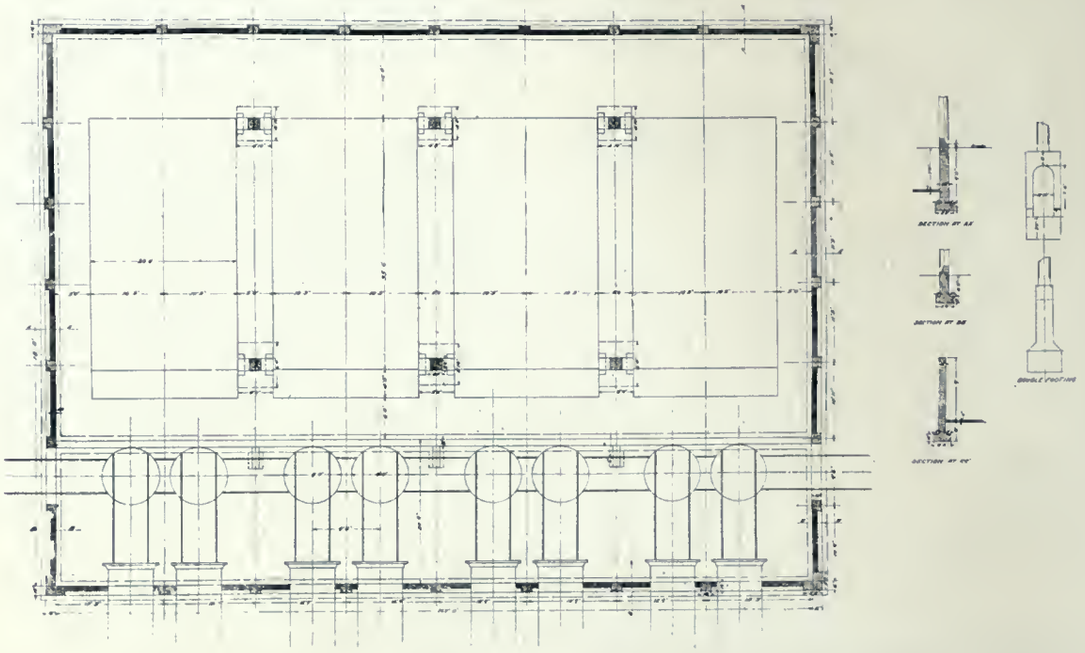
ing and embedded at a level with the floor, the head of the winch standing about two feet above the surface.

The charcoal building is 45 by 100 feet, with roof girders carried on a central line of columns and exterior columns. The columns of the monitor roof are carried on the inner third point of these girders, producing an arrangement giving a maximum of light at the point required, as well as a comparatively clear floor space.

By far the most elaborate structure in its general layout, of any of the buildings constructed as a part of the plant, is the still house. This building in its greatest width is 73 feet, while its length is 129 feet 6 inches. It comprises the neutralizing room, tank room, main distil-

PLANT OF WOOD PRODUCTS COMPANY—INTERIOR VIEW OF OVEN HOUSE, SHOWING DIVIDED BEAMS WHICH CENTRE AT ONE END ON A SINGLE COLUMN. THE DETAIL OF THIS ARRANGEMENT MAY BE SEEN IN THE ROOF PLAN OF THIS BUILDING, PUBLISHED HEREWITH. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

lery room and refinery, the latter being located in the four-storey part of the building. The raw products of the distillation are pumped from the collecting tanks in the



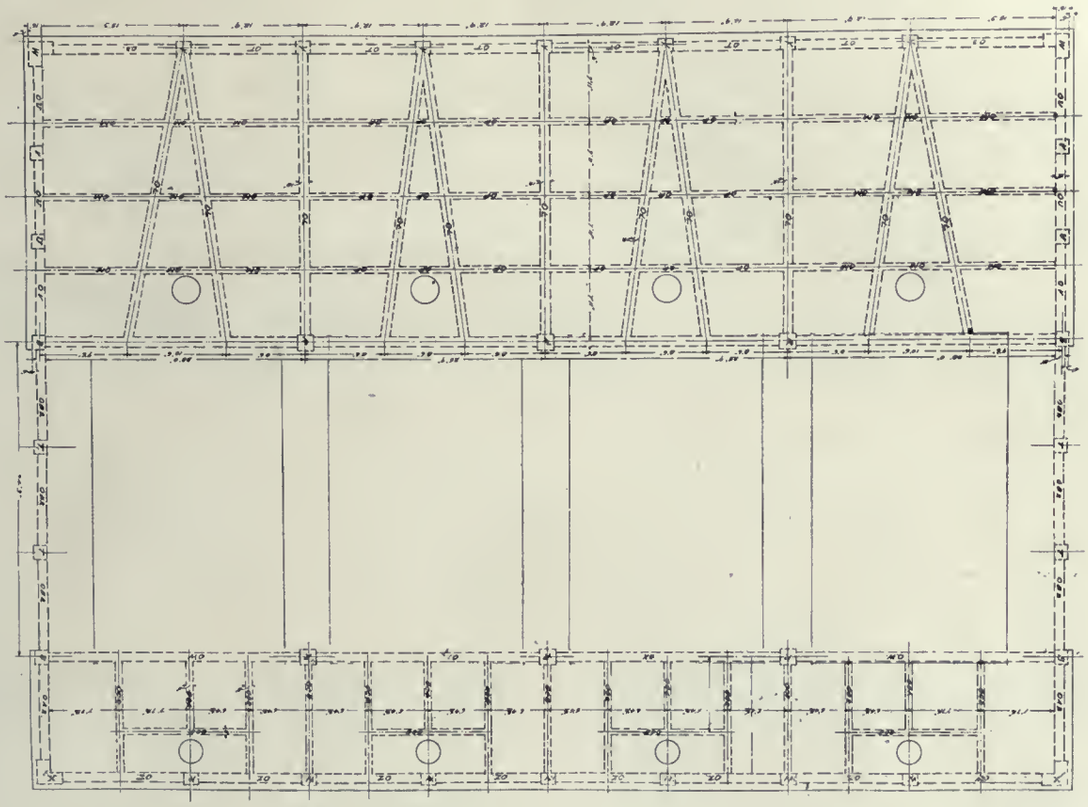
PLANT OF WOOD PRODUCTS COMPANY—FOUNDATION PLAN OF OVEN HOUSE, SHOWING THE SIX DIVIDED FOOTINGS, ALSO THE FOUR PAIRS OF TWELVE CORD RETORTS. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

cars and stored until shipped. The cars are handled through the coolers and in the charcoal house by means of an electric winch, centrally located in the latter build-

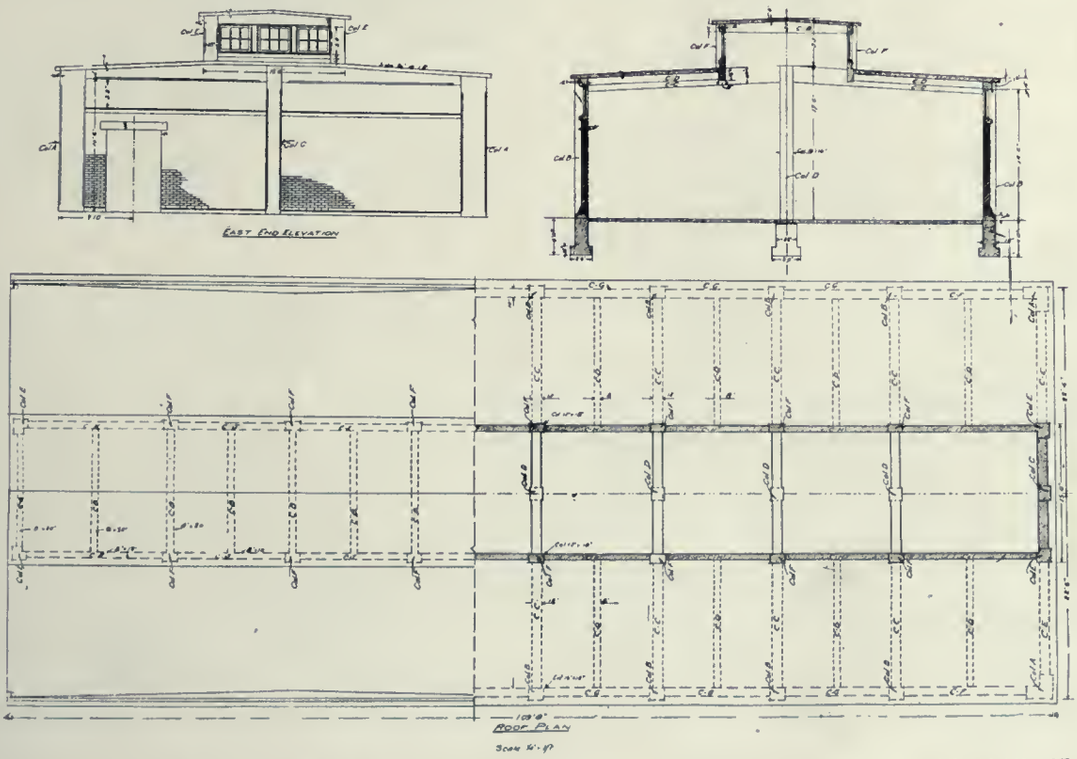
oven house to the settling tanks in the still house, and from the settling tanks are carried forward through the various processes of neutralization with quicklime to re-

move the acetate acid, and to increase the percentage of alcohol of the resultant liquors.

The structural features of the still house present some very interesting points. At the north end is an exceedingly strong floor system capable of sustaining a load of four 3,500 gallon tanks for holding raw liquors. This floor is placed at an elevation of 14 feet 6 inches above the grade and its bearing strength is estimated at 400 pounds per square foot. Opposite in the refining end of the building, large openings, 9 feet 6 inches in diameter, are left for the purpose of making room for the final alcohol stills. Here the levels have been constructed for a safe loading of 450 pounds per square foot on the second floor, and 350 pounds on the third and fourth floors. In the centre or main room, the roof system is carried on some very high columns. The columns are 22 inches in



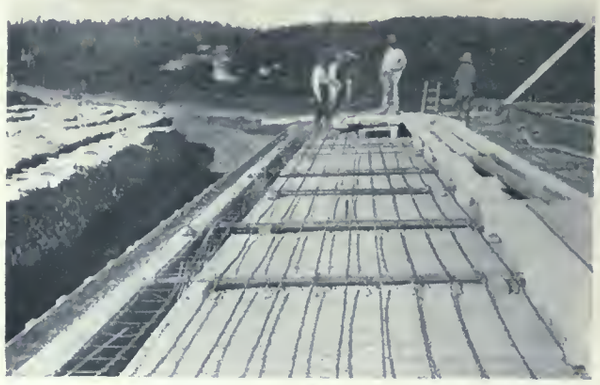
PLANT OF WOOD PRODUCTS COMPANY—ROOF PLAN OF OVEN HOUSE, SHOWING DETAIL OF ARRANGEMENT OF THE DIVIDED BEAMS WHICH CENTRE AT ONE END ON A SINGLE COLUMN. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.



PLANT OF WOOD PRODUCTS COMPANY—EAST END ELEVATION, TRANSVERSE SECTION AND ROOF PLAN OF CHARCOAL HOUSE E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

PLANT OF WOOD PRODUCTS COMPANY—VIEW OF CHARCOAL HOUSE, TAKEN FROM THE SOUTH, SHOWING THE SAND LIME BRICK CURTAIN WALLS. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

diameter and approximately 23 feet in height to the monitor. These were poured in one operation from the top.



PLANT OF WOOD PRODUCTS COMPANY—ROOF OF CHARCOAL HOUSE, WITH REINFORCEMENT READY FOR THE POURING OF THE CONCRETE. ALL ROOFS ARE FIGURED FOR 125 LBS. LIVE AND DEAD LOAD. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

a specially graded concrete which would enable the base of the column to be poured without separation of the aggregates being used. This work was to a certain extent experimental, but it was found upon removal of the forms, that the concrete work at the base of the columns was perfect in every instance. While it is not considered

PLANT OF WOOD PRODUCTS COMPANY—INTERIOR VIEW OF CHARCOAL HOUSE IN FINISHED CONDITION. NOTE THE MONITOR ROOF RAISED ON THE INNER THIRD POINTS OF THE MAIN GIRDERS. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

good practice to pour concrete columns at a greater height than twelve to fourteen feet, the exigencies of construc-

PLANT OF WOOD PRODUCTS COMPANY—FORM WORK PARTIALLY ERECTED AND COMPLETED FOR THE FIRST TOWER OF THE CHARCOAL HOUSE. THIS FORM WORK WAS PRACTICALLY ERECTED COMPLETE IN A DAY AND A HALF. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

PLANT OF WOOD PRODUCTS COMPANY—END VIEW OF STILL HOUSE COMPLETED. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

tion in this instance made it inadvisable to attempt to pour these columns in separate runs.

Another roof system having a considerable span has been developed in the main portion of this building. This

PLANT OF WOOD PRODUCTS COMPANY—FIRST STORY AND ROOF FORM WORK FOR THE STILL HOUSE. IT IS WORTHY OF NOTE THAT THE LUMBER FOR THE FORM WORK WAS USED ONLY ONCE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

is carried on girders of approximately 32 feet span with secondary beams connecting therewith, running longitudinally with the building.

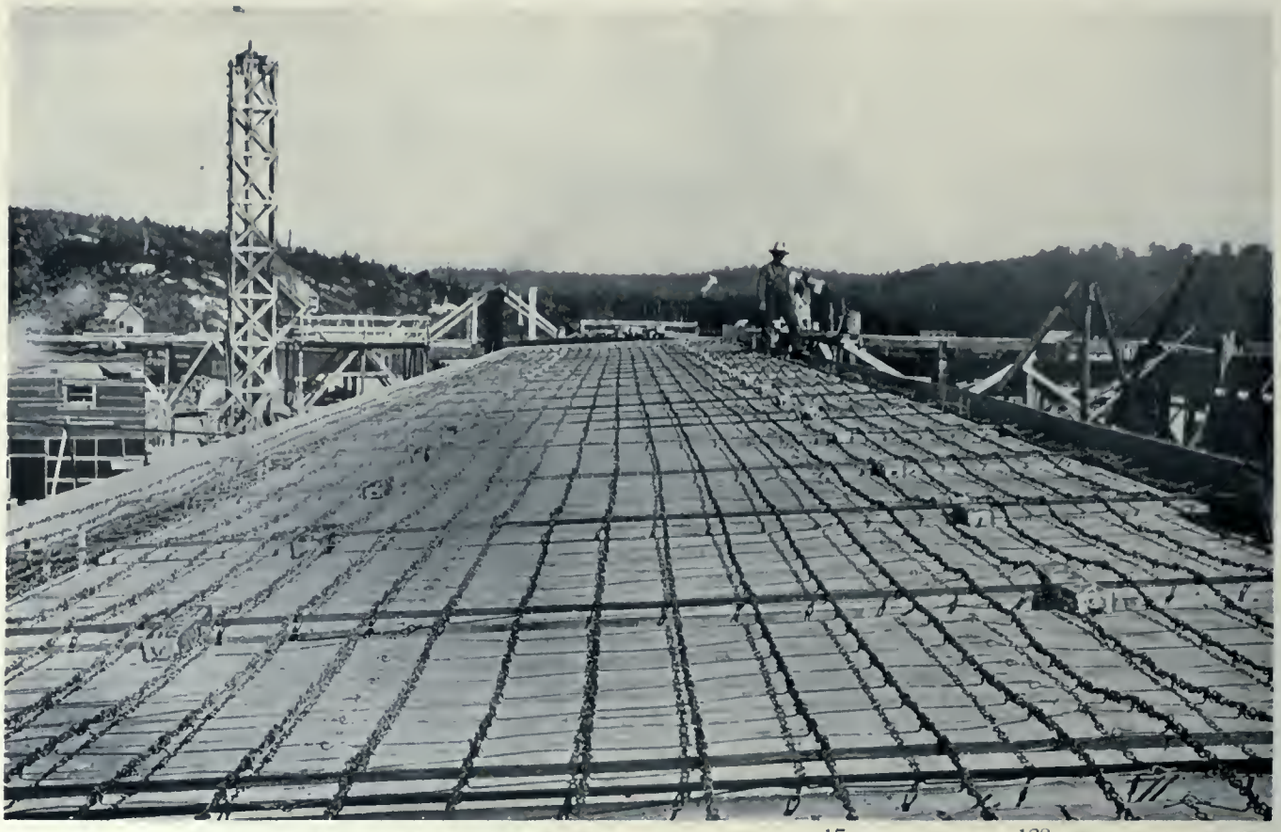
The stairways throughout the whole plant are constructed entirely of reinforced concrete with unsupported landings, and the windows in all the buildings are of a special type of rebatted factory windows, all pivot hung and made with heavy muntings for the sash throughout.

The water tower is a structural undertaking in connection with this plant that is particularly noteworthy, in that it not only furnishes several unique features in detail, but is the first reinforced concrete water tank resting on a high tower of openwork construction which has been built in Canada.

In developing the plans of this structure it was early decided upon that the use would be made of the full diameter of the tank in placing columns, so as to carry the weight of the tank to the best possible advantage. It was considered inadvisable to use a spread footing for the piers in the sense that the columns would then stand on a batter. It was found very satisfactory, in working out the design, to use a buttress type of exterior columns and later, during the process of construction, the square central hollow column was changed to four 16-inch columns standing at the corners of the box column shown in the drawings. These central columns will eventually be bricked in between with a hollow brick wall to furnish a frost-proof box for the water pipe.

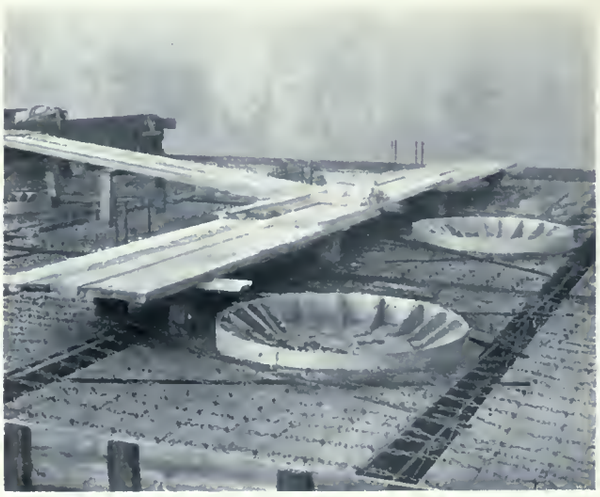
The capacity of the tank is fifty thousand gallons, and the tank stands from grade line to top of roof 93

PLANT OF WOOD PRODUCTS COMPANY—VIEW SHOWING STEEL CHAIN FABRIC ON THE TANK FLOOR OF STILL HOUSE, USED IN CONNECTION WITH THE NIAGARA BAR FOR BEAMS. THIS FLOOR WAS FIGURED FOR 400 LBS. UNIFORM LIVE LOAD; IT IS NOW LOADED TO OVER 50 TONS CONCENTRATED LOAD, AND THERE IS NO APPARENT DEFLECTION AND IT IS IN PERFECT CONDITION. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.



PLANT OF WOOD PRODUCTS COMPANY—VIEW OF LOWER FLOOR OF STILL HOUSE—17 FEET WIDE AND 128 FEET LONG. ATTENTION IS CALLED TO THE USE OF CONCRETE BLOCKS FOR HOLDING THE CHAIN FABRIC AND REINFORCING BARS IN SUITABLE POSITION TO RECEIVE THE CONCRETE. THESE BLOCKS HAVE A DOVE-TAILED SECTION ENABLING THE CONCRETE, AS POURED, TO HOLD THEM SECURELY IN PLACE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

feet in height. During the process of construction, use was made of the space between the four central columns above mentioned for the purpose of hoisting concrete to



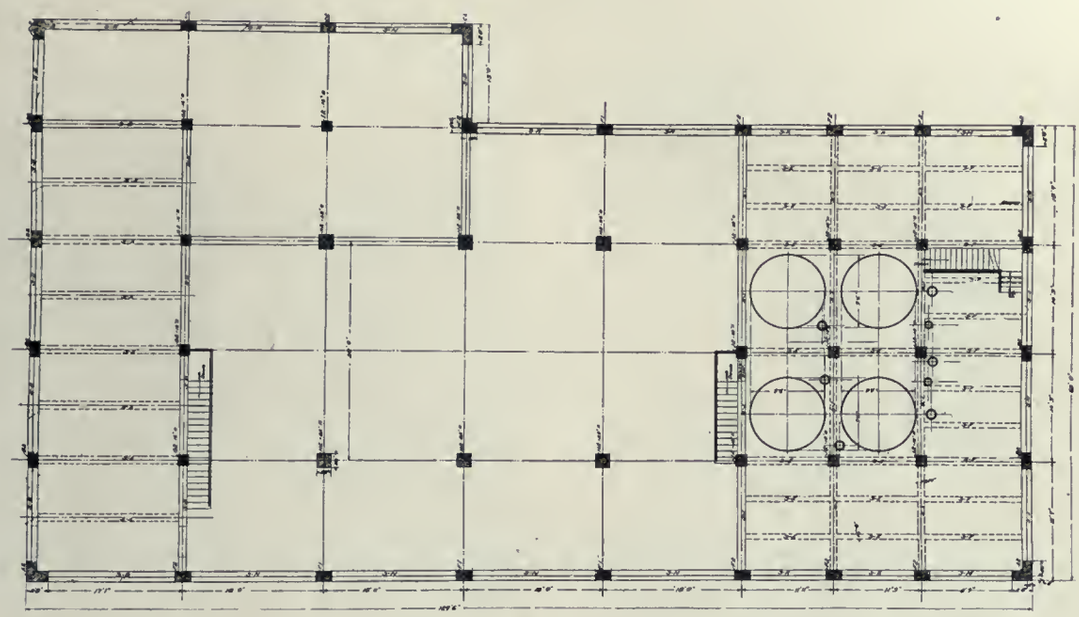
PLANT OF WOOD PRODUCTS COMPANY—VIEW SHOWING STEEL CHAIN FABRIC ON THIRD STORY OF STILL HOUSE AND THE FORM WORK FOR OPENINGS LEFT IN THE FLOOR FOR THE REFINING APPARATUS. NOTE THE MANNER IN WHICH THE REINFORCEMENT IS CARRIED AROUND THE OPENINGS. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

the upper levels. This hoisting was done in connection with a small belt driven hoist attached to the planing mill shafting (forming a part of the construction equipment), which stood immediately adjacent to the water tower, and proved very satisfactory in speed and operation throughout all conditions of weather. The hoisting arrangement was handled by a tripod with 14-inch boom block in the peak of the tripod, this being carried up from floor to floor as the work progressed until finally the entire framework of the tank, including the roof was set in place, and the tripod set on top of the form work. This necessitated leaving a 3-foot square opening at the centre of the roof through which to handle the concrete. The bucket holding the concrete was dumped at the peak of the roof and flowed down the slope, dropped into the side walls of the forms with great ease and in a very satisfactory condition.

It may be interesting to note that the temperature, during the process of pouring the tank, dropped in one instance to nine degrees above zero. During part of the time it was, of course, found desirable to heat the materials to some extent. In no case, however, did the

PLANT OF WOOD PRODUCTS COMPANY—THIS VIEW SHOWS THE WIDE SPAN ROOF CONSTRUCTION OF THE MAIN DISTILLERY ROOM OF THE STILL HOUSE. THE SPAN HERE SHOWN IS 32 FEET IN THE CLEAR FOR THE GIRDERS, WITH 18-FOOT LONGITUDINAL SPAN FOR THE BEAMS. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

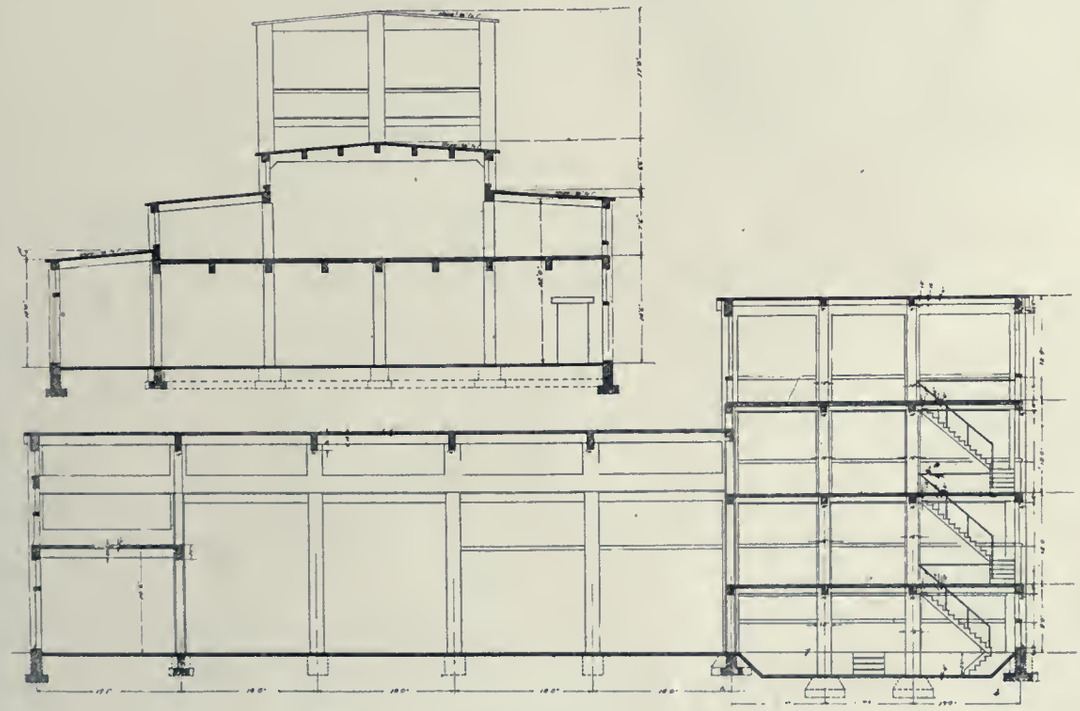
concrete come through to the concrete buckets of a sufficiently high temperature to evidence any injury. As shown by the details of steel in the water tank, twisted steel bars were used almost exclusively in connection



PLANT AND WOOD PRODUCTS COMPANY—FIRST STORY PLAN OF STILL HOUSE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

therewith. No modifications were made of this detail, except that instead of two lines of twisted steel shown in the lower portion of the tank, these two lines were merged into one line resting more nearly at the centre line of the tank walls. The walls of the tank are 12 inches thick, which will, perhaps, be considered by some to be unnecessarily thick, but this was decided upon as enabling a more complete prevention against leakage, the same thickness being also adopted for the floor of the tank.

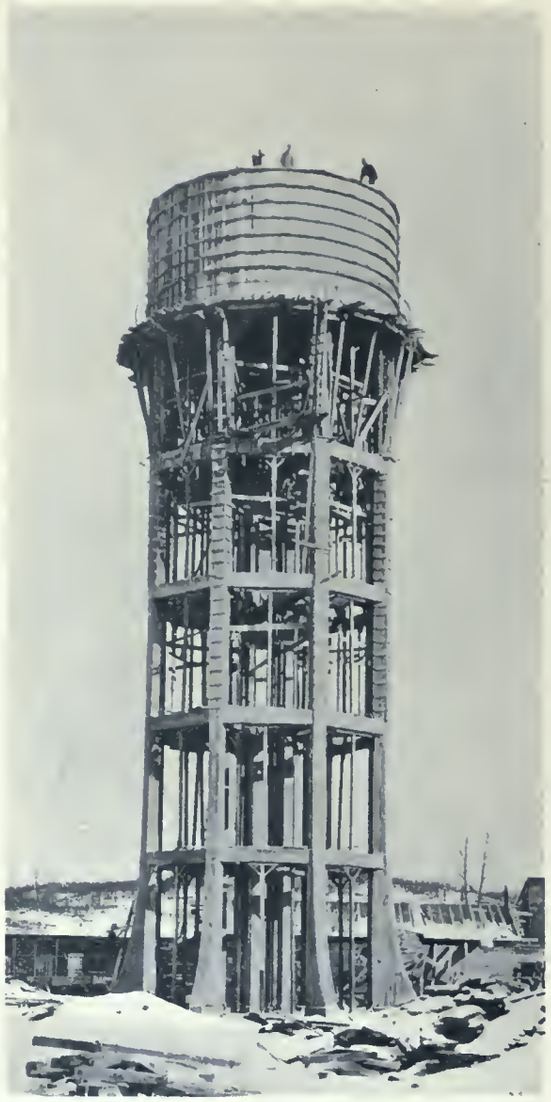
Careful consideration was given to the amount of flood water annually sent down through the valley of the Burnt River, and in figuring the dam for the flood rather over one foot in height throughout the entire length, it was decided that the dam would be amply safe under these conditions. One peculiar feature was encountered, however, in the construction of the dam, in that the bed rock that it was intended to rest upon sloped off so deeply at the north end so as to be approximately 24 feet below the normal head of the dam. It had been the intention to carry a concrete cut-off wall entirely to bed rock, but at a level of approximately 16 feet below the normal heel, a bed of very fine compact sand was encountered into which sheet piling was driven several feet.



PLANT OF WOOD PRODUCTS COMPANY—LONGITUDINAL AND TRANSVERSE SECTION OF STILL HOUSE. E. D PITT, DESIGNING AND CONSTRUCTING ENGINEER

The final feature of the construction work is a small concrete dam 214 feet long, exclusive of the wing walls, for carrying a normal head of about 9 feet of water. This was decided upon as making an amply firm bed for holding the dam, in consideration of its comparatively small normal head. Therefore, a 2 1-2—4-foot cut-off

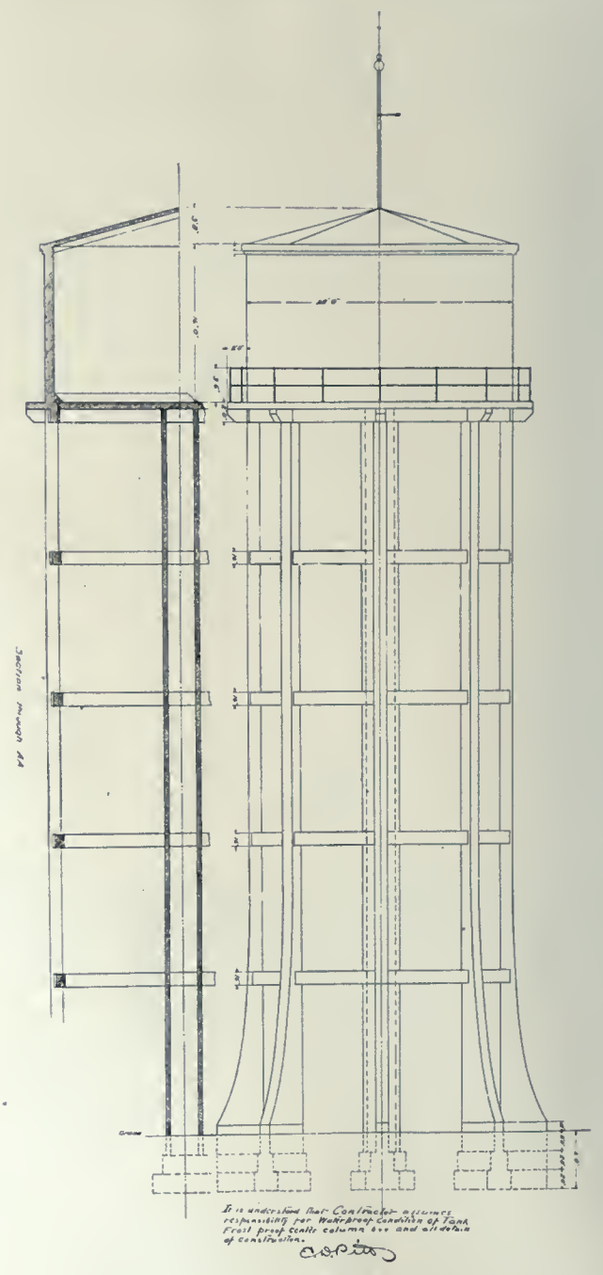
wall was founded upon this as a continuation of a cut-off wall extending to rock throughout the greater portion of the dam. At the normal spillway the entire structure is founded on rock. Suitable reinforcement of twisted bars



PLANT OF WOOD PRODUCTS COMPANY—VIEW SHOWING THE WATER TOWER PRACTICALLY COMPLETE AND TANK READY TO POUR. THIS IS THE ONLY CONCRETE TANK RESTING UPON AN OPENWORK CONCRETE TOWER THAT HAS BEEN ERECTED IN CANADA. IT IS INTERESTING TO NOTE THAT THE WATER TANK WAS POURED WITH THE TEMPERATURE AT ONE TIME NINE DEGREES BELOW ZERO, AND INVESTIGATION SINCE THE TANK WAS COMPLETED, SHOWS THAT THE CONCRETE IS IN FIRST-CLASS CONDITION. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

was incorporated into the body of the dam to prevent the possibility of structural cracks. This has been found to be ample for the purpose required, as no structural cracks have occurred at the point where the dam leaves the rock and is resting upon the sand foundation. Indications point to the fact that the condition of the work is thoroughly safe for all requirements. The storage pond formed by the dam is approximately one and one-half miles long, with an average width of about 400 feet.

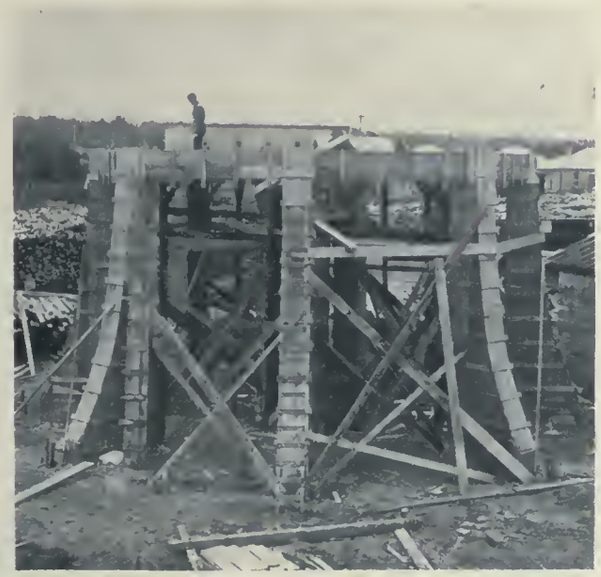
Finally, we wish to give the results of our experience in using Community steel chain fabric, this being the first job of any extent upon which this style of reinforcement has been used. We have found after the initial work was done upon this job that the force of men employed in laying the steel chain could be reduced to the barest limits, and still give good and sufficient service, the chain being handled with an ease and rapidity which has proven remarkable. Of course, in this first work, special pains were taken to make everything as perfect as possible in connection with the work, yet we found on comparatively difficult roof work, where the space covered was not large, that the cost of applying, in comparison with other forms of reinforcement, proved to be remarkably small. Steel chain fabric was decided upon as to its use in competition with a bar form of roof made up of the Niagara bars. It was found by the use of the chain fabric that approximately 1-3 of the concrete could be eliminated in connection with the roofs, this being an item of considerable value in connection with placing concrete at the points required above the ground. Four-inch roof slabs were used throughout with intermediate beams, whereas, if a bar system of reinforcement had been used, it would have been necessary to



PLANT OF WOOD PRODUCTS COMPANY—ELEVATION AND TRANSVERSE SECTION OF WATER TOWER. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

have used a six-inch slab in the main. One remarkable feature in connection with the use of the chain fabric has been that by the very nature of its construction the steel chain is automatically held above the point of con-

tact with the roof forms, and no evidence is given of any of the chain showing when the forms have been removed, therefore indicating that the fireproofing feature of the automatic spreaders has been very carefully considered



PLANT OF WOOD PRODUCTS COMPANY—SHOWING FIRST FORM WORK FOR THE REINFORCED CONCRETE WATER TOWER READY FOR POURING. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

and has worked out with entire success. In connection with the use of the Niagara bar, plain square and flat steel negative reinforcement was used throughout the job. It was found very satisfactory to use this plain steel reinforcement without additional shear members, owing to the fact that the steel chain fabric furnished such a high mechanical bond in connection with the slab, that the use of shear members in the negative reinforcement was not considered necessary. One or two interesting points in connection with the long spans have proven quite satisfactory, that is, that for compression reinforcement in the longest span used, a 52-foot span beam over the top of the boilers in the boiler house, we used twisted steel with excellent success. The Niagara bar in this particular beam was of the following form—3-4 x3 inches, 54 feet long, five bars with shear members 30 inches long spaced 3 inches on centres for the outer quarters of the beams and 6 inches on centres up to a space about 4 feet wide at the centre of the beam. In this connection, the compression resisting bars of twisted steel were carried down into the body of the beam for additional shear resistance, not that it was considered absolutely essential, but that it was considered advisable

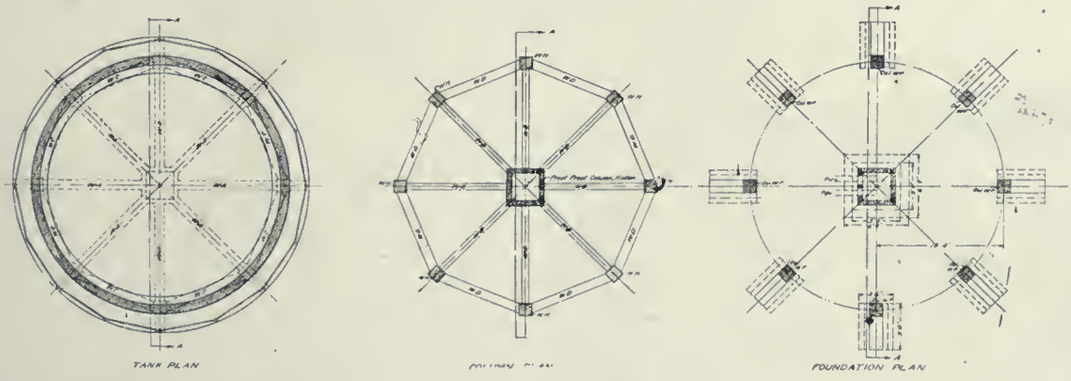
owing to the fact that the beam itself is somewhat lacking in depth. It would have been preferable to have used 52 inches as the minimum depth of this beam, but the considerations of construction limited it to 42 inches

The cement used upon the work was of two brands—Monarch Cement, made by the Lakefield Portland Cement Company, and Star Brand Cement, manufactured by Canadian Portland Cement Company. Both of these brands proved exceedingly satisfactory in their general working qualities.

In connection with the form work for the entire job, but very little other timber than hemlock was used For some of the heavier first-storey columns 2-inch hemlock surfaced one side with undressed joints, just as it came from the saw, were found exceedingly satisfactory. For the floor forms and similar beam work, 1-inch hemlock dressed one side was used. The strut work throughout

PLANT OF WOODS PRODUCTS COMPANY—WATER TOWER WITH FIRST SECTION COMPLETED, AND FORM WORK OF SECOND SECTION READY TO POUR. THE TWISTED STEEL DOWELL BARS, AS WILL BE SEEN, ARE IN PLACE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

the entire job was 4 x 4 hemlock and spruce. For the finer form work, such as cornices, etc., some pine was



PLANT OF WOOD PRODUCTS COMPANY—FOUNDATION, COLUMN AND TANK PLANS OF WATER TOWER. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

used, but the writer has found in his construction work that very little form work is of any value for second use, and it is much better, taken all in all, to calculate on us

PLANT OF WOODS PRODUCTS COMPANY—DAM IN PROCESS OF CONSTRUCTION, SHOWING THE EXCAVATION INTO THE SAND FOUNDATION AT NEARLY ITS LOWEST POINT. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

ing inch stuff throughout the work, with no provision made for using any more of this the second or third time than is absolutely necessary. Only in rare instances does form work come through the stripping process of sufficient value to be of further use.

PLANT REQUIRED FOR CONSTRUCTION.

The main feature of the construction plant was a No. 2 1-2 Smith mixer with Ransome hoist bucket and tower complete. In connection with the hoisting apparatus, a 5 x 7 single drum hoisting engine was used. Steam was furnished for the entire job by a 65 h.-p. locomotive type boiler. One Deane pump, 7-6-½-5, furnished water for the mixer. This, with a small Worthington pump at the site of the dam, was found amply capable of doing everything required in connection with water furnishing, and also unwatering at the site of the dam.

It was found necessary to install a fairly complete wood-working plant for the manufacture of the dressed lumber, and for making up the forms. At the point where the work was located it was practically impossible to obtain anything but undressed stock at advantageous figures, and therefore the planing mill proved of great service in connection with this work. The mill comprised a 25 h.-p. horizontal engine, pony planer, rip-saw, band-saw, swing-saw, sticking machine and emery wheel.

During the process of excavating at the heel of the dam for a concrete cut-off, it was found necessary to install a Pulsometer pump for handling the final unwatering at the greatest depth in excavation reached. The various runways leading from the hoist tower to the separate buildings were found much more advantageous than to have had a smaller concrete unit which could have been moved from place to place—the central unit necessitating only central stock piles for sand and stone, and, of course, also being closely adjacent to the cement storage house, as will be seen by the general plan, the lay-out of the buildings and the plant for handling material in connection therewith; this central location served well for everything except the work of erecting the water tower.

The chemical engineer under whose direction the entire works were constructed, is Mr. William H. Oliver, of Toronto, and his assistant on construction was Mr. J. E. Wilson, C.E., a graduate of the School of Practical Science, Toronto.

The rolling steel shutters closing off the wood storage room from the boiler room were supplied and installed by A. B. Ormsby, Limited, of Toronto.

PLANT OF WOOD PRODUCTS COMPANY—VIEW OF DAM IN PROCESS OF CONSTRUCTION, SHOWING WASTE-WAY FOR THE NORMAL FALL OF THE BURNT RIVER, IN THE RECENT DRY SEASON. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

PLANT OF WOOD PRODUCTS COMPANY—VIEW OF COMPLETED DAM FOR STORAGE PURPOSES—214 FEET LONG OVER A NORMAL HEAD OF 9 FEET. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

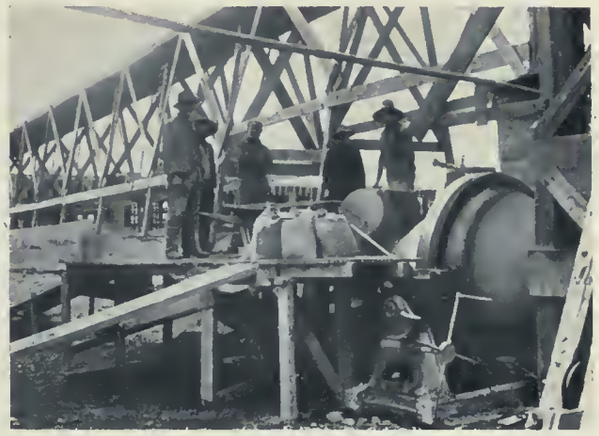
"BURNT MONEY."---A Sensational Indictment of American Extravagance. --- Building Reform Necessary.

IN VIEW of the great fire losses sustained in this country, even within the past year, those in Canada who are concerned with the conservation of our substantial building growth and the elimination of all unsafe and dangerous methods of construction, will find of absorbing interest an article, under the title of "Burnt Money," appearing in the January issue of Everybody's Magazine.

While the article in question relates solely to conditions as found in the United States, the writer has inadvertently pointed out a state of affairs which is all too

evident in many parts of the Dominion, and which, if we are to profit from the experiences of our neighbors to the south, calls for a number of urgent and necessary reforms in the building codes of many of our municipalities.

Some years ago it was realized that the generally shoddy construction of our buildings made great conflagrations in our cities not only possible but certain and a fire-prevention movement was set afoot. Mr. F. W. Fitzpatrick, of Washington, started it. He had studied the situation, and, being one of the foremost architects and authorities upon construction in the country, was eminently qualified to advise how to go about the work. He organized the Building Inspectors and other societies, whose main purpose is to secure better buildings in our cities; he induced municipalities to revise their building codes; the insurance companies helped and the architects have helped. Mr. Fitzpatrick has put the matter plainly before the people and has written much upon the subject.

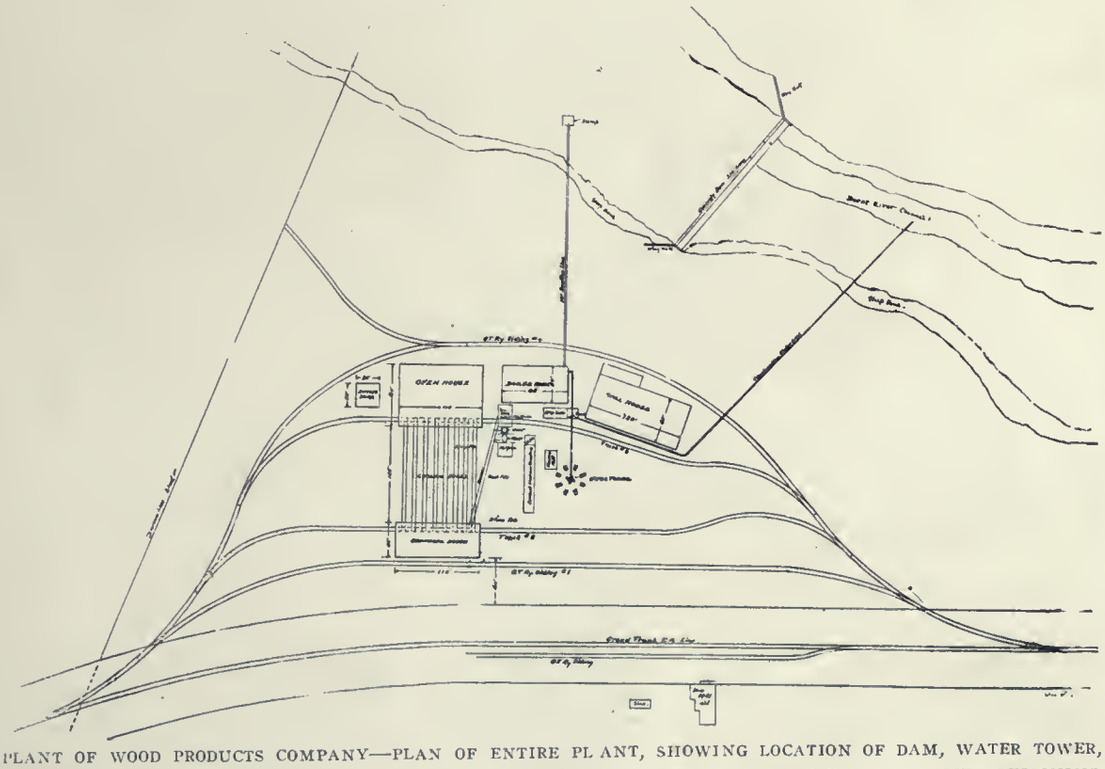


PLANT OF WOOD PRODUCTS COMPANY—SHOWING THE NO. 21-2 SMITH MIXER THAT WAS USED ON THE JOB, ALSO THE 125-FOOT RUNWAY FROM HOIST PLATFORM TO CHARCOAL HOUSE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

Articles by him have appeared in McClure's and other periodicals and newspapers and now Mr. Samuel Hopkins Adams, one of the original muckrakers, and who has been instrumental in securing many needed reforms in many directions, has assisted Mr. Fitzpatrick by writing this splendid article for Everybody's.

The Editor of Everybody's prefaces the article by saying: "This is a record of shame. A sensational indictment of American extravagance. We know that our national fire bill was startling, but the facts and figures that Mr. Adams presents here shocked us. They'll shock you. Not satisfied with slaughtering our forests, we are burning up our homes at a killing pace every year. We are pervaded with pride over our superiority to the rest of the world, while actually our fires cost us more than the combined loss of any other six civilized nations. Here are the figures straight in your faces. You can change the record. Mr. Adams shows how. Remember, we cannot as a nation waste our substance and prosper."

A MODEL coal handling plant has recently been completed on Gaspe street, near Laurier avenue, Montreal, for the Harte & Adair Coal Company. It has a capacity for 6,000 tons, and in construction is reinforced concrete throughout. The coal is all stored overhead, 15 feet from the ground, in a large circular-shaped structure, supported by massive concrete piers which are set 18 feet apart, thus allowing clear driveways in every direction for carts and coal wagons. The walls, which are 6 inches at the base and 4 inches at the top, are held by buttresses 30 inches thick, placed nine feet apart. One hundred and sixty-two miles of steel rods were used in reinforcing, and the floor, which is only 5 inches in thickness, is doubly reinforced. The incoming coal is dumped from the cars into a hopper which feeds ac continuous pocket elevator having a capacity of 60 tons an hour. Two men are all that is required to handle 600 tons per day of 10 hours; an electrician who runs the machinery, and a man to open the car hoppers.



PLANT OF WOOD PRODUCTS COMPANY—PLAN OF ENTIRE PLANT, SHOWING LOCATION OF DAM, WATER TOWER, TRACKS, STILL HOUSE, OVEN AND BOILER HOUSES, AND CHARCOAL HOUSE. E. D. PITT, DESIGNING AND CONSTRUCTING ENGINEER.

NEW PAROCHIAL SCHOOL, BELLEVILLE, ONT.---Erected for St. Michael's Parish,---Entrance Tower of Ecclesiastical Design.---Plan Compact and Entrances Well Placed.---Provides for Eight Class Rooms.---Lighting, Heating and Ventilation Thoroughly Considered.

AMONG the large number of school buildings which have of late been erected in Canada, one that combines design, construction and equipment—as regards heating, lighting and ventilation—in a noteworthy manner, is the parochial school built at Belleville, Ont., for St. Michael's Parish.

The general plan of the building is a most compact and satisfactory arrangement of an eight-roomed school for the use of both sexes. It is economical in construction and is very successful from the point of view of controlling the pupils while in the corridors and halls.

Every effort has been made to utilize to the best possible advantage every foot of floor space and to have all class rooms and halls bright and thoroughly heated and ventilated.

The class rooms on first floor are 32 feet 3 inches by 26 feet 3 inches, and have a clear height of 14 feet, with windows kept within 6 feet of the ceiling so that the light will be thrown down as much as possible from above. These windows are arranged for left hand lighting only. The class rooms will accommodate conveniently fifty pupils for the higher grades and fifty-six in the lower grades. Slate blackboards are placed at the front walls of each class room and composition blackboards on the rear and sides opposite windows.

There is a double cloak room 7 feet by 26 feet off of each class room, with a low screen partition across the centre and two entrance doors, the boys and girls being kept at opposite ends. These cloak rooms are arranged with seats and subdivisions and provided with hooks for pupils' clothes. The entrance doors to each class room are double hinged swing doors, in two leaves with floor door stops.

The kindergarten is somewhat larger than the other class rooms, being 38 feet 3 inches by 26 feet 3 inches, and has a large fireplace at one end with two additional windows. Connected with this kindergarten is a specially large cloak room so that the teachers may assist the small children with their wraps. Off this cloak room is a lavatory for the use of this kindergarten only.

Through the centre of the building runs the main corridor twelve feet wide with exits at either ends and staircases running from basement to second floor, each flight being six feet wide. The main entrance under the front tower leads into a small entrance hall which is used by the principal as an office if necessary, and which in case of emergency can also be used as an additional exit.

The arrangement of the second floor is similar to the first except that a class room is placed over the kindergarten. These class rooms are of similar shape and size to the ones below.

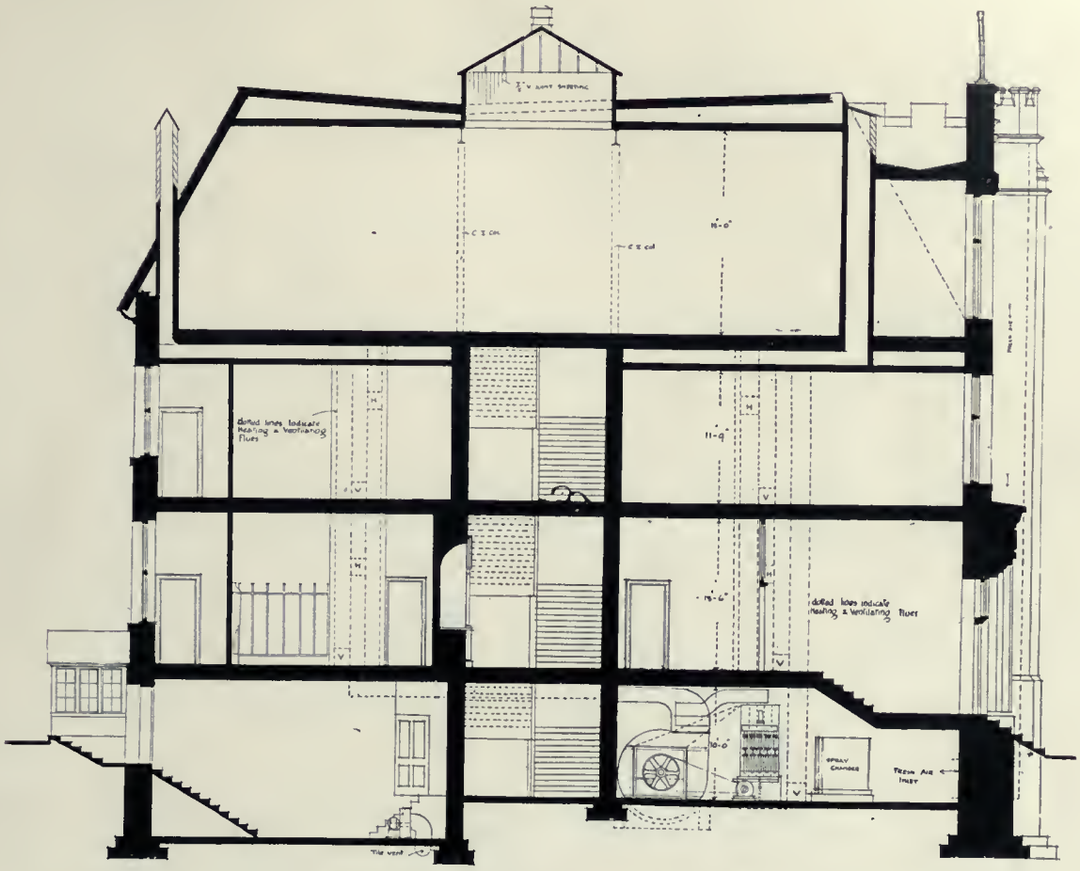
A room for the use of the teachers with a private lavatory is placed in the centre of the building in rear of the corridor, and a recitation-room is placed in front of the corridor over the entrance hall and vestibule.

As has already been mentioned, the staircases are six feet wide, and have landings midway between the floors of a similar width. Instead of balustrades, double sheeting is carried to the height of five feet on the open side of staircase, and is capped with a heavy rail, heavy hand rail of iron being run at a convenient height from the steps. On each landing large windows are placed practically the same width as corridors. The sills are kept high up, from floor, and the sashes are glazed with prismate glass, which not only diffuses the light through the corridors but prevents the children from loitering on the landings to

FRONT ELEVATION, ST. MICHAEL'S PARISH SCHOOL, BELLEVILLE, ONT., SHOWING DETAIL OF CENTRAL TOWER, MAIN ENTRANCE AND WINDOWS. MR. C. P. MEREDITH, ARCHITECT.

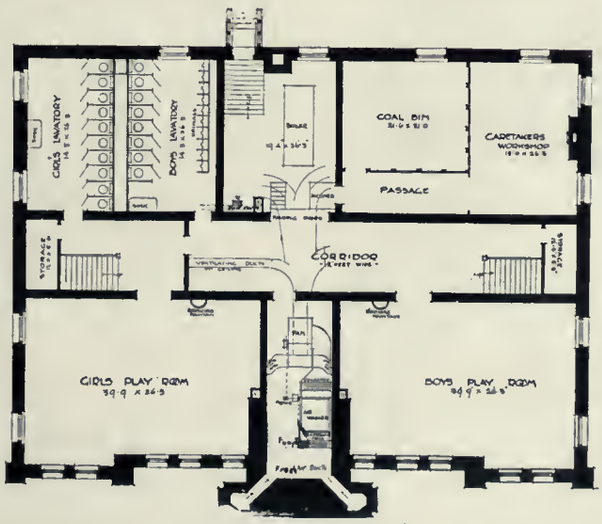
look out of the windows. A burlap dado is carried about all class-rooms and halls.

The top or third floor is used as an assembly hall, one stair leading to the hall and the opposite stair leading to the stage and dressing rooms, etc. This second stair can also be used in case of emergency. The assembly hall, which is sixteen feet high, has, in addition to side windows, a large ceiling skylight.



SECTIONAL END ELEVATION, ST. MICHAEL'S PARISH SCHOOL, BELLEVILLE, ONT., SHOWING LOCATION OF FAN-ROOM AND HEATING AND VENTILATING FLUES. MR. C. P. MEREDITH, ARCHITECT.

The arrangement of the basement is such that, after the pupils leave the first floor and are therefore not under the eye of their teachers, the boys and girls are entirely separated. Play-rooms of 40 feet x 26 feet are situated at opposite ends of the building at the foot of staircase, and the lavatories, which are 14 feet 8 inches by 26 feet, are placed back to back, with a double partition wall between, this space being used for the plumbing and ventilating pipes. The boiler is placed in rear in centre with fan-room immediately opposite in front.



BASEMENT FLOOR PLAN, ST. MICHAEL'S PARISH SCHOOL, BELLEVILLE, ONT., SHOWING THE LOCATION OF RECREATION ROOMS, BOILER ROOM AND FAN ROOM. MR. C. P. MEREDITH, ARCHITECT.

The construction of the building, unfortunately, is not fireproof, but as the class-rooms are only on the first and second floors there is little or no danger from fire with staircases and exits arranged as they are.

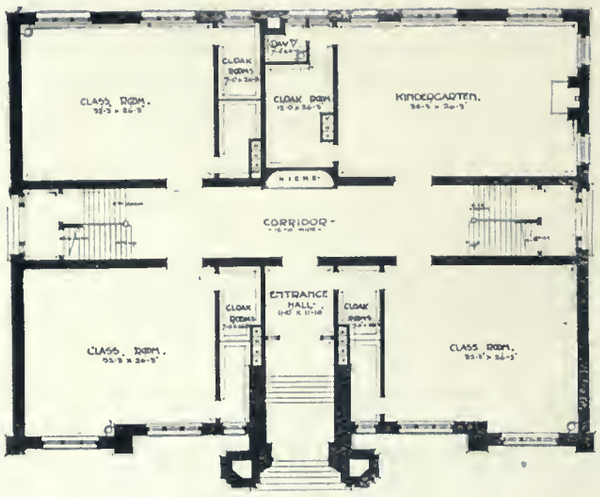
The exterior walls of the building and corridor walls are of solid masonry, and the joists are carried on steel beams in thickness of the floors. The floors are of hardwood and deadened, and the ceilings are covered with metal. The heating, which is of steam, is both by the direct and indirect systems, and is controlled by the Johnston system of automatic temperature regulation throughout. The large boiler is kept about four feet below basement floor.

The Buffalo forge system of ventilation is used; the fresh air being brought in through two large flues from above the roof to the fan-room, where it passes through the temporary coil air washer and reheater and into the large fan, 71 inches in diameter, by which it is forced through the various ducts into the class-rooms and halls. This system will deliver 16,600 cubic feet of air per minute and will raise it from 20 degrees below zero and deliver it to 78 degrees. The exhaust air is carried off from each cloak-room and hall out through the roof. No fresh air is sent direct into the cloak-room but into class-rooms, and the exhausts are carried out from class-rooms through open parcels to the cloak-rooms, so that there is no danger of foul air passing from cloak-room to class-room.

A small one-horse-power motor is used for exhausting the air from the lavatories and carrying it through separate duct to the open air.

Care has been taken in selecting the plumbing fixtures so that the lavatories may be kept as sanitary as possible. Drinking fountains are placed in play-rooms and corridors, and basins in class-rooms.

The various halls and class-rooms are connected with the principal's room by a fire alarm system. There is also



GROUND FLOOR PLAN, ST. MICHAEL'S PARISH SCHOOL, BELLEVILLE, ONT., SHOWING THE ARRANGEMENT OF CLASS ROOMS AND ENTRANCES. MR. C. P. MEREDITH, ARCHITECT.

an inter-communicating telephone system between all class-rooms.

The building was designed and erected under the supervision of Architect C. P. Meredith, of Ottawa, who has had a broad experience in this class of work in Eastern Ontario, having erected a number of schools for both Public and Private School Boards.

NEARLY $500 PER ALARM! --- Enormous Figures of One City.---Owners' Carelessness and Shoddy Construction Responsible.

A WRITER in Munsey's SCRAP BOOK states upon authority that there have been 14,597 fire alarms in the city of New York during the last twelve-month. Ten per cent. of these were false alarms. Each alarm sent in costs $481.17, and the total cost of maintenance of the Fire Department was $7,000,000. The alarms will average fifty a day and the average loss per fire is $540, while the total loss to the city was $7.250,-000, and at each fire an average of 10,000 gallons of water is used. Further, it is stated that fully one-third of these fires are the result of gross carelessness.

All this gives added force to the suggestion made by the International Society of Building Inspectors that the European law of "neighborhood liability" be enacted on this continent too. That means that the person upon whose premises fire originates, a fire caused by neglect or carelessness on the owner's or the agent's part, is held liable at law for the damages done to other people's property by the spread of that fire beyond his own premises. In Europe this works to a charm in making people exceedingly careful in handling ashes, waste paper, etc., etc. Our insurance companies could also aid materially in reducing our fire waste by making their policies read that they would be liable for only 50 per cent. of the damage done by fire caused directly by carelessness and neglect. It is always easy to trace up the the causes of fires and these regulations would do wonders to lessen the number. In Europe they have not one-sixth of the fire losses that we suffer and largely becauses of fires and these regulations would do wonwatchfulness. It would not be anything of a hardship either, if our cities would be sensible enough to legislate that nothing but thoroughly fireproof buildings should be erected hereafter.

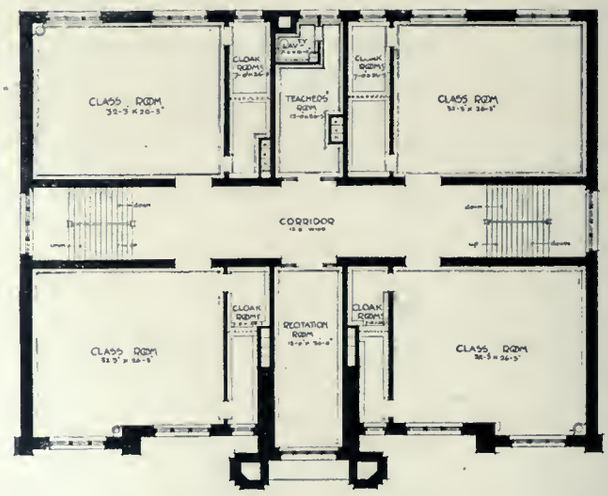
A BIT OF ANCIENT HISTORY.---Nero's Reason for Burning Rome.

THE CONFLICT that is being waged in the United States between the cement and clay journals, in their effort to discredit the materials of the interests which each other represents, has not been without its humorous side. Under the heading of Newly Discovered Facts in Ancient History, CEMENT AGE, in a recent issue prints the following:

"We find among the publicity items sent out by the interest opposed to concrete the following interesting and instructive paragraph":

The records show that in old Rome, when they used concrete construction in their larger buildings, a protest was made to Nero by the conservative element in his entourage against the use of that material because its accidents and collapses caused so many deaths among the slaves who worked upon those buildings that it was feared those workmen would mutiny.

"The savant who dug this bit of information from the archives of the past is entitled to the distinction of having suggested the solution of what has long been a problem to historians, namely, why Nero burned Rome. Had concrete, which is the best fireproof material extant, been used exclusively in Rome, it would not have occurred to Nero to attempt to destroy the city by fire. Doubtless this truculent Emperor chuckled to himself in granting the request to suspend concrete construction and then tuned up his fiddle and prepared the torch for the conflagration



SECOND FLOOR PLAN, ST. MICHAEL'S PARISH SCHOOL, BELLEVILLE, ONT., SHOWING HOW THE SPACE BETWEEN CLASS ROOMS HAS BEEN EMPLOYED FOR TEACHERS' QUARTERS AND RECITATION ROOM. MR. C. P. MEREDITH, ARCHITECT.

that marked the climax of his brutality. Thus we have further evidence to prove that where concrete is not, fire will lay waste."

THE UNITED STATES FORESTS now cover about 550,000,000 acres, according to the Forest Service, while the original forests covered at least 850.000,000 acres. The Government owns about a quarter of the total forest area, which contains one-fifth of all timber now standing. The timber lands privately owned are generally more valuable than those of the Government, but are far less carefully managed.

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 **January, 1909** **No. 3**

Current Topics

OTTAWA PROPOSED BUILDING BY-LAW is at the present time undergoing another series of amendments after which the measure will be finally dealt with by the Fire and Light Committee.

* * *

A STAINED GLASS WINDOW depicting scenes from the "Pilgrim's Progress," says the Illustrated Carpenter and Builder of London, is to be placed in the north aisle of Westminster Abbey as a memorial of John Bunyan. The estimated cost of the window is given as £1,200.

* * *

GLASS BRICKS ARE NOW USED in Silesia for building purposes. They are said to be of a durable nature and are made in various tints. These bricks have been used quite extensively of late in the construction of residential houses.

* * *

ACCORDING TO A STATEMENT made to the London press by a prominent railway official, Canada shows a greater railway development at the present time than any other country in the world. The advance, he said, is marked on every hand, and the amount of new construction in progress was quite unequalled.

* * *

HIS EXCELLENCY, LORD GREY, the Governor-General of Canada, has notified Mr. Alcide Chausse, secretary of the Architectural Institute of Canada, that he has the pleasure of accepting the invitation to become the patron of that organization. The moral support of so high a dignitary should not only add to the prestige of the Institute, but should exert a strong influence in the promotion of its aims for the betterment of architecture throughout the Dominion.

THE SUBLICIAN BRIDGE AT ROME, according to the State Trade Journal, Hull, Eng., is the oldest in history. It has twice been rebuilt, but is in a state of ruins at the present day.

* * *

SCOTLAND HAS THE LARGEST town clock in the world. It is located in the tower of the Glasgow University. The hammer weighs 129 pounds, the pendulum 300 pounds, and the whole clock about a ton and a half.

* * *

WORK ON A 4,000,000 BUSHEL ELEVATOR has been started at Fort William by the Grand Trunk Pacific Railroad. The structure is designed to be a model of its kind, and the machinery equipment will introduce a number of new features for the handling and storing of grain. It is to be of absolute fireproof construction and will be ready to receive grain shipments by November, 1909.

* * *

OTTAWA'S NEW MAYOR is Charles Hopewell, a builder and contractor. As his name is somewhat significant, Ottawa has every reason to be optimistic. Being well grounded in the rudiments of his regular calling, the city can expect much in the way of constructive legislation and the prompt execution of its affairs. This is not, however, Mr. Hopewell's debut in a civic capacity. He has been prominent for a number of years past in municipal affairs, and last year was a member of the Board of Control. May it be said at the end of the year that Hopewell did well.

* * *

TORONTO ELEVATOR BY-LAW providing that all elevators in buildings be licensed, went into effect January 1. The cost for each car is $2 a year, or $1 for the last six months. The measure provided for a more rigid inspection on the part of the city in the future than has been customary in the past, so as to bring the elevator service in all buildings up to a greater degree of safety, by precluding as far as possible the occurrence of accidents, through regular examination of all equipment. Toronto is setting a good example for other municipalities where there is an absence or lax enforcement of a similar law.

* * *

CANADIAN TRADE COMMISSIONER J. S. Larke, at Sydney, Australia, reports that the Victorian Government has under consideration a scheme involving the construction of a storage reservoir, 60 miles from Melbourne, which would impound 60,000,000 cubic feet, nearly double that conserved by the Assouan dam on the Nile. The dam would have to be 1,700 feet long and 140 feet high at the deepest part of the river it would cross. The estimated cost is £1,500,000, which is considered low for the advantages that will flow from it, as it is calculated to irrigate over 300,000 acres of land and to supply power for electrical development.

* * *

THE ENTIRE DOME of Philadelphia's great City Hall is to be covered with gold, and more than 10,000,000 sheets of gold leaf will be used before the task is completed. So that as little of the precious metal as possible shall be wasted, each workman will be enclosed in a screen adjusted about his waist as he puts the metal in place, leaf by leaf, hundreds of feet above the streets. The gold leaf to be used is being manufactured especially for the city in book form, each book containing 25 leaves, 3⅜ inches square. These are delivered in packs of 20 books. To allow a single leaf for every 3 inches of space to be covered will necessitate the use of 20,461 packs, which makes 409,220 books, or 10,230,000 leaves.

THE MANCHESTER GUARDIAN in a recent issue speaks of the benefits that will be derived from a bill going through the British Parliament which will allow builders in Manchester to secure requisite strength in walls thinner than those they now make of brick. The object is to use re-enforced concrete, the advantages of which are now so widely recognized that other municipalities are asking Parliament to give them powers like those being sought by Manchester. Government buildings, which are exempt from local laws, have already been so constructed.

* * *

AN INNOVATION known as "a practical experience afternoon," wherein a majority of the manufacturers present recounted their experiences and discussed the many trying problems with which they have to deal, was one of the features of the annual convention of the Canadian Clay Products Manufacturers, which was held at Brantford, Ont., January 12, 13 and 14. This combined with the large attendance and the number of excellent papers and addresses delivered at the several sessions, made the convention a most successful and enjoyable affair in every respect.

* * *

THE PERSONNEL OF OFFICERS for the ensuing year as voted on by the Winnipeg Builders' Exchange at their regular annual meeting, is as follows: President, W. H. Carter; 1st vice-president, F. H. Davidson; 2nd vice-president, T. Black; secretary, A. Pearce; treasurer, T. D. Robinson. Messrs. G. W. Murray, J. Bourgeault, J. Hooper and F. Hinds were elected as directors for three years ending 1911. The vacancy caused by the resignation of Director A. T. Davidson, whose term expires this year, will be filled by Mr. J. W. Morley, the retiring president.

* * *

THE BUILDERS' EXCHANGE, MONTREAL, inaugurated the New Year by holding an "open house" to its members and friends on January 2. More than two hundred gathered to exchange fraternal greetings and to informally discuss the outlook for the year. Refreshments were served and throughout the reception a general feeling of optimism prevailed, most members believing that the coming season will be a most active one. The visitors were received by Mr. Thomas Ford, the president; Mr. J. N. Arcand, vice-president; Messrs. Alex. Bremmer, W. E. Ramsay and J. T. Castle, directors, and Mr. J. H. Lauer, secretary. Among those present were Messrs. George Hood and N. J. T. Gagnon, past presidents, and Mr. James Simpson, who was the first president of the association at its foundation.

* * *

ONE OF THE QUICKEST pieces of concrete work done in the Dominion has recently been completed in the construction of the piers for the huge Chaudiere dam across the Ottawa river. The expeditious manner in which this part of the task has been carried out, will result, it is anticipated, in the completion of the entire dam considerably ahead of the schedule time, which is set for December 1, 1909. The main portion of the dam consists of 49 piers and two abutments, all of solid concrete reinforced with a powerful network of steel rods which are bolted by 1¾-inch bolts to the solid rock of the river bed. It is arranged on part of the true arc of a circle having a radius of 546 feet 9 inches, the centre of the arc being within the big kettle of the natural falls at this point. The piers are each 39 ft. 5 in. long and four feet thick up stream and two feet thick down stream. To protect them from ice in the spring each is faced on the up stream side with curved half-inch steel plate set into the cement. The preparatory work, such as the building of coffer dams, etc., was commenced August 13 last, and the first concrete was laid as late as October 1.

EXPERIMENTS WITH SULPHITE PITCH, recently made, proved it to be most successful as a dust layer for roadways. When dissolved with water to a certain consistency and sprayed over roads, it affords a dressing which is sufficient to prevent dust arising for at least six weeks. This method of dust laying, it is said, is much more preferable to the use of oil or tar, is much less expensive, has no odor, and does not destroy vegetation.

* * *

THERE HAS BEEN A GREAT INCREASE in the building operations projected at various points in the West. At Fort William there has been considerable activity, no less a sum than $6,000,000 having been invested in improvements during the present season. Navigation is the foundation upon which the future of this city depends, and for improving the entrance into Fort William for larger vessels, half a million dollars has been spent, largely for dredging. At Westfort a large slice of territory will be added to Fort William by the construction at a cost of half a million dollars, of the Grand Trunk Pacific bridge. In the erection of new buildings half a million dollars will be spent, and for new elevators $2,000,000. With so many improvements being added to this port, it is necessary for the civic authorities to make many improvements in the form of sewers, streets and lighting. For this purpose half a million dollars will have to be spent.

* * *

A ST. LOUIS, MISSOURI, BUILDER in order to demonstrate his contention that it is possible to make excellent use of space that has heretofore been considered of no avail in residence work, has erected a house on somewhat novel lines. The principal feature of this new house is a so-called balcony on the third floor. It might be better called a third-floor roof-garden. The third storey of the house, or rather the walls of the third storey, are built about eight feet in from the walls of the lower storey. The roof is at the same time so constructed that it reaches out beyond the outer walls, thus forming an eight-foot walk in open air, around the third storey of the house, the whole being protected from the elements by the wide spreading roof which forms a sort of cover to the walk. This walk can be entered from doors in the third storey, which open right on this open space. In the summer time it forms an ideal spot for rest and cool air, while in the winter time there is no inconvenience from the cold because the main part of the house remains as thoroughly closed as if the walls went right straight up to the roof.

* * *

SIX UNDERGROUND STOREYS are to form a part of a forty-three storey building to be erected in New York city at 50 Broadway. This undertaking will probably inaugurate a new era in business building construction, as no previous attempt has been made to carry a building to such an extreme depth. Five of the six floors will be below the water level, and with improved methods of lighting, ventilation and heating, the architect, William S. Hazlett, claims that the underground rooms will in every way be just as healthful as thousands of offices above the street level where artificial light is used during the day. The building, when completed, it is said, will be the tallest single compact building in the city. It is to be put up for the Broadway and New Street Realty Company at a cost of $3,875,000, and will be of the best type of fireproof construction, being entirely devoid of wood. All the subterranean floor space has already been rented on a long lease, which will bring in a total rental of $1,000,000. As it is expected that the proposed ordinance restricting the height of buildings will shortly become operative, this structure will probably be the last building of an extreme height to be erected in New York city.

WORLD'S GREATEST CHIMNEY.---Built at Great Falls' Montana Smelting Works.---Towers 506 Feet Above Its Foundation.---Internal Diameter at Top 50 Feet.---Designed to Remove 4,000,000 Cubic Feet of Gases per Minute.---Problems Involved in its Construction.

EXTENDING to a height of 506 feet from its base. and rising 500 feet above the grade of the surrounding district, the largest and highest chimney in the world has recently been completed at the smelting works of the Boston and Montana Consolidated Copper and Silver Mining Company, at Great Falls, Montana. This gigantic stack is 140 feet higher than the greatest height that has heretofore been attained in chimney construction. It has an internal diameter at the top of fifty feet and has been designed to carry off from the copper smelter 4,000,000 cubic feet of gases per minute at an average of 600 degrees Fahr. The special character of its construction, together with the problem involved in calculating wind stresses, its ability to resist corrosion from gaseous acids, and the fact that it is built so as to carry sixty feet of additional height with but small increase in maximum pressure, renders this chimney, both in design and construction an exceedingly interesting engineering accomplishment.

The smelters are of great size and located on the north bank of the Missouri River, some three miles down stream from Great Falls, the site being a sloping area which rises gradually to a general elevation of about 250 feet above that of the furnace buildings. There are a larage number of blast and reverberatory furnaces and converters, and the gases from them have been removed hy a 186-foot stack on the upland at the rear of the plant, some 1,500 feet distant, to which they are conveyed through three large rectangular flues buried level with the surface of the slope. This original stack rises about 400 feet above the furnace charging floor, and, with the ordinary temperatures of flue gases and outside temperature, it has a capacity of approximately 700,000 cubic feet of gas per minute. It was built of plain brick and cement mortar and had become seriously disintegrated in recent years by the action of the acid that forms in wet weather from the sulphur dioxide in the waste gases, and furthermore both it and the connecting flues and dust chamber had become entirely inadequate for the increased requirements resulting from recent extensions of the plant. As a consequence, it was decided to provide both a much larger dust settling chamber and a large new stack on the hill, which in combination will be adequate for even further extensive additions to the smelters. The importance of the recovery of the dust is due to its metalliferous character, it being found highly profitabale to reclaim and treat it for recovery of sulphur, silver and arsenic in addition to copper.

GIGANTIC CHIMNEY ERECTED AT THE SMELTING WORKS OF THE BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY, GREAT FALLS, MONTANA. FROM FOUNDATION TO CAP IT IS 506 FEET HIGH.

In the design of the new chimney it was decided to provide for practically double the capacity that is at present required when the plant is operated to its maximum. This maximum duty involves the handling of approximately 2,000,000 cubic feet of gases per minute. and the chimney accordingly was designed for the removal per minute of 4,000,000 cubic feet of gases at about 600 degrees Fahr. A site for it was chosen at the rear of the plant near the old chimney and a short distance further away, in order to secure a slightly higher elevation, the new site being approximately 2,000 feet from the furnace flue connection in the smelter house and having an elevation of 246 feet above the charging floor of the furnaces. The disposal of the gases high enough above the surrounding country to render them inoffensive to vegetation and animal life was, of course, a consideration in the selection of the site, but the location of the original stack upon the hill at an elevation of some 500 feet above the city of Great Falls had proved ample for this requirement, so that the height of the new stack was based rather on its draft-creating capacity than on any particular intention to avoid creating a nuisance. With this height and the gas issuing at the expected final temperature of about 600 degrees Fahr., the chimney will have an effective draft of about 3 3-4 inches, which, with its internal diameter of 50 feet, gives it a capacity sufficient for the operation of approximately 150,000 boiler horse-power, if it were to be used for power plant operation, with five pounds of coal burned per boiler horse-power.

The specifications limited the maximum bearing pressure due to both static load and the wind pressure of a 125-mile gale to 21 tons per square foot at any section, and required the construction to be capable of resisting the action of the sulphur gases. This practically limited the design to a brick chimney with an acid-proof lining, and, as it was specified further that it should be so designed that 60 feet of additional height can be added without raising the maximum bearing pressure above 22 tons per square foot, the radial brick construction with perforated blocks was selected as best adapted for securing the degree of stability required for the gerat height and wind load of 33 1-3 pounds per square foot of projected area. The construction of the chimney was intrusted to the Alphons Custodis Chimney Construction Company, of New York, the contract being awarded to them on December 22, 1906. The work of construction began early in 1907, the greater part of the year being required for the construction of the foundation, 111 feet in maximum diameter and 22 1-2 feet deep, and a manufac-

VIEWS SHOWING FALSE WORK OF FOUNDATION AND CONSTRUCTION OF OCTAGONAL BASE OF 506-FOOT CHIMNEY, RECENTLY ERECTED AT THE SMELTING WORKS OF THE BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY, GREAT FALLS, MONTANA.

turing plant for the brick required for the stack, as it was advantageous to make the brick locally, in view of the large quantity and special forms required. The cornerstone of the stack proper was laid on April 7, 1908, and the chimney was topped out on October 23.

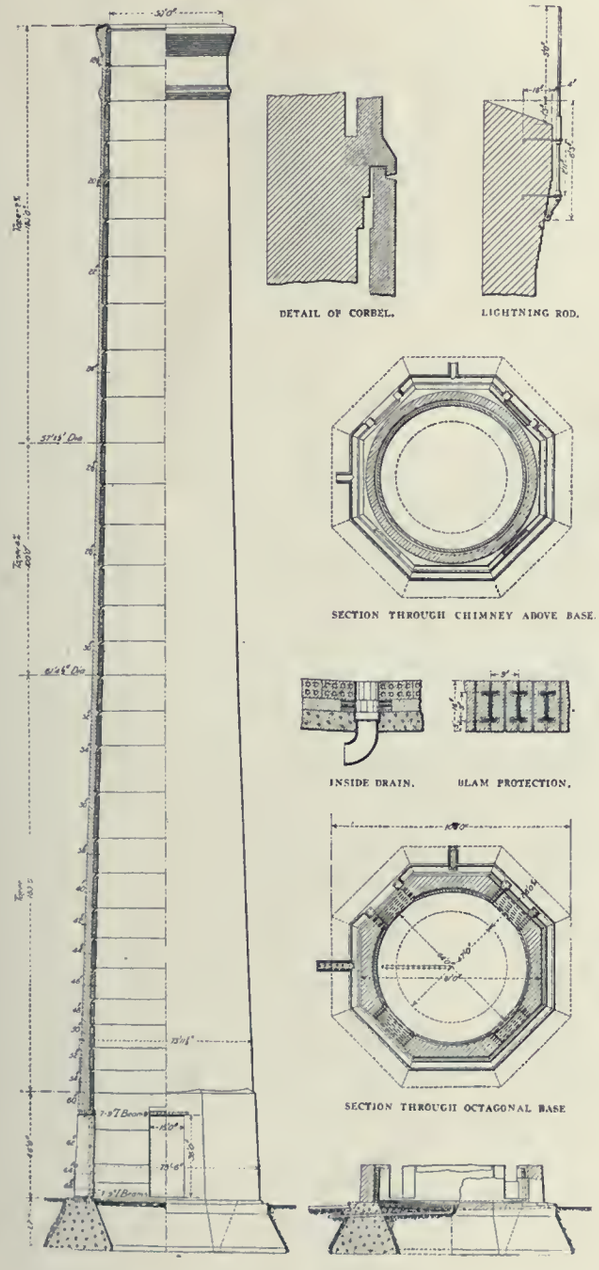
One of the first features on which the design of the stack was based was the foundation conditions afforded at the site. The material in the vicinity of the smelter is a hard shale to all depths to which borings have been made. While not equal to good solid rock in bearing capacity ,it was considered, amply strong to support the new chimney, which had been calculated to weigh between 17,000 and 18,000 tons, if the foundation were spread for sufficient footing. It was at first decided to carry the foundation mass down to a depth of about 30 feet, with the base spread for a bearing of less than five tons per square foot, the form of foundation block chosen being a pyramidic frustum, with a conical open space within, for, owing to the interior diameter of the chimney at the base being 66 1-2 feet, it was not necessary to fill in the central portion under the open flue. During the progress of the excavation, however, the shale proved to be of such a uniform character that, at a depth of about 20 feet, it was decided to test the bearing capacity of the material to ascertain whether it was necessary to carry the foundation down 30 feet. The tests were made by loading jointly four cast-iron plates, each 2 feet square, with a total of over 200,000 pounds of steel rails, the weight of which was distributed between the four bearing plates by a cradle. Deflection indicators were arranged at each of the four corners of the cradle, and rails were added until a deflection was noted. The loading which caused deflection was 208,395 pounds, corresponding to a bearing pressure of 6 1-2 tons per square foot on the shoes, and this settlement did not increase during the period of the tests.

VIEW OF CHIMNEY IN PROCESS OF ERECTION, SHOWING THE LARGE FLUE OPENINGS IN ITS BASE. THE EXTERIOR AND ACID-PROOF LINING BRICKS USED IN ITS CONSTRUCTION, WERE MADE ON THE GROUNDS BY THE CONTRACTING ENGINEER.

As a result of these determinations and of calculations subsequently made, indicating that, with the foundation terminated at about this point, the bearing pressure resulting from the total load of the chimney and foundation would not exceed 4.83 tons per square foot, the excavation was stopped at a depth of 22 1-2 feet below the surface, and the foundation mass begun with the octagonal outer edge, 103 feet across the flats, and the circular inner edge, 47 feet in diameter. The outer pyramidal faces of the foundation have a slope of about 6 1-2 to 12, and the faces of the inner portion a slope of 5 to 12, the diameter of the top face of the foundation being 64 feet for the inner circular opening and 81 feet across flats on the outside. The foundation is formed of a 1:3:5 mixture, using a good quality of crushed slag for the aggregate.

There are four flue openings, each 15 feet wide by 36 feet high inside, in four sides of the octagonal base. Owing to their width, the foundation under each of them was reinforced by seven 10-inch 25-pound I-beams,

about 21 feet long, embedded about 12 inches below the surface at each point to distribute the concentrated loads occurring at either side of the opening. The volume of water liable to be caught and drained on the surfaces of a stack of this height will, especially in a driving rain, be very large. Gutters 30 inches wide and 12 inches deep were accordingly provided entirely around the top edge of the foundation mass to which the drip from the outer surfaces of the stack may drain for removal away from the base. This gutter has a slope 1-8 inch per foot toward the outlets and was formed



DETAIL OF 506-FOOT RADIAL BRICK CHIMNEY AT GREAT FALLS, MONTANA.

with the foundation mass, and is in two sections, between points of flue connections to the stack. These outlets are gutters leading away from the foundation, to which each is tied and reinforced by seven 3-4-inch round rods from 10 to 16 feet in length. For the drainage of the inside of the stack, the floor of the flue is paved with perforated brick laid in acid-proof mortar, and the entire circular area pitched with a slope of 1-2 inch to the foot toward an outlet at the centre This pavement has a foundation of concrete 6 inches thick, over which sand was spread to a thickness of 4 inches to carry the perforated brick. The drainage outlet is a 6-inch vitrified tile duct, with an elbow terminating in an 8-inch drainage opening through the pavement. The screen in the drainage opening is lead, in order to resist the attack of appreciable amounts of sulphuric acid that is formed from the waste gases with rain.

The stack proper consists of an octagonal base, 46 feet in height, which has a taper of 8 per cent., and above this a circular barrel, with three different tapers, the first 180 feet above the base having a taper of 7 per cent., the next 100 feet a taper of 4 per cent., and the remaining 180 feet to the cap a taper of 2 per cent. These variations in taper, which were adopted to obtain the desired bearing pressures, due to both weight and wind loads, give the chimney a very graceful appearance despite the large diameter.

The chimney was built in twenty-three different sections, nineteen of which are above the octagonal base, the minimum thickness of the chimney wall varying from 66 inches at the base to 18 1-8 inches at the top by uniform decrements of 2 inches per section, excepting at the section immediately above the top of the base, where the thickness decreases from 60 inches to 54 inches. The outside diameters of the stack are 78 1-2 feet at the base, 53 feet 9 inches at the base of the cap, while the inside diameters range from 66 1-2 feet at the foundation line to a clear opening of 50 feet at the top. The heights of the sections in this chimney vary widely, those of the octagonal base section varying from 7 to 16 feet, and the nineteen sections of the chimney barrel from 10 to 50 feet, as indicated in the detail drawing of the chimney. At the top of each of the sections above the base there is a corbel provided in accordance with the usual Custodis construction for the support of the sectional lengths of the chimney's lining.

The octagonal base, by which increased wall thickness was secured to compensate for the support withdrawn by cutting the four flue openings into it, ranges in thickness at the bottom from 66 inches through the flat side to about 9 1-2 feet at the corners. The thickness at either edge of the flue openings is approximately 7 1-2 feet, and the sectional area of the supporting wall at the section through the upper part of the flue openings is greater than that in the circular section immediately above the base. The weight above each of the flue openings is distributed to the sections of the wall at either side by seven 9-inch 21-pound I-beams, 19 feet in length and projecting 2 feet beyond the openings at each edge. They rest on bearing plates of steel plate, 2 feet wide by 7 feet long by 1 inch thick. These I-beams, being directly over the flue openings, are protected by special brick, 4 1-2 inches thick by 16 inches deep, shaped at the brick yard to tightly enclose the I-beams. They are applied to the I-beams with the surfaces of the latter and all joints flushed with acid-proof mortar, so it is thought there will be no danger of the steel being attacked by the sulphur gases from below. But two flue openings are to be used at present, and the other openings are bricked up with 15-inch walls that may be knocked out when necessary. In the blank walls clean-out doors have been installed, 2 x 3 feet in size, through which the metalliferous dust accumulating at the base of the stack may be removed.

The chimney blocks were made in five different lengths, 4, 5, 7 1-8, 8 5-8 and 10 5-8 inches, and vary in width from 6 1-4 to 6 11-32 inches, but are all of the standard thickness of 4 5-8 inches. Owing to the large radii here encountered, the curvature of the inner and outer faces is so slight as to be scarcely perceptible, the curved edges of the blocks departing from the chord across the corners by but 1-32 inch. The blocks are laid up in 1:2:5 mortar of cement, lime and sand, the lime being added in this proportion to render the finished structure sufficiently elastic to withstand the vibration caused by strong winds. The outer face of the brick work is, for a distance of 100 feet below the cap, pointed with an acid-proof mortar to render it imper-

vious to the action of the gases; this is the cause of the whitened appearance of the upper portion of the stack.

In order to withstand the acid action of the gases, the lining is acid-proof brick, formed in 4-inch radial perforated blocks and installed in the usual Custodis sectional method, the individual sections being supported on corbels built out from the inner surface of the main chimney barrel. These bricks, which were, like those used for the main wall of the chimney, made locally, are composed of materials containing no ingredients subject to attack from acids. The acid-proof mortar which is used for laying the lining brick, and also at other points, as above referred to, is a strong cement of silicate of soda, asbestos wool and other ingredients, capable of resisting the action of strong acids as well as a temperature of 2,000 degrees Fahr. The lining is laid throughout with a 2-inch air space, and at the top of each lining section a special construction is employed to prevent either metalliferous dust from the gases or acid condensation from gaining access to the air space. A special acid-proof brick, with an overhanging lip, is here used for the outer edges of all corbels, which overlap the top bricks of the lining sections. In addition to this protection, mineral wool is stuffed into a recess behind the top of the lining underneath the corbel. There is one lining section to each section of the chimney barrel proper, where the latter sections are 20 feet in height or less, but the lining is divided where the heights of sections are greater. For instance, at 196 feet above the top of the foundation, the chimney wall sections increase to 30 feet or more, and for the next six main sections there are two sections of lining, while for the top two sections of the barrel, which are each 50 feet in height, there are three sections of lining, it not being considered desirable to erect the sections of lining in single brick thickness to a height greater than about 20 feet.

The cap for the protection of the top of the chimney walls from the weather and the acids that may form from the gases is formed from special terra-cotta blocks, with interlocking sections for the joints. The cap is laid on a section of the chimney wall that is 43 inches in thickness and is set 9 3-4 inches higher at the inner edge to give a drainage slope in an outward direction. There are three forms of bed tile used, varying in length from 14 to 18 1-2 inches and laid on the stepped blocks, with the upper tiles overlapping the lower ones. Over the joints between these bed tiles there are special interlocking tile caps. The bed tiles are jointed to the tops of the stepped blocks with acid-proof mortar, and the interlocking joints between them and the joining caps, which are more exposed to the gases, are also made with such mortar. The terra-cotta tiles were formed of materials carefully selected with respect to resistance to the action of acids and were well glazed and 160 of each form were used for the construction of the cap, or 900 tiles in all.

Protection to the chimney from lightning is provided by a multi-point arrester at the cap, with connections to ground plates through two lines of soft copper cable carried on opposite sides of the stack. There are sixteen points around the cap, each formed of a 1-inch copper rod rising 5 feet above the highest portion of the cap and terminating in a 1 1-4-inch platinum tip, and these points are connected at their lower ends to a ring of 1 1-4-inch copper rod that encircles the lower portion of the cap. The point rods are firmly anchored by braces of galvanized wrought iron bricked into the cap from 18 to 20 inches, so as to carry the rod at a distance of about 4 inches outside of the walls. In order to stiffen the supports for the rods within the braces, lengths of 1 1-4-inch iron pipe are brazed vertically in their outer ends, through which the rods are passed. All of the lightning-rod work is protected with a coating of sheet lead 1-8 inch thick throughout the upper 50 feet of the chimney in order to resist corrosion by acids formed by the chimney gases in wet weather. The anchor braces are lead coated for a distance of some six inches within the brickwork, and the lead sheathes of both the braces and the rods are carefully joined to form a continuous coating over all the metal surfaces. The ground plates to which the two large conductors at the sides of the chimney connect are heavy copper plates about 3 feet square, which were buried some distance from the foundation.

The chimney has an outside ladder from the base to the cap, which is fitted with body-guards at every second rung. Both the rungs and guards are formed of 3-4-inch painted round iron rods, the rungs 12 inches in length and the guard loops 30 inches, giving a clearance over the ladder of 18 inches, and for a distance of 50 feet below the cap they are lead coated.

The design of the chimney of this height was favored by its great diameter, no difficulty being experienced in

VIEW OF WORKMEN'S SCAFFOLD INSIDE OF STACK. THE SPEAKING TUBE SHOWN AT X IS PART OF A COMPLETE SYSTEM OF COMMUNICATION WHICH CONNECTED WITH EACH ELEVATOR.

eliminating any tendency toward tension in the brickwork, even with assumed wind pressures far exceeding those ordinarily provided for on this continent, although in order to fulfil the specification for bearing pressure it was found advisable to form the barrel of the stack with digering tapers. The method of calculations used in the design involved the determination of the unit pressures per square foot at the bases of the various sections of the chimney, due to the weight of the entire portion above, to which unit pressures were added those computed for the corresponding sections as a result of wind action for obtaining the increased bearing pressure occurring on the lee side during a wind storm, and from which are subtracted the same computed amounts

to obtain the diminished pressures on the windward side resulting from the tension effect. Owing to the prevalence of severe winds in the region of the chimney and, further, its location, with its base at an elevation of 3,549 feet above sea level, the allowances made for wind pressure upon the chimney structure are considerably greater than is customary for chimney construction on this continent. In the calculations a maximum wind velocity of 100 miles per hour, exerting a pressure on a flat surface of approximately 50 pounds per square foot, was primarily provided for, but in place of the usual assumption for round chimneys that the total effective pressure of the wind on its barrel is equivalent to one-half of this unit pressure, or 25 pounds per square foot on the plane of its projected area, the total effective pressure was here assumed at two-thirds of the actual wind pressure on a flat surface, or 33 1-3 pounds per square foot. This assumption corresponds with the common practice in German and will, it is thought, provide amply for any storms likely to occur at Great Falls.

SCAFFOLD AND TOWER.

The construction of the workmen's scaffold inside the stack was a problem that gave the contracting engineers a great deal of concern. It involved the efficient and safe handling of some 17,000 tons of material, and at the same time the conditions under which the men worked at great heights had to be made perfectly safe. It was impossible to use a single floor beam system on the inside on account of the great diameter of the stack. It was also necessary to design a system that could be raised in the least possible time, when the bricklayers were not working. The bricklayers could not work under the men who were raising the scaffold on account of the danger of falling material. It was necessary to provide sufficient number of elevators of ample size to quickly handle some 200 tons of material per day.

The scaffold consisted of a 12-post tower made of 10 x 10 timbers. At each of the four flue openings these uprights were spaced at the proper distance to take a 6 ft. x 9 ft. elevator. Oak ways were spiked to the 10 x 10's as guides for the elevator. The cat-head or cross timbers at the top of the posts that held the sheaves through which the elevator cables operated, were built of 3 x 10 timbers, and were held in place on top of the 10 x 10's by means of a 3-4-inch dowel pin. This was necessary, as the cat-head had to be removed at each raise of scaffold, their design being such that it could be handled off and on quickly by means of gin poles. The tower was sway braced by 2 x 6-inch timbers and 3 x 10-inch sash braces. The 3 x 10-inch sash braces held one end of the floor beams; the other end rested on the walls of the chimney. Spanning the floor beams were 6 x 6-inch timbers on which 2 x 10-inch plank formed the floor of the scaffold. When the scaffold was raised, the 6 x 6-inch and the 3 x 10-inch planks were carried up, leaving behind the heavy 8 x 10-inch floor beams.

It will be noted that on account of the elevator operating between 8 of the posts, it left one side of each post without bracing. This left the perfect tower system incomplete. This could have been remedied by carrying up four posts in the centre of the chimney, with their sway braces, sash braces, etc. These would have had to have been extended every 17 feet. In order to prevent the crushing in effect of the elevator posts, four intersecting trusses were introduced between these posts at every 30 feet. These trusses were framed and put together on the ground and hoisted to place when necessary, and were designed, not to take a vertical load, but to resist a racking strain. The scaffold was absolutely uniform and symmetrical from top to bottom, each 17 feet being a duplicate of the 17 feet below. The post load was about 18 tons, and during the whole construction of the chimney no settlement or buckling was observed.

The chimney was plumbed entirely from the outside by a 5-foot plumb rule cut to the batter of the chimney and equipped with two level glasses set in planes at right angles to each other.

During the progress of the work, the centre was checked by engineers' instruments, and at the finish by the use of a 30-pound plumb bob. It was difficult to detect that the chimney was out of plumb even so much as one inch in 506 feet.

As a means of communication between the men on the scaffold and those working below, a complete system of speaking tubes was kept in operation at each elevator.

One double drum electric hoist, one single drum electric hoist and a 35 horse-power steam engine operated the elevators. The electric power gave a speed of 300 feet per minute; the steam, 600 feet per minute. The engine signals were given by means of an electric bell system controlled by a push button on top of the scaffold.

The design of this chimney is due entirely to the Alphons Custodis Chimney Construction Company, of New York city, who also installed the brick plant and executed the entire contract. This company is represented in Eastern Canada by the Eadie-Douglas Company, of Montreal and Toronto. The magnitude of the contract will be better appreciated from the quantities of materials required, there being used 13,000 tons of radial blocks, 3,075 barrels of Portland cement, 5,225 barrels of lime, 4,180 cubic yards of sand and 200 tons of acid-proof mortar for the construction of the chimney, exclusive of the foundation. The foundation, which is formed of a 1:3:5 concrete, required 5,200 barrels of cement, 2,000 cubic yards of sand and 4,000 cubic yards of crushed slag.

VANCOUVER ARCHITECTS have submitted a proposal for the new fire limit by-law, which provides that the city council fix the regulations governing the height and character of buildings that can be erected on a basis of frontage values, graded as follows: $200 to $300 per front foot values, buildings to be of ordinary brick and from two to five storeys; $1,000 to $1,500 a front foot, to be of slow burning material and to be limited to five or six storeys; $2,000 to $3,000, with tendency to fireproof structure, seven to nine storeys, and from $6,000 a foot upward, to be skeleton fireproof, allowing for from ten to thirty stories. The architects contend that under this plan the fire limits would adjust themselves automatically. The building inspector and the assessment commissioner were requested to prepare a map showing approximately how the limits would lie under this arrangement. When this plan has been prepared another conference will be held.

RECENT CABLE ADVICES from Rangoon, Burma, state that the new rolling lift railway bridge across the Ngawun River has been completed and opened for traffic. This structure, which is the largest bridge built in Burma, has a movable span 220 feet long, the total length of bridge being 920 feet. The bridge is connected on the main line of the Burma railways extension connecting Rangoon with Kyngin. The Ngawun River is in the fertile delta of the Irawaddy River, and forms a connection between this river and the Bay of Bengal. The government authorities required the large movable span to expedite the railroad traffic and the heavy traffic on the river carried on by the Irawaddy Flotilla Company's vessels which traverse these waterways from the coast to the interior of Burma as far as Mandalay, more than 400 miles inland. The bridge was designed by the Scherzer Rolling Lift Bridge Company of Chicago and New York, and manufactured in England at the works of Spencer & Company, Melksham, Wiltshire.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—The City Council has decided to accept the offer of the Otis-Fensom Elevator Company for the purchase of twenty-two acres in the Ashbridge Bay area, on which the company will erect a large factory.

Toronto.—Architect R. R. Barbor has prepared plans for a two-storey brick factory to be erected at 782 King street west, near Major street, for M. P. Warren, 90 York street. It will be of brick construction with stone foundation, felt and gravel roof, hardwood floors, hardwood and pine interior finish, open plumbing, hot water heating, combination lighting, fireproof doors and windows, plate glass, electric bells, telephone system, power and equipment. Estimated cost, $5,000. The owner will purchase all necessary materials, and erect building by day work.

Paris, Ont.—The Harold Sanderson Refrigerator factory, which was recently destroyed by fire, will be rebuilt on a larger scale on a site near the present Plow Works. The Board of Trade and Town Council have provided the company with temporary quarters. The value of the destroyed plant was over $50,000.

Windsor, Ont.—The Reo Motor Car Company, of Lansing, Mich., have decided to locate their Canadian branch plant in this city, with W. G. Morley as manager.

Windsor, Ont.—The Seeley Manufacturing Company has decided to erect a new building.

Windsor, Ont.—The Lufkin Rule Company has decided to erect a large addition to their building next spring.

Windsor, Ont.—The Postum Cereal Company, Battle Creek, Mich., will erect a factory to cost $50,000 at this place next spring.

Welland, Ont.—A by-law has been carried, granting a fixed assessment of $10,000 for ten years to the Dane Manufacturing Company, of Ottumwa, Iowa. The company will establsih a Canadian plant, adjoining Welland, for the manufacture of farm implements, for which a site of 130 acres has been secured. Estimated cost of plant, $250,000.

Norwich, Ont.—Mr. J. J. Rank's grist mill at this place has been destroyed by fire, entailing a loss of about $13,000, partly covered by insurance.

Dundas, Ont.—The Canada Woolstock Company's mill at this place has been badly damaged by fire.

Listowel, Ont.—The following contracts have been awarded in conection with the new Morris Piano Company's factory to be erected here: Brick work, Jacob Kritzer; carpenter work, Bamford Bros. and E. Parry; painting and glazing, J. Seburger. The main building will be three stories in height and the engine house and dry kiln one storey. Ball bearing shafting will be installed.

Lakeside, Ont.—Mr. Vining's grist mill at Lakeside, Ont., has been destroyed by fire. Loss not stated.

London, Ont.—The Murray Shoe Company will in the near future erect a new factory on Richmond street, adjoining the Unitarian church. The building will be three stories in height, 300 by 50 feet.

Milton, Ont.—Architect P. H. Finney, 43 Victoria street, Toronto, has prepared plans for a $25,000 factory to be erected here for the C. R. Willmott Company. The building will be of mill construction throughout, with felt and gravel roof, combination lighting. Specifications include concrete reinforcement, one freight elevator, power and equipment.

Brockville, Ont.—The National Manufacturing Company, whose foundry at Pembroke was recently destroyed by fire, will locate in Brockville.

Bridgeburg, Ont.—The Anderson Milling Company's buildings at this place have been destroyed by fire. Loss estimated at $75,000.

Clinton, Ont.—S. S. Cooper's planing mill at this place has been completely destroyed by fire. Loss $12,000, with insurance of $6,300.

Montreal.—Architect Chas. Bernier, 70 St. James street, has prepared plans for a factory to be erected for the Campbell Clothing Company.

Montreal.—The Caledonian Biscuit and Confectionery Company, 102 Christophe Colomb street, are making arrangements for the installation of additional machinery. They also purpose erecting at an early date a new building on the lot adjoining their present structure. The capital of the company will be increased from $48,000 to $100,000.

Lachine, Que.—A company of New York capitalists is negotiating with the local Council for the erection of a large paper factory. If matters are arranged, work on the building will be commenced next spring.

Three Rivers, Que.—The machine shop of the Canadian Iron and Foundry Company has been completely destroyed by fire. Loss estimated at $25,000.

Glace Bay, N.S.—The Globe Laundry on Minto street has been destroyed by fire, entailing a loss of $3,000.

Belmont, N.S.—Mr. Thomas A. Barnhill's lumber and building materials mill has been destroyed by fire. Some of the machinery destroyed is as follows: Plane and matcher, dove-tail and door and sash machines, pony and buzz planer, sand paper and belt-sanding apparatus. Loss estimated at $5,000.

Forest Glen, N. B.—The grist and carding mill owned by Mr. T. W. Colpitts has been totally destroyed by fire. Loss approximately $4,000.

St. John's Nfld.—The Rope Walk, the largest local industrial enterprise, has been destroyed by fire. The loss will probably total $70,000, covered by an insurance of $60,000.

New Westminster, B.C.—Seaton Bros., formerly of Vancouver and San Francisco, have closed a deal for the crane-ways on Lulu Island, and also the dry-dock known as the Emmerson dry-dock. It is proposed to open a machine shop, woodworking plant, and later a steel forging plant, as they will in the near future undertake the construction of steel boats.

Vancouver, B.C.—The Western Sheet Metal Works have taken out a permit for the erection of a building on Howe street to cost $3,000.

Rossland, B.C.—The engineering works of H. W. Cunliffe have been partially destroyed by fire. Loss estimated at $10,000.

Winnipeg, Man.—British capital is backing a large packing enterprise for Winnipeg, with H. A. Mullins, head of the cattle exporting firm of Mullins & Co., as manager. The sum of $250,000 is guaranteed to inaugurate a plant as soon as the new stock yards are ready to proceed with building.

Selkirk, Man.—A site has been purchased for the erection of a large match factory at this place which will at least employ fifty men. The officers of the company are: R. C. Moody, President; Dr. Ross, Vice-President; and J. Mantion, Managing Director. The company is capitalized at $40,000.

Saskatoon, Sask.—The following companies have decided to locate branches in Saskatoon: The John Deere Plow Company, Chicago; the J. I. Case Thresher Company, Hamilton; the Cockshutt Plow Company, Brantford; the Gray Carriage Company, Chatham; the M. Campbell Farming Mills Company, Chatham; the Singer Sewing Machine Company; the Rat Portage Lumber Company, Winnipeg, and the International Harvesting Company.

Gas Plants, Elevators and Warehouses

Toronto.—The Copp, Clark Company have purchased a site, 90 by 250 feet, on the south side of Wellington street, near Portland street, on which they will erect a large warehouse and bindery.

Port Arthur, Ont.—A contract has been awarded for a large terminal elevator to be erected here for the Thunder Bay Elevator Company. It will be built by the Barnet-McQueen Company, of Fort William, at a cost of $600,000, and will have a capacity of 1,500,000 bushels.

Glencoe, Ont.—The Municipal Council has closed a contract with the Colonial Engineering Company, of Montreal, for the erection of a gas producer plant of ninety-six horsepower. Contracts have also been awarded for the electrical machinery and for pole line and wiring.

Montreal.—Architect Eugene Payette, 15 St. James street, has prepared plans for a warehouse to be erected for Carl Rosenberg of the British American Import Company at a cost of about $65,000.

Sherbrooke, Que.—Architect C. E. White has prepared plans for the erection of a six-storey warehouse for the Mitchell Hardware Company.

Halifax, N.S.—The Board of Trade is considering a proposition for the establishment of a large cold storage warehouse in Halifax.

St. John's N.F.—Architects Butler & McDonald have prepared plans for the erection of three warehouses and the rebuilding of a three-storey building on Water street.

Winnipeg, Man.—The T. Eaton Company will build a warehouse at the corner of Hargrave and Graham avenue, to be connected with the main store on Portage avenue by tunnel. The building will be 130 feet by 100 feet. A system of carrier belts will be installed.

Winnipeg, Man.—James Ballentyne and Company's warehouse has been destroyed by fire. Loss, $50,000, fully covered by insurance. The headquarters of this firm are in Montreal. Mr. Geo. A. Young is manager of the company in Winnipeg.

Winnipeg.—The Atlas Elevator Company of this place will erect at least twenty-five elevators on the Grand Trunk Pacific Railroad during the coming year.

Brandon, Man.—Codville & Co.'s wholesale warehouse has been destroyed by fire, entailing a loss of $75,000.

Vancouver, B.C.—The main elevator of the Vancouver Milling Company has been totally destroyed by fire. Loss estimated at $200,000.

Vancouver, B.C.—Lewis & Sills, Vancouver, have taken out a permit for the erection of a frame warehouse on Parker lane, at a cost of $6,000.

Calgary, Alta.—The Western Milling Company's elevator and warehouse has been destroyed by fire. Loss, $50,000.

Edmonton, Alta.—Plans have been prepared for the City Council for the installation of an 1,500 h.p. steam or producer gas engine. A supplementary 1,000 h.p. engine is also being considered.

Saskatoon, Sask.—Mr. F. N. Selanders, Commissioner of the Board of Trade, has arranged for a cold storage plant to locate here this year. The plant will be run on the ammonia system.

Saskatoon, Sask.—Tenders will be received from Feb. 1st to Feb. 15th for a two-storey warehouse to be erected on 22nd street for Wilson Bros. at a cost of $18,000. The building will be of mill construction, with brick walls, concrete foundation, gravel roof, steam heating and electric lighting, structural iron, freight elevator, sheet metal work, plate glass and prismatic glass. W. W. LaChance is the architect.

Carlyle, Sask.—The Farmers' elevator at this place has been destroyed by fire. Loss estimated at $18,000, covered by insurance.

Electrical Construction

Montreal, Que.—The Montreal Harbor Commissioners are considering the advisability of installing a lighting system on the MacKay Pier at an estimated cost of $100,000.

Ormstown, Que.—The electric light works and Walsh's rolling mill have been destroyed by fire. The property is insured for $7,500, which does not cover the loss.

Ottawa.—Application will be made to the Legislature for an act to incorporate the Eastern Ontario Counties Electric Belt Line Railway Company, to connect Cornwall, Brockville, Morrisburg, Winchester and Ottawa, and intervening places. A branch line from Kenmore to the village of Russell would connect with the Ottawa-New York Railway.

Dundas, Ont.—The following places have voted in favor of the Hydro-Electric Power By-law: Dundas, Simcoe, Chatham, Stratford, Port Stanley, Tilsonburg, Norwich, West Lorne, Comber, Amherstburg, Tilbury, Essex, Leamington and Windsor.

Fort William, Ont.—Notice has been given at the Parliament Buildings of a private bill by Fort William for the validation of a by-law to raise $170,000 for the extension of the electric street railway system, for power to acquire fifty-eight acres of Indian reserve territory, and to complete a contract with the MacKay & Kakabeka Falls Railway Company.

Winnipeg, Man.—Tenders will be received up to 11 a.m. Jan. 20th for supplying 50 luminous or magnetite arc lamps, with necessary station regulating apparatus for controlling same. M. Peterson, Secretary Board of Central Office, Winnipeg, Man.

Bridges, Wharves and Subways

Toronto.—A by-law has been passed by the ratepayers authorizing the expenditure of $215,000 for the construction of the Wilton avenue bridge.

Toronto.—K. L. Aitken, city electrical engineer, and P. W. Sothmann, engineer of the Hydro-Electric Power Commission, will prepare plans for the construction of a six-foot waterproof tunnel on Garrison Common, for the purpose of laying across the railway tracks the electric wires in connection with the power distribution plant.

Brockville, Ont.—The Townships of Edwardsburg and Augusta have made application to the County Council for the erection of a bridge over the Nation River on the townline between the townships named.

Brantford, Ont.—A deputation representing Brantford, Galt and other towns on the Grand River have made application to the Minister of Public Works for provincial aid in making surveys for proposed dams on the river. The Government engineers estimate that four dams may be required. The delegation was headed by Mr. Brewster, M.P.P., Major Craig, M.P.P., and George Pattinson, M.P.P.

Niagara Falls, Ont.—President Thomas Penney, of the International Traction Company, states that work on the proposed trans-Niagara bridge will be commenced early next spring. The bridge will provide accommodation for both steam and electric railway lines, together with a roadway for heavy teaming.

St. Felicien, Que.—The Government will rebuild the bridge recently destroyed by fire at this place.

Shelburne, N.S.—A grant of $8,000 has been made towards the construction of a public wharf at this place.

St. John, N.B.—The Navy Island Bridge Committee at a recent meeting took initial steps for the securing of plans and specifications for the proposed new structure. Engineer J. S. Armstrong was instructed to prepare a proposition for the consideration of the Board.

Vancouver, B.C.—Mr. R. H. Sperling, on behalf of the Vancouver Power Company, and their consulting engineer, Mr. J. D. Schuyler, have laid before the Provincial Executive plans for the proposed raising of the dam at Coquitlam Lake.

Prince Rupert, B.C.—The Provincial Government of British Columbia have decided to build a wharf at Prince Rupert, B.C. The section to be built first will be about 60 feet long by 80 feet deep, with a depth of water of 20 feet at extreme low tide.

Regina, Sask.—The plans prepared by City Engineer Smith for the proposed Broad street and Albert street subways will in the near future be submitted for the consideration of the Board of Railway Commissioners. Estimated cost of each subway, $85,000. As per plans, they will have a span of 100 feet and a width of 94 feet. Provision is made for six railway tracks, with an allowance for more trackage if required.

Waterworks, Sewers and Canals

Toronto.—Tenders will be received up to noon, Jan. 19th, for the construction of the following sewers: Gerrard street, from Carlaw avenue to Pape avenue; Marlborough avenue, from Avenue Road to Sidney street; Sidney street, from Marlborough avenue to Cottingham street. Tenders will also be received for 800 feet of rubber fire hose for flushing sewers. Joseph Oliver (Mayor), Chairman Board of Control, City Hall, Toronto.

Toronto.—The City of Toronto has taken out a permit for a one-storey brick pumping station to be erected on John street at a cost of $11,100. R. McCallum, city architect.

New Toronto, Ont.—Mr. Andrew F. Macallum associated with Mr. T. Aird Murray, engineers, Toronto, have prepared plans for a sewerage system for New Toronto.

Peterboro, Ont.—Randolph Macdonald, of Toronto, has been awarded the contract for section No. 7 of the Trent Canal. This section extends from Rice Lake to Healey's Falls, a distance of 20 miles. It includes the construction of a dam and lock at Hastings, new guide piers at G.T.R. bridge above Hastings, a swing bridge and guide piers at the Narrows (Trent Bridge), and the dredging of the Trent River from Hastings to Healey's Falls, to provide a nine-foot draught. Contract price, $450,000.

Stratford, Ont.—The ratepayers have passed a by-law authorizing the expenditure of $25,000 for the installation of sewerage disposal works.

Wallaceburg, Ont.—The Town Council is contemplating the installation of a waterworks system to cost $90,000.

Ottawa.—Tenders will be received up to 4 p.m., Jan. 29th, for the supply of some 160,000 barrels of cement, more or less, required for the construction and maintenance of the various canals of the Dominion. Tenders may be made for the total quantity, or for a portion thereof. L. K. Jones, Secretary, Department of Railways and Canals, Ottawa, Ont.

St. Thomas, Ont.—The ratepayers have passed a by-law providing for the expenditure of $40,000 for the installation of septic tanks.

Ottawa.—Mr. Johnston Edgerly, manager in Canada of the Montreal, Ottawa & Georgian Bay Canal Company, Ottawa, states that a syndicate of London and Canadian financiers are preparing to undertake the Georgian Bay Canal scheme. The capital stock of the company is $100,000,000.

Antigonish, N.S.—The Town Council will in all probability install a sewerage system in the near future. Prof. Lee of McGill University has been engaged to make a thorough test of the engineering difficulties regarding this project.

Winnipeg, Man.—Tenders will be received up to 11 a.m., Feb. 22nd, for the supply and erection of turbine pump, with electric motor, for the city water works. M. Peterson, Secretary, Board of Control Office, Winnipeg.

Victoria, B.C.—At a recent meeting of the City Council it was decided to accept the tender of the D'Olier Engineering Company, for which J. K. Rebbeck is local agent, for the supply of the following equipment for the installation of the high pressure system. Electric driven unit consisting of motor direct connected to two two-staged turbine pumps provided with bronze runners and diffusion veins, and one steam driven unit consisting of a steam turbine direct connected to a three-staged turbine pump; at a price for the set up complete in place in accordance with the specifications of $17,630, the installation to be completed by about May 15, 1909.

Vancouver, B.C.—At a meeting of the reeves of the municipalities adjacent to Vancouver a resolution was passed recommending to the respective councils that a competent engineer be employed to make a survey and report as to the cost of a joint water system from Seymour creek, sufficient to supply 200,000 people residing in South Vancouver, Point Grey, Burnaby, Richmond and contiguous places.

Macleod, Alta.—A by-law has been passed by the ratepayers authorizing the installation of a complete sewerage system at an estimated cost of $35,000.

Banff, Alta.—Tenders will be received up to noon, Feb. 5th, 1909, for the following sewer pipe and fittings, required for extensions to the Banff sewerage system: 282 feet of 8-inch sewer pipe, 1,810 feet of 9-inch sewer pipe, 600 feet of 15-inch sewer pipe, 30 6-inch off 15-inch sewer junctions, 60 6-inch off 9-inch mfwywaVn junction. The brand and name of manufacturer must be stated in the tender. The whole of the material to be delivered f.o.b. cars at Banff, Alta., on or before April , 1909. P. G. Keyes, Secretary, Department of the Interior, Ottawa, Ont. Address tenders to Howard Douglas, Commissioner of Parks, Banff, Alberta.

Railway Construction

Ottawa.—The Canadian Northern Railway will make application to the Government for assistance to build a line from Port Arthur to Sudbury.

Brantford, Ont.—It has been announced by the management of the Grand Valley Radial Road that the proposed line to Port Dover will be rushed to completion next summer, along with extensions to the city lines for the carrying out of which the company has provided a guarantee to the city of $25,000.

Berlin, Ont.—At a meeting of the Berlin Board of Trade, Mr. W. A. Bugg, of the Woodstock-Guelph Railway Company, outlined the plans for the proposed radial railway from Woodstock to Guelph, a distance of about 50 miles. The estimated cost of construction would be about $15,000 per mile.

Bristol, N.B.—Superintendent Downie of the C.P.R. states that the company will rebuild the station at this place which was destroyed by fire.

St. John, N.B.—The Intercolonial Railway Company's water tank at Island yard, St. John, has exploded, causing damage, including loss of tank, estimated at $10,000. The tank had a capacity of 100,000 gallons.

St. Boniface, Man.—Tenders will be called in the near future for the construction of the National Transcontinental railway shops near St. Boniface. Some time ago contract was awarded to Contractor Kely, of Winnipeg, for one of the buildings, but it has been decided to call for tenders for the erection of the whole plant, plans for which are now complete. It is understood that arrangements have been made for the cancellation of the contract for the portion of the plant already awarded.

Brandon, Man.—The Canadian Pacific Railway has renewed its appropriations to be used in connection with the Bran-

don depot and yards. The plans provide for a large main building joining the old portion of the depot.

Brandon, Man.—The Canadian Northern Railway will in the near future commence the erection of the proposed new depot and freight sheds. The depot when completed will cost approximately $45,000. The freight sheds will take up a block of 500 feet, occupying the site of the old sheds.

Moose Jaw, Sask.—Notice is officially given that the Alberta Central Railway Company will apply to the Dominion Parliament at its coming session for a charter for the building of a railway line from a point on its main line at or near Red Deer, Alta., southerly and easterly to Moose Jaw.

Calgary, Alta.—The Grand Trunk Pacific Railway and the Canadian Northern Railway are negotiating with the Government for the purchase of the Royal North-West Mounted Police barracks property on which to erect a union station.

Public Buildings

Toronto.—The Dominion Government will in all probability erect a new general Post Office at the south-east corner of Front and Bay streets.

Toronto.—The Library Board has taken out a permit for the erection of a one-storey brick library building on Queen street west, at a cost of $25,000.

Toronto.—The city has taken out a permit for the erection of a two-storey brick bath house on Stephanie Place at an estimated cost of $44,000

Toronto.—Plans and estimates are being prepared, and will be presented to the Legislature when it meets shortly, for an addition to the Parliament Buildings. It is proposed to erect a new wing for library, archives, patents, surveys department, etc. It is estimated that the cost will be approximately half a million dollars.

Toronto.—The Ontario Government has taken out permit for alterations to Osgoode Hall, corner Queen street and University avenue. Estimated cost of improvements, $50,000.

Toronto.—The city has taken out a permit for the erection of a one-storey frame ferry shed on Bay street at a cost of $16,000, also a permit for the erection of a two-storey brick wagon house on Agnes street, near Teraulay street, at a cost of $14,000. R. McCallum, city architect.

New Liskeard, Ont.—The local Library Board is making application to Andrew Carnegie for funds for the erection of a $5,000 library building at this place.

Strathroy, Ont.—The ratepayers have passed a by-law in favor of the proposed new Carnegie Library.

Montreal, Que.—Architect R. A. Brassard, 9 St. James street, has prepared plans for a new armory to be erected for the 65th Battalion on Pine avenue at an estimated cost of $100,000.

Montreal.—Extensive alterations and repairs will be made to the Art Gallery on Phillips Square and possibly a new building erected on the present site. E. & W. S. Maxwell, 6 Beaver Hall Square, are the architects.

Quebec, Que.—A new post office building is to be erected on the site on the corner of St. Joseph and Dorchester streets, St. Roch, at an estimated cost of $60,000.

Verdun, Que.—Mr. Isaac Collins, 207 Ash avenue, Montreal, general contractor for the proposed new municipal building, has awarded to the Sayer Electric Co., 14 Beaver Hall Hill, Montreal, the subcontract for the wiring and electric fixtures. Architects MacVicar & Heriot, 104 Union avenue, Montreal.

Saskatoon, Sask.—The City Council will prepare a by-law for the raising of $30,000 for the purchase of 80 acres of land located about a mile south of the city and the erection thereon of buildings suitable for the holding of the annual agricultural exhibitions.

Edmonton, Alta.—Inspector MacKinnon has condemned the temporary government buildings at this place for not having fire-escapes, and has ordered fire-escapes to be put in immediately.

Business Buildings

Toronto.—The following contracts have been awarded for a $10,000 building to be erected at 749-65 Yonge street for Messrs. Eyrie Bros. & Webster, corner Yonge and Temperance streets: Mason work, Fussell & Thompson, 53 Poplar Plains Road; carpentry work, A. B. Coleman, 191 Dowling avenue; plastering, R. Dancy, 171 Spadina Road; plumbing and heating, Power Bros., 393 Spadina avenue; electric wiring, McDonald & Willson, 187 Yonge street; roofing, G. M. Bryan, 524 Yonge street. Burke, Horwood & White, 28 Toronto street, are the architects.

Toronto.—Messrs. Schultz & Garrett, Room 704 Continental Life Building, have taken out a permit for the erection of three attached three-storey brick stores and dwellings on the n.w. corner of Bloor and Markham streets. Estimated cost, $10,000.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for a store and dwelling to be erected on Bloor street, near Albany avenue, at a cost of $3,000. It will be of brick construction, with brick foundation, felt and gravel roof, pine floors and interior finish, open plumbing, hot water heating, combination lighting and electric bells.

Toronto.—R. G. Leaman, general contractor, will receive tenders up to Jan. 25th for all trades, with the exception of heating and plumbing, required in alterations to stores and dwellings at 353-5 Gerrard street, near Broadview, for Margaret Leamen, 353 Broadview. The work includes roughcast and stone work, felt and gravel roof, hardwood and pine floors and interior finish, combination lighting, open plumbing, hot air heating, structural iron, tile, metal ceilings, cornice, plate glass, electric bells, mantels, head glass.

Toronto.—Mr. J. C. Wilgar has purchased the property at 376 Queen street east, on which he will erect a pair of stores.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for a pair of stores and dwellings to be erected on Queen street near Parliament street at an estimated cost of $6,000. The buildings will be two stories in height, of brick construction, with brick foundation, felt and gravel roof, pine floors and Georgia pine interior finish, open plumbing, combination lighting, hot water heating, metal ceilings, skylights and electric bells.

Toronto.—Miles Vokes, corner Yonge and Adelaide streets, has taken out a permit for a $35,000 five-storey brick store building to be built on Queen street near Bond street. G. M. Miller, General Trust Building, is the architect.

Toronto.—Messrs. Schultz & Garrett, 704 Continental Life Building, Toronto, will erect fifteen stores and dwellings on the n.w. corner of Bloor and Markham streets at a cost of $100,000. The buildings will be of brick construction, with stone foundation, felt and gravel roof, hardwood and pine floors and interior finish, open plumbing, combination lighting, heating. Specifications include tile, vaults, metal ceilings, electric bells, plate, art and leaded glass.

Toronto.—Wm. Williamson, 133 Woodbine avenue, has been awarded the general contract for a pair of two-storey stores to be erected on the corner of Queen and Herbert streets for W. H. Coon, 1910 Queen street east. The buildings will be of brick construction, with brick foundation, shingle roof, pine floors and interior finish, open plumbing, combination lighting, combination heating.

Toronto.—Messrs. McDonald & Willson, 187 Yonge street, have purchased the property at Nos. 12-16 Queen street east, on which they will erect a five-storey building.

Hamilton, Ont.—Architect Herbert H. New, 608 Spectator Building, has prepared plans for an office building to be erected for the Hamilton Pressed Brick Company. The building will be of brick construction, with shingle roof.

Markstay Ont.—The store buildings of Robert Roy and A. P. Lefebvre have been destroyed by fire. Loss etsimated at approximately $10,000. Mr. Roy will rebuild in the near future.

Pembroke, Ont.—Architect Colborne P. Meredith, Ottawa and Pembroke, has prepared plans for a two-storey store and office building to be erected here for Mrs. J. H. Munro. It will be 140 by 60 feet, of brick construction with stone trimmings, and will cost $16,000.

Sault Ste. Marie, Ont.—The Hussey block at Sault Ste. Marie, Ont., has been completely destroyed by fire and the Coronation block, adjoining, badly damaged.

Montreal, Que.—The Henry Birks & Sons' block at the corner of St. Catherine street and Phillips Square has been badly damaged by fire. Loss approximately $100,000.

Montreal, Que.—Lamy's departmental store has been destroyed by fire. Loss on building, $25,000.

Montreal, Que.—Architects Hutchison & Wood, Royal Insurance Building, and Architects Saxe & Archibald, 59 Beaver Hall Hill, have prepared sketch plans for a departmental store building to be erected at the corner of St. Catherine street west and Mountain street for Messrs. Jas. A. Oglivy & Sons.

Montreal.—Architect A. F. Dunlop, Lindsay Building, has prepared plans for the proposed extension of S. Carsley's building on St. Catherine street west, now occupied by the W. H. Scroggie Company.

Montreal.—The annex to the Sun Life's building has been damaged by fire to the extent of $5,000, covered by insurance.

Montreal.—It is reported that the H. A. Wilder Company will erect a building on the site purchased by them on the s.e. corner of Bleury and Berthelet streets.

Montreal.—Messrs. Freeman's, who recently purchased Polequin's restaurant on St. Francois Xavier street, will thoroughly remodel the premises and convert the large wine cellars in the basement into a palm garden.

Montreal.—The John D. Duncan Company, 213 Mountain street, has purchased land adjoining their present premises, on which they will next spring erect a building. Architects MacVicar & Heriot, 104 Union avenue, will perpare the plans.

Rossburn, Man.—The block of stores owned by B. W. Johnstone has been destroyed by fire. Loss approximately $30,000, partly covered by insurance.

Vancouver, B.C.—Dr. L. McKechnie has taken out a permit for alterations to his office building on Granville street at an estimate cost of $10,000.

Vancouver, B.C.—A syndicate known as "The Exchange Building, Ltd.," has been incorporated for the purpose of erecting a large office building on Hastings street. A high speed elevator service, electric light, steam heating, lavatories, vacuum cleaning systems, etc., for each room will be installed. Mr. Jno. S. Heyler, 518 Hastings street, is the architect. Mr. John Kendall, of Kendall & Sewell, Crown & Wilson Block, is Secretary for the incorporation.

Vancouver, B.C.—Dr. Good, of Winnipeg, has purchased the site of the Maple Leaf theatre at this place, on which he will erect a modern building.

Vancouver, B.C.—The National Finance Company will erect a large three-storey building to be used for stores, offices and apartments. Work on the structure will be commenced at once.

Victoria, B.C.—The W. & J. Wilson Company have taken out a permit for the erection of a two-storey and basement business block on Herald street to cost $25,000. It will be of brick and cement construction. Architect, W. C. Frame. Contractors, Luney Bros.

New Westminster, B.C.—Plans have been prepared by Architect E. G. W. Tait for a brick block to be erected at the corner of Church and Columbia streets for Messrs. Berrett & Deane, real estate brokers. The block will consist of stores, with rooms and offices above, and will cost approximately $50,000.

Prince Albert, Sask.—The store and offices of Messrs. William Cowan & Co. have been destroyed by fire. Loss estimated at over $20,000, covered by insurance.

Prince Albert, Sask.—Mr. R. T. Goodfellow has had plans prepared for a large brick block, adjoining his present block at the corner of River street and Central. Estimated cost, $15,000.

Saskatoon, Sask.—Tenders were recently received for the new Land Titles building to be built of stone, brick, concrete and steel, and absolutely fireproof. It will be erected here for the Provincial Department of Public Works. The vestibule and public space will be finished in Tennessee marble, with tile flooring. Messrs. Storey & VanEgmond, of Regina, are the architects.

Saskatoon, Sask.—Messrs. Emerson & Fisher, hardware and stove manufacturers, with factory at Sackville N.B., will in all probability erect a branch at this place for distribution purposes.

Banks

Toronto.—The Bank of Toronto has purchased the former premises of the National Club on Bay street, opposite Melinda street, on which they will erect a head office building in the near future.

Toronto.—The Imperial Bank has purchased a site at the s.e. corner of Bathurst and Dupont streets, on which they will erect a branch bank. The lot has a frontage of about 50 feet on Bathurst street. They have also purchased a site at the corner of Queen street and Roncesvalles avenue for the erection of a new building. The lot is 120 feet deep, with frontage of 40 feet.

Pembroke, Ont.—Architect Colborne P. Meredith, Ottawa and Pembroke, has prepared plans for a $12,000 bank to be erected at Pembroke for Mrs. J. H. Munro. The building will be of brick construction with stone trimmings, one storey in height, 26 by 75 feet.

Montreal, Que.—Architects Cox & Amo, 121 Mansfield street have prepared plans for the erection of a branch bank building for the Quebec Bank at corner of Atwater avenue and Notre Dame street.

Montreal.—La Banque Nationale, corner St. James street and Place d'Armes Hill, have purchased the property at the rear of their present structure, on which they will erect a large new building. Several stories will also be added to their present building.

Three Rivers, Que.—Architects Daoust & Lafont are preparing plans for the erection of a bank building at this place for La Banque Nationale.

Sawyerville, Que.—Messrs. Byers & Anglin, 18 St. Alexis street, Montreal, general contractors for the branch bank to be erected here for the Bank of Montreal, have awarded to the Consolidated Plate Glass Company, 30 St. Sulpice street, Montreal, the contract for plate and other glass.

Winnipeg, Man.—Fire in the basement at the rear of the Molsons Bank building has resulted in damage to the extent of $20,000. The heaviest losers are the Canadian Importing & Jewelry Manufacturing Company, who had a warehouse and factory in the building. The loss to the Molsons Bank is not known. The Banque de Hochelaga, adjoining, has been damaged to the extent of $3,000, covered by insurance.

North Vancouver, B.C.—The Bank of British North America have purchased a site at the n.e. corner of Lonsdale avenue and Third street, on which they will erect a bank building.

North Vancouver, B.C.—The Bank of Hamilton have purchased a site at the s.e. corner of Lonsdale avenue and First street, on which they will erect a bank building.

Clubs and Societies

Toronto.—Plans have been prepared for the proposed new club house, to be erected on the Avenue Road site by the Canada Bowling Club. The building will be 90 feet by 32 feet, and will cost approximately $8,000.

West Toronto.—Tenders will be received from Feb. 1st to Feb. 15th by Architects Ellis & Connery, Manning Chambers, Toronto, for a two-storey Masonic Temple to be erected on Annette street, West Toronto, for the West Toronto Masonic Temple Limited. The building will be of brick construction, with stone foundation, slate roof, maple and pine floors, Georgia pine interior finish, open plumbing, steam heating, electric lighting. Estimated cost of structure, $15,000.

London, Ont.—The Masons of London purpose erecting a temple in the near future.

Kingston, Ont.—The Knights of Columbus have purchased the Stearns property on King street for the purpose of erecting a club next summer.

Montreal.—Architects Mitchell & Crighton, Inglis Building, have prepared plans for an addition to the Italian Immigration and Society's building at 69 Osborne street.

Winnipeg, Man.—Architect J. A. Harvey, Manning Chambers, Toronto, has prepared plans for a three-storey Squash Racket Court to be erected here on Donald street at a cost of $6,000. The building will be of brick construction, with stone foundation, felt and gravel roof, Georgia pine and maple floors and interior finish, open plumbing, steam heating, electric lighting.

Vancouver, B.C.—The Directors of the Western Club have purchased a site on the s.w. corner of Hastings and Hornby streets, on which they will erect a club building to cost at least $40,000. The property has a frontage of 52 feet and a depth of 120 feet. Work on the structure will be commenced in the near future. Mr. Lambert Bond is President of the Club.

New Westminster, B.C.—Plans are being prepared for a block, to cost $20,000, to be erected on Agnes street, near the site of the old Baptist church, New Westminster. The building will be used as Masonic headquarters.

Moose Jaw, Sask.—At a meeting of the business men a resolution was passed advising the Board of Directors of the Y.M.C.A. to take immediate steps for the completion of the Y.M.C.A. building.

Asylums and Hospitals

Toronto.—Preliminary plans have been prepared for an enlargement to the Western Hospital. In connection wtih this undertaking it is proposed to erect an Administration building, Nurses' Home, Infectious building, Laundry, Mortuary, Ambulance building, Chapel, boiler houses and other outbuildings. The scheme, as laid out, has been estimated to involve an expenditure of about $500,000.

Toronto.—Architects Darling & Pearson, 2 Leader Lane, are preparing plans for the new General Hospital to be erected on College street at an estimated cost of $1,112,000.

Montreal, Que.—Messrs. Reid, MacGregor & Reid, general contractors for the new wing for the Alexandra Hospital, have awarded to H. Andrews & Co., 125 Bishop street, the sub-contract for plastering. Architects, E. & W. S. Maxwell, 6 Beaver Hall Square.

St. John, N.B.—Fire which broke out in the laundry of the Provincial Hospital for Nervous Diseases, at Lancaster, near St. John, N.B., destroyed the centre "L," a three-storey structure about 500 feet long, in which were the boiler house, laundry, kitchen, chapel, attendants' rooms, and one ward which accommodated about twenty-five patients. Loss estimated at $60,000.

Vancouver, B.C.—The Salvation Army is contemplating the erection of a hospital in Vancouver.

New Westminster, B.C.—Tenders for the construction of the central building of the new Provincial Asylum to be located on the one-thousand acre tract at the confluence of the Coquitlam with the Fraser River, four miles from this city, will be called for in the near future. It is estimated that the structure will cost $270,000 and will accommodate five hundred patients. Architect, H. S. Griffiths, Toronto. Dr. Doherty is superintendent of the institution and the Provincial Sectretary is Hon. Dr. Young.

Edmonton, Alta.—The Public Hospital Board have had plans prepared for a hospital building to accommodate three hundred patients, when the structure is complete. This provides for a central administration building and the main hospital, which it is proposed to build next year. The two wings, which will complete the structure, will be added later on. The amount required for the present undertaking will be not less than $150,000.

Regina, Sask.—The City Council has adopted the plans and specifications for the proposed municipal hospital, to be known as the Regina General Hospital. The City Clerk will receive tenders up to 5 p.m., Feb. 1st. Copies of plans and specifications may be seen at the Builders' Exchange, Winnipeg.

Churches

Hamilton, Ont.—The congregation of the Herkiker Baptist Church will in all probability erect a new church next spring, to cost $20,000. Thomas Simpson is the Chairman of Building Committees.

Lindsay, Ont.—The chapel of St. Mary's Roman Catholic Church has been damaged by fire to the extent of $5,000.

Eden, Ont.—The Methodist Church at this place has been destroyed by fire. Loss estimated at $8,000. The pastor is Rev. G. C. Balfour, of Streetsville. The church will in all probability be rebuilt.

London, Ont.—The trustees of the church of St. John the Evangelist, have under consideration plans for the building of a new mission church at the corner of Adelaide and St. James Streets. Work on the building will in all probability be commenced in the spring.

Montreal, Que.—The St. Thomas d'Aquin congregation will erect a church on St. Antoine Street, Montreal, at an estimated cost of $12,000. Architect, J. A. Karch, 17 Place d'Armes Square. Contractors, Sparrow & McNeil, Coristine Building.

Quebec, P.Q.—The Roman Catholic parish church at St. Ambroise, Indian Lorette, near Quebec, has been destroyed by fire. Loss estimated at $100,000, with insurance of about $60,000.

Ancienne Lorette, Que.—Architects Ouellet & Levesque, 115 St. John Street, Quebec, P.Q., have prepared plans for three artificial marble altars to cost $5,000 for the church of Roman Catholic congregation at this place.

St. Timothee, Que.—The Roman Catholic church at this place has been destroyed by fire. Loss estimated at $85,000, with insurance of $35,000.

Coteau Du Lac, Que.—The parish church at Coteau du Lac, Que., has been destroyed by fire entailing a loss of $60,000.

Indian Lorette, Que.—The Parish Church at Indian Lorette, Que., has been destroyed by fire. Loss over $95,000; insurance $40,000.

Ste. Angele, P.Q.—Messrs. J. H. Morin & Sons, Trois-Pistoles, P.Q., have been awarded the contract for a $49,135 church building to be erected at this place for the Roman Catholic Congregation. The building will be 180 by 72 ft. and will be of stone construction. Ouellet & Levesque, 115 St. John Street, Quebec, P.Q., are the architects.

Victoria, B.C.—The congregation of St. Barnabas church will erect a new edifice at the corner of Corbook and Caledonia avenue to cost $10,000. The building will be of stone construction, with concrete foundation, slate roof, hot air heating, electric lighting. Rev. E. G. Hiller, rector.

Residences and Flats

Toronto.—The following contracts have been awarded for a two and one-half storey brick dwelling to be erected on Binscarth road, near Glen road, for Messrs. Sim & Smart, 372 Markham street, at cost of $5,000: Masonry, Chas. Wood, 611 Manning avenue; plastering, W. J. Haddock 790 Crawford street; plumbing, heating and electric wiring, J. R. Seager, 799 College street. Architect, J. H. Galloway, 77 Victoria street.

Toronto.—W. H. Little, 33 Henry street, has been awarded the plastering contract for a two-storey and attic dwelling to be erected on Woodlawn avenue, near Yonge street, for John T. Aggett, 199 Yonge st. The plumbing, heating and electric wiring will be done by day work, the owner supplying all materials. Architects, Eden Smith & Son. 199 Yonge St.

Toronto.—Architect C. J. Gibson, 75 Yonge street, has prepared plans for a two-storey dwelling to be erected on Roxborough street, near Bedford road, for J. A. McEvoy, 30 Prince Arthur avenue. Estimated cost, $6,500. The building will be of brick construction, with stone foundation, slate roof, oak and pine floors and interior finish, open plumbing, hot water heating, combination lighting, electric bells and mantels. The following contracts have been awarded: Elgie & Page, 21 Havelock street, mason work; T. B. Manual, 658 Bloor street west, carpentry work.

Toronto.—Architect J. A. Harvey, Manning Chambers, is preparing plans for a three-storey apartment house to be erected on Gerrard street east, opposite the Normal School, at a cost of $40,000. The building will be of brick construction, with stone foundation, felt and gravel roof, fireproof floors, oak interior finish, open plumbing, hot water heating, electric lighting. It will be equipped with fire escapes, dumb waiters, fireproof windows, telephone system, and mantels.

Toronto.—Architect J. A. MacKenzie, 32 Adelaide street east, has prepared plans for a store and dwelling to be erected at the corner of Broadview and Gerrard streets, for Mr. F. A. Jacobs, 145 King street east. Estimated cost, $6,000. The building will be of brick construction, with brick foundation, felt and gravel roof, pine and hardwood floors and interior finish, open plumbing and hot water heating.

Toronto.—Architect Geo. R. Harper, 61 Yonge street Arcade, has prepared plans for a $6,000 residence to be erected on Glencairn avenue, west of Yonge street, North Toronto, for Mrs. Edith L. Reade, Merton avenue, of that place. It will be two and a half stories in height, of brick construction, with slate roof, pine and hardwood floors and interior finish, combination lighting, hot water heating and mantels.

Toronto.—Architect G. B. Harper, 61 Yonge street Arcade, has prepared plans for three attached dwellings to be erected on Bartlett avenue, near Hallam street, for Mr. H. E. Bell, 40 Yonge street Arcade. The building will be of brick construction, with stone foundation, felt and gravel and shingle roof, hardwood and pine floors and interior finish, open plumbing combination lighting, hot water heating and mantels. Messrs. Tait & Angus, 164 Macpherson avenue, have the general contract. Estimated cost of building, $8,500.

Toronto.—Architect Geo. R. Harper, 61 Yonge street Arcade, has prepared plans for two two and one-half storey residences to be erected on Major street, south of Lowther avenue, for Mr. E. M. Shildrick, 397 Givens street, at a cost of $8,000. It will be of brick construction, with stone foundation, slate, felt and gravel roof, pine floors with hardwood borders, hot water heating, combination lighting and mantels.

Toronto.—Architect Geo. R. Harper, 61 Yonge street Arcade, has prepared plans for a two-storey residence to be erected on Pearson avenue, east of Roncesvalles avenue, for Mr. H. I. Clarkson, 335 Clinton street. The building will be of brick construction, with stone foundation, pine floors and interior finish, hot water heating, combination lighting, electric bells and mantels.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for two detached two and one-half storey dwellings to be erected on St. George street, near Dupont street, for Wilkins & Company, 70 Wellesley street. The building will be of brick construction, with stone foundation, felt and gravel and slate roof, hardwood floors and interior finish, open plumbing, hot water heating and combination lighting. The structures will cost $7,000.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for a $3,500 dwelling to be erected on Kendal avenue, near Wills street, for Mr. James Crang, 720 St. Clair avenue. It will be of brick construction, with hardwood floors and interior finish, hot water heating and combination lighting.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for a two and one-half storey store and dwelling to be erected on Bloor street, near Lansdowne avenue, at a cost of $4,000. It will be of brick construction, with brick foundation, felt and gravel roof, pine floors, Georgia pine interior finish, open plumbing, combination lighting and hot water heating.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for an apartment building to be erected on McCaul street at a cost of $10,000. It will be of brick construction with felt and gravel roof, hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, electric bells and mantels.

Toronto.—Architect Jas. L. Havill, Mail Building, has prepared plans for a two and one-half storey dwelling to be erected on Binscarth Road for Mr. H. Bishopric, 108 Mail Building. The structure will be of brick, with open plumbing, electric lighting, hot water heating, oak and pine floors and interior finish and mantels.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has prepared plans for a three-storey bachelor apartment house to be erected on Bond street at a cost of $40,000. The building will be of brick construction, with slate, felt and gravel roof, pine floors and interior finish, open plumbing, combination lighting and steam heating.

Toronto.—Architect Leonard Foulds, 43 Victoria street, is preparing plans for a two and one-half storey residence to be erected on Palmersten Boulevard, near College street, at a cost of $5,000. It will be of brick construction, with stone foundation, slate roof, hardwood and pine floors and interior finish, open plumbing, steam heating, combination lighting, plastic relief work, mantels and grates.

Toronto.—Architect J. W. Siddall, 75 Yonge street, has prepared plans for a two and one-half storey dwelling to be erected on Indian Road, near Ridout street, for Mr. B. W. Barton, 20 Givens street. It will be of brick construction, with shingle roof, pine floors and interior finish, open plumbing, hot water heating and combination lighting.

Toronto.—Architect J. Hunt Stanford, 34 Victoria street, has completed plans for a two and one-half storey dwelling to be erected on Palmerston Boulevard for Mr. E. Ferris, 292 Victoria street. It will cost $4,000, and will be of brick construction, with stone foundation, slate roof, oak and pine floors and interior finish, mantels, open plumbing, hot water heating and combination lighting.

Toronto.—Contracts have been awarded as follows for a pair of dwellings to be erected on Major street, near Lowther avenue, for Messrs. Almond & Page, 634 Palmerston avenue: Painting and glazing, A. Longbottom; roofing and tinsmithing, A. Ryan, Bathurst street; plumbing and heating, Chas. Tyler, 1208 Yonge street. Architect, J. Hunt Stanford, 34 Yonge street Arcade.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and one-half storey residence to be erected on Poplar Plains Road, near Lynwood avenue, for Mr. H. Hutson, 43 Victoria street. The building will be of brick construction, with stone foundation, slate roof, oak and pine floors and interior finish, mantels, open plumbing, hot water heating and combination lighting. Cost of building, $5,000.

Toronto.—Messrs. Deeth & Son, 44 Gore avenue, will erect two pairs of semi-detached brick dwellings on Dufferin street, near Fisher street, at a cost of $9,000. They will be two and one-half stories, of brick construction, with stone foundation, pine floors and interior finish, open plumbing, hot air heating, combination lighting. The owners will supply all materials, and the buildings will be erected by day work.

Toronto.—Messrs. Deeth & Son, 44 Gore avenue, will erect two semi-detached brick dwellings on north side of Fisher street, near Dufferin street, at a cost of $4,000. The building will have stone foundation, shingle roof, pine floors and interior finish, open plumbing, hot air heating and combination lighting.

Toronto.—Messrs. F. Wilkins & Co., 70 Wellesley street, will erect two detached dwellings on St. George street, near Dupont. The buildings will be of brick construction, with stone foundation, felt and gravel and slate roof, hardwood floors and interior finish, open plumbing, hot water heating, combination lighting. Specifications include dumb waiters, tile, ornamental columns, plastic relief work, plate glass, telephone system, electric bells, refrigerator, leaded glass, eight mantels, and two bathrooms. Estimated cost, $7,000.

Toronto.—Mr. R. E. MacDonagh, 148 Spadina avenue, will erect a pair of two and one-half storey semi-detached brick dwelings on the east side of Grace street, near Bloor street, at a cost of $5,000. The buildings will have stone foundation, felt and gravel and slate roof, oak and pine floors and interior finish, open plumbing, hot air heating and combination lighting.

Toronto.—The following contracts have been awarded for a brick dwelling to be erected on Thorold street, near Indian Road, for Mr. Geo. Palin, 32 Montrose avenue: Plumbing and heating, Howard & Atkin, 88 Arthur street; roofing and tinsmithing, Geo. Read, 17 Montrose avenue.

Toronto.—Mr. J. S. Case, 141 Geoffrey street, will erect two detached two and one-half storey brick dwellings, on Roncesvalles avenue, near Geoffrey street, at a cost of $8,000. The buildings will have slate roof, oak and pine floors and interior finish, open plumbing, hot water heating, combination lighting, electric bells and mantels. The following contracts have been let: Masonry, Thompson & Turner, 3 Palmerston Square; plastering, Garner & Whiteman, 35 Auburn avenue.

Ottawa, Ont.—Tenders will be received up to Jan. 30th for a $7,000 two-storey residence to be erected on Lisgar street for Mr. Joseph Hesser, 20 Elm street. The building will be of brick veneer construction, with stone foundation, pitch and gravel roof, hot water heating, electric lighting, enamel plumbing. A. Tracy, 380 Gladstone avenue, is the architect.

Ottawa, Ont.—Tenders will be received up to Jan. 30th for all trades, with the exception of mason and carpentry work, required in the erection of a two and one-half storey dwelling on Lisgar street for Mr. Jos. Hesser, 20 Elm street. The building will be of brick veneer construction, with stone foundation, pitch and gravel roofing, hot water heating, electric lighting, enamel plumbing and mantels. Architect, A. Tracy, 380 Gladstone avenue. Estimated cost, $3,000.

Brockville, Ont.—James Frederick has been awarded the contract for a large summer home to be erected on Jarvis Point for Mr. Geo. C. Boldt, of the Waldorf Asteria, New York City. The building will be three stories in height, 88 by 51 feet, of Swiss design.

Montreal, Que.—A company to be capitalized at $250,000 is being promoted by G. W. Badgley, 124 St. Peter street for the purpose of erecting an apartment house on the west of Cote des Neiges Road, above Sherbrooke street. The building will be konwn as the "Seaforth;" will have frontage of 220 feet, and contain forty-five apartments.

Montreal.—Architect Eric Mann, 30 St. John street, has awarded the following contracts for the construction of nine flats on Pine avenue for Mr. David Sperber: Brick work, A. E. Wand & Co.; plumbing and heating, Greenberg & Co.

Montreal.—Architect Jas. E. Adamson, Coristine Building, has awarded the following contracts in connection with the erection of a residence at 102 Crescent street for Mr. Chas. Skelton: General contract, Jackson & Co., 335 Hibernia street; masonry, Jas. Young, Outrement; plumbing, Alex. MacKay & Co., corner of St. Martin and Dorchester street west.

Montreal.—Architect Theo. Daoust, 103 St. Francois Xavier street, has prepared plans for a residence to be erected on McCulloch avenue for Mr. Jos. Gravel. The building will be constructed of Deschambeau stone and brick, and cost $35,000.

Montreal.—Architects E. & W. S. Maxwell, 6 Beaver Hall Square, have awarded to Jas. Morison, 207 Guy street, the contract for the brick and masonry on a residence on Drummond street for Mr. R. B. Angus.

Montreal.—Architects E. & W. S. Maxwell, 6 Beaver Hall Square, have awarded to Messrs. John Quinlan & Co., 4412 St. Catherine street, the general contract for the erection of a residence on Peel street for Mr. C. F. Smith.

Montreal.—Architect J. A. Karch, 17 Place d'Armes Hill, has awarded to Sparrow & McNeil, Coristine Building, the contract for excavation and masonry work for the presbytery to be erected on St. Antoine street for the St. Thomas Aquinas Church.

Montreal.—Architect Chas. Bernier, 70 St. James street, has awarded to Messrs. Elendeau & Soly, 688 Mount Royal avenue, the contracts for roofing, cornice work, plumbing, gas and electric work, and hot water heating, for three tenement houses to be erected on Park avenue for Mr. Napoleon Deslauriers.

Montreal.—Mr. Wm. Lyall, of Peter Lyall & Sons, general contractors, Board of Trade Building, has purchased a large block of land on Western avenue, Notre Dame de Grace (a suburb of Montreal), on which he will erect twenty semi-detached residences in the spring.

Montreal, Que.—Architect Chas. Bernier, 70 St. James street, has prepared plans for the erection of a residence in Hochelaga for Mr. Dufrosne.

Outremont, Que.—Architects Wright & Sons, 204 St. James street, have prepared

plans for a cottage to be erected in Outremont for Mr. J. H. Mackay.

Winnipeg, Man.—The Johnson block, an apartment building, has been damaged by fire to the extent of $6,000.

Victoria, B.C.—Geo. C. Mesher has taken out a permit for the erection of six dwellings at the corner of Hulton and Cowan streets. The buildings will be one and one-half stories in height, with stone foundation, and will cost $16,000.

Victoria, B.C.—Messrs. Parfitt Bros., contractors, will erect eight cottages at a cost of approximately $3,000 each, and a business establishment to cost about $6,000, for which an acre block fronting Fernwood Road has been purchased as a site.

Vancouver, B.C.—R. Gintzburger has taken out a permit for the erection of a residence on Cordova street, between Cambie and Abbott streets, at a cost of $9,000.

Vancouver, B.C.—J. Bigerton, Vancouver, has taken out a permit for the erection of six houses at the corner of Nelson and Cardere streets, at a cost of $17,000; also a permit for the erection of a dwelling on Pacific street, at a cost of $5,600.

Vancouver, B.C.—Mrs. Mary Hanna has taken out a permit for the erection of a brick store and apartment building on Westminster avenue, near Dupont street, at a cost of $20,000. A permit has been also granted to J. L. Lougheed and A. McVicar for the erection of four houses at the corner of Fifth avenue and Columbia street at a cost of $6,000.

Victoria, B.C.—Dr. T. J. Jones will erect an $8,000 dwelling at the corner of Belcher street and Linden avenue. Architect, W. P. Wilson. Contractor, W. M. Ross.

Saskatoon, Sask.—Architects Webster & Noel have decided to erect a ten suite apartment block to cost in the neighborhood of $20,000. The building will be two stories in height, 42 by 85 feet, and will have steam heating and electric lighting.

Hotels

Port Arthur, Ont.—Mayor Carrick and Solicitor Keefer state that an agreement has been closed for the transfer of a piece of city property to the Canadian Northern Railway Company, upon which the company will erect a new quarter million dollar hotel. Work will be started early in the spring. They will also do considerable harbor dredging, and make terminal track extensions.

Washago, Ont.—The Northern Hotel has been destroyed by fire, entailing a loss of $7,000, with $3,000 insurance.

Coldwater, Ont.—The British Arms Hotel and the Abbott block have been completely destroyed by fire. Mr. Colby is proprietor of the hotel. Total loss estimated at $40,000, partially covered by insurance.

Montreal.—The Consolidated Plate Glass Company, 30 St. Sulpice street, have been awarded the contract for the leaded glass in the new addition to the Chateau Frontenac, Quebec City.

Montreal.—Vice-President McNicoll, of the Canadian Pacific Railway, is at present in New York, looking over the hotels and railway terminals in that city, with a view to adopting the most up-to-date features in the reconstructing of the Place Viger hotel and station, for which plans have been prepared by Mr. Painter, the architect for the company.

Opera Houses and Rinks

Windsor, Ont.—The curlers of Windsor have decided to form a joint stock company and erect a rink. The following have been appointed as a committee to collect stock and erect the building: J. A. Russell, chairman; Rev. H. A. Harley, secretary; P. W. Dimock, W. M. Christie and R. Paulin.

Montreal, Que.—It is reported that the Sparrow Company will rebuild the Academy of Music on the N.-W. corner of Bleury and Major streets, if their present building is razed for the proposed extension to the S. Carsley Company's building.

Montreal, Que.—Architects Mitchell & Creighton, Inglis Building, have awarded to J. A. Major, 902 Albert street, St. Henri, the contract for the construction of a moving picture theatre for the Idealograph Co. at 1691 Notre Dame street west.

Moncton, N.B.—The Builders Woodworking Co., Ltd., Moncton, have been awarded the contract for the erection of an $8,000 theatre building at this place for Messrs. Torrie & Winter.

Fire Stations and Jails

East Toronto.—At a meeting of the Fire and Light Committee it was decided to erect a new fire hall and supply new fire engine for East Toronto.

Hull, Que.—City Engineer Farley has been instructed to prepare plans and specifications for the erection of a fire station in Ward 4.

Vancouver, B.C.—Messrs. Morrison & Cowan have been awarded the contract for the construction of the new Fairview fire hall. Contract price, $6,150, with $250 extra for laying of concrete foundation over basement.

Asquith, Sask.—A by-law will be submitted to the ratepayers for the purpose of authorizing the raising of the sum of $16,000 by debentures for local improvements, including the erection of a fire hall, a building for agricultural exhibitions, sidewalks, etc.

Schools and Colleges

Toronto.—The Property Committee of the Board of Education has accepted plans for enlarging the Riverdale High School, for which $60,000 has been appropriated.

Toronto.—The Alexandra School for Girls is contemplating the erection of a new school building and a new reception building, each to cost $12,000. The Government will be asked for assistance.

Toronto.—Plans have been accepted for enlarging the Kent street and the Fern avenue schools.

St. Catharines, Ont.—At a regular meeting of the Public School Board the acceptance of the following tenders was recommended for the erection of a new school building. Messrs. Newman Bros., for the whole of the work, exclusive of heating, plumbing and ventilation, $23,000; Messrs. A. Riddell & Son, for the entire plumbing, exclusive of heating and ventilation, $1,568.

St. Catharines, Ont.—At a meeting of the Public School Board it was recommended that a four-room school building be erected on the present site of St. James Ward school.

Hamilton, Ont.—John E. Riddell has been awarded the contract for the galvanized iron and slating work of the high school and library buildings at Dundas; also copper skylight and roofing for the Bank of Hamilton at Toronto.

London, Ont.—It has been decided to erect a new school building in Chelsea Green early next spring. The building will contain two rooms, with a seating capacity of two hundred, and will cost in the neighborhood of $3,000.

Strathroy, Ont.—The Collegiate Institute Trustee Board will in all probability either erect a new collegiate building or make extensive alterations to the present building.

Oshawa, Ont.—F. G. Gale has been awarded the general contract for alterations to local school building. Contract price, $6,000. The general contractor will sub-let all branches of the work, with the exception of the carpentry work. Architect, P. H. Finney, 43 Victoria street, Toronto. The work will include brick and stone work, shingle roofing, pine floors and interior finish, electric lighting, open plumbing, metal ceilings.

Kingston, Ont.—At a meeting of the School of Mining Governors a committee was appointed to arrange for a delegation to wait upon the Ontario Government to ask for the erection of a new building for the School of Mining, Kingston.

Waterloo, Ont.—The ratepayers have passed the following by-laws: $15,000 for a new school, $5,000 for roads, and $3,000 for an isolation hospital.

St. Hyacinthe, Que.—Architect Maurice Perrault, 15 St. Lawrence Boulevard, Montreal, has awarded to Andre Bonin, St. Hyacinthe, Que., the contract for the erection of a Catholic seminary at this place. The building will be of fireproof terra cotta construction, and will cost $200,000.

St. John, N.B.—Messrs. Lewis & Sons have been awarded the contract for new fire escapes for the local school buildings. Contract price, $13,931.

Halifax, N.S.—The contract for the erection of an extension to the Holy Heart seminary building on Quinpool Road has been awarded to S. H. Brookfield, Ltd. The extension is to connect the main building with the chapel; it will be about forty feet in length, three stories in height, and will be of brick and granite construction.

Montreal.—The Corporation Ecole Hantes Etudes H. Mercier, 216 New York Life Building, have taken out a permit for the erection of a school at the corner of St. Hubert street and Viger avenue at a cost of $240,000. Architects, Gauthier & Daoust, 180 St. James street. Contractor, Jos. Bourgue, Hull, Que.

Montreal, Que.—The Corporation Ecole Hantes Etudes H. Mercier, 216 New York Life Building, have taken out a permit for the erection of a school at the corner of St. Hubert and Lagauchetien streets. Estimated cost, $150,000. Architects, Gauthier &Daoust, 180 St. James street. Contractor, Jos. Bourgue, Hull, Que.

Dauphin, Man.—Dauphin No. 1 school, which contained four rooms of public school and four of collegiate, has been destroyed by fire. Loss estimated at $12,000, with insurance of $8,000.

Victoria, B.C.—Architect W. C. Frame has prepared plans for a Chinese school to be erected on Fisguard street, above Government street. The plans call for a two-storey building of concrete and brick construction, to contain ten rooms. Cost of building, $12,000.

Nelson, B.C.—At a meeting of the School Trustees it was decided to submit to the City Council a by-law authorizing the expenditure of the sum of $17,500 for the completion of the new public school building.

Wilkie, Sask.—Tenders will be received from Feb. 1st to Feb. 15th for the erection of a two-storey school building for the local School Board (J. H. Turnbull, Sec. Treas.). Estimated cost, $6,000. The building will be of frame construction, with stone foundation, shingle roof, fir interior finish. Architect, W. W. LaChance, Saskatoon, Sask.

Civic Improvements

Toronto.—At a meeting of the Board of Control the following contracts were awarded for supplies for the engineer's department for 1909, viz.: Iron and steel, Russill Hardware Company, 126 King street east, and Thos. Meredith & Co., 156 King street east; brass work, Dean Bros., 184 Richmond street west; rubber valves, Dunlop Rubber Tire Co., Booth avenue, Canadian Rubber Co., 1 Front street east, Gutta Percha and Rubber Co., 47 Yonge street; paving brick, Ontario Paving Brick Co., Weston Road, West Toronto; cedar paving posts, Reid & Co., Esplanade and Berkeley streets; Portland cement, Thorn Cement Co., Belleville; sewer pipe, Dominion Sewer Pipe Co.; general supplies, Thos. Meredith & Co., Russill Hardware Co., Aikenhead Hardware Co.

Sarnia, Ont.—Mr. Frank Guttridge has been awarded the contract for paving Front street with three-inch, twenty-pound creosote wood block; contract price, $27,000.

Prince Rupert, B.C.—W. W. Forrester, contractor, New Westminster, has been awarded contract for the construction of public improvements at Prince Rupert, B.C., which are being undertaken jointly by the Government and the Grand Trunk Pacific Railway. The contract price is about $200,000.

Vancouver, B.C.—Tenders addressed to the District Municipal Office, Esplanade, North Vancouver, will be received up to noon, Jan. 25th, for the following: (1) Compound steam 10-ton road roller, with scarifier attached; (2) hand truck for fuel, oil and tool tender for roller; (3) watering cart with distribution pipe and suction hose; (4) travelling van and two traction engines of 4-ton capacity; (5) portable compound toggle knapping motion stone-breaker, with screens, elevating and loading machinery; (6) electric motors, with belt and belt attachments for driving the stone-breaker, etc. Specifications and full particulars can be had on application to Mr. Donald Cameron, District Engineer. Alex. Philp, C. H. C.

LICENSE LAW STRONGLY OPPOSED.—

Continued from Page 40. ∴ ∴ ∴

would find themselves unable to insist on any examinations other than those based on a relatively low standard of knowledge and ability. They would find it impossible to make the Government force everybody wishing to practice architecture, take a full architectural course when such will be established in the university. But any standard for an architect, lower than this, the Government should refuse to officially recognize, and they should also refuse to stamp as "architect" even a graduate of the school at the close of his full course and the university. on the other hand, should energetically oppose such a law because of the low grade standard it would set up for the term architect.

The statement that "Architectural registration is the public's only protection against the incompetent practitioner" is also untenable, because, as we have shown, such a law would neither give him nor force him to obtain the instruction worthy of the title "architect," and your writer truly says, "The architect must be a thoroughly trained man." Therefore, a license law would not secure to the public, "competency in architectural design."

Neither would it secure that competency in the construction of buildings, which would be secured by a Provincial building law, because the proposed license law would examine the man at the inception of his career on only a few theoretical problems, whereas, a building law would examine, not only all his propositions on paper, but all the building he may ever erect throughout the whole of his career.

Furthermore, a building law provides for cases of new methods of construction; for instance: Suppose a license law had been in force, say ten years ago—before reinforced concrete came into vogue—all the old practitioners would be licensed and yet they would not have to be examined by the license law on reinforced concrete construction, and yet by it they would be allowed to practice without examination on this important branch of architectural work. A building law would prevent this and submit all practitioners on all new methods of construction to continuous examination, because plans and specifications of all new methods of construction would have to be submitted for approval before a permit to begin erecting would be granted. Therefore, a law specifying the structural requirements of building is much more effective protection for the public than a license law examination.

Again, while it is clear that to submit plans and specifications of every proposed building project to a government official for a permit before proceeding with the erection of a building, is the best possible protection of the interests of the public; it is also very clear this method of protecting the public would be quite inapplicable to the three professions, whose laws are frequently cited as examples for the architectural profession, viz., law, medicine and dentistry, because it would be obviously absurd to compel a lawyer to submit his brief, a physician his prescription, and a dentist his method of treatment, to a government official to obtain permission for each case before acting. Therefore, the best method of controlling the practice of the profession of architecture, in the public interest, must be different to the best method of controlling the profession of law, medicine and dentistry in the same interest, or to state it negatively: The architectural profession must not be controlled, in the public interest, in the same manner in which the three aforesaid professions are controlled in same interest.

Again, if a resident of the province can continuously draw plans and specifications of buildings which meet the requirements of a proper building law, he is surely by that means passing a continuous government examination. He should, therefore, be entitled to earn his living by drawing plans and specifications without hindrance.

As to the statement, "The prospective builder in the province of Ontario has absolutely no means whereby he may distinguish between the incapable imposter and the competent designer," it is sufficient to say, in the light of the foregoing, he has exactly the same means of knowing this as he knows the difference between any other professional men. Do not the public, in the outlying districts, evidence their knowledge in this respect when they come to the larger places to select architects of experience in a given line when they have important commissions to award? The public are wiser than your writer gives credit.

My conclusion is: It is not "Architectural Registration," it is not a "Provincial Board of Examiners responsible only to the Government" which the community needs; but they do stand sorely in need of ample opportunity for their sons to adequately study architecture to the extent that they may become "thoroughly trained men." This means a thoroughgoing architectural school and also an architectural museum more amply equipped than such needs to be in a community possessed of historical monuments. The community also needs a comprehensive and moderate provincial building law specifying the requirements to be fulfilled in the construction of various classes of buildings. These the community are entitled to receive from the Government of the province. And the public, the university and the profession should unitedly see to it that no influence will succeed in having half a loaf of stale bread dispensed where a full loaf of the best bread is absolutely necessary to the best architectural health of the province.

The fact that other countries are advocating license laws for the architectural profession is no reason at all for adopting such a law in the province of Ontario, when it is easily seen that such a law would be not nearly as efficient for the general good as would be a thorough educational course, on the one hand for students, and a building law on the other hand for architects.

It is well to take note that we are at very vital stage in the architectural development of our province. We, therefore, need to be extremely careful to avoid laying a foundation in our architectural life, which the next generation will deem unworthy of the superstructure which must ultimately be erected. Let us avoid laying a foundation which they will surely abandon. Let us be wise men. Let us dig broadly and deeply. Let us go to bed rock for our foundation because the superstructure eventually erected will surely be worthy of the very best possible foundation.

If the older men of this generation will not see, we must remember the young men now entering on their studentship and who feel the need of real help to study will become the men of the future, seeing more clearly what is necessary, and they will ultimately do the work which ought to be accomplished in these days.

Your writer having made reference to the O.A.A., and their "opponents," I venture to predict that should the O.A.A. prove themselves in the future to be advocates of this thoroughgoing educational policy, instead of still remaining advocates of compulsory registration, they will find their former "opponents" lined up, not against them, but on their side. "Opponents" of the O.A.A. are in reality only opponents of the very inefficient educational policy hitherto advocated by the O.A.A.

In conclusion, Mr. Editor, allow me to make the suggestion that you devote several articles in your valuable paper, to show what is being done in our province in the way of architectural education and what the equipment is for that purpose, giving samples of the work done by the students. Then, to go no farther afield, cover the same ground, in those States of the Union with which we are most in touch—the States of New York and Michigan. Let your readers become most thoroughly

acquainted with the training students received and samples of the work produced by them, both at home and next door to them. If this is done, and it should be done, I feel confident, the advocates of compulsory registration will see how utterly inadequate anything but a thoroughgoing educational scheme will meet the crying —but unheeded—needs of this great province.

Yours truly, J. C. B. HORWOOD.

ANOTHER PHASE OF THE MATTER.---Views of Mr. A. H. Gregg of Toronto, as Set Forth in a Communication to "Construction."---Does Not Understand Why Architect Should Object to a Licensing Act. ∴ ∴ ∴ ∴

In view of the fact that Mr. Horwood's letter to CONSTRUCTION *was read at the Convention of the Ontario Association of Architects and was there discussed, Mr. Gregg's rep.y as is published below is perfectly in order.*—EDITOR.

Editor CONSTRUCTION:

Your November editorials on the subject of Architectural Registration, advocating the law designed to create a Government standard of competence in the practice of architecture, are so forcible that your readers are impelled to put on their thinking caps, whether or not they agree with you.

At the convention of the Ontario Association of Architects, just concluded, a discussion took place on this good old subject, and the outcome of the discussion was that the association practically shelved certain proposals to bring before the Legislature amendments to the Architects' Act, which would result in making the profession a close corporation as well as a proposal looking towards the establishment of a licensing law, similar to that in force in the State of Illinois. This decided action was, I believe, largely brought about by the general feeling that in view of the evident present-day temper of the legislators, the press and the public, it would only be wasting ammunition to attempt to make architecture a close profession and that a licensing law would only be considered as a measure of protection for the public, and as such it was for laymen and not architects to advocate its enactment.

During the discussion, Mr. J. C. B. Horwood was present and by special request read a letter written by him, which, I understand, is to appear in this number of CONSTRUCTION. In this letter Mr. Horwood expresses strong disapproval of a licensing law as proposed by you, as well as of any system of compulsory education such as is involved in the making of the profession of architecture a close corporation. It is a little curious to note that in last January's CONSTRUCTION, Mr. Horwood stated that "the licensing of architects would be very unwisely placed in the hands of a close corporation of architects," but refers to the fact that in some of the States the licensing of architects "rightly remains with the Government." Now that you propose a licensing act with a Government Board of Examiners, he objects to that also.

There are, however, some tenets as regards architectural education and the architect's relation to the public which, I think, we all hold in common and some of these might be enumerated. All will agree that the architect should be a thoroughly trained man, whose training should not be confined to the practical knowledge requisite for safe building, but should include a most thorough training in all that makes for good architecture as an art. To carry on this training, all will surely agree that there is need of the educational facilities of schools of architecture with proper staff and equipment. And whatever the efficiency of the architect, by whatever system or lack of system it may be produced, all will agree that the safety of the public demands that stringent building laws should be enacted and well enforced.

Differing to some extent from Mr. Horwood as to ways and means, it seems to me that the only hope of inducing systematic study for architectural students is found in some form of compulsion. As a corollary, the only hope that the public have to obtain properly qualified architects is to demand a system, that will guarantee that all who practice as architects have at least the advantages of a thorough education—a system that assumes that there are some things that every architect should be taught. To adopt such a system would not be the wielding of a "rod." It would be merely the placing of a barrier in the road of the student—a barrier that would be promptly let down to those willing to exert themselves for their own betterment.

Personally, I care not how this compulsion is brought about, whether by the making of the profession a close corporation or by a licensing law or by the gentler compulsion brought into action by the gradual recognition by architects and the public of the superior efficiency of the graduates of some school of architecture or of those who have followed the course of study and training presented by some architectural association with the consequent necessity felt by all desiring to obtain positions in architects' offices or to establish a practice on their own account of falling into line. The first method seems to be out of the range of practical politics, the second, the system most readily obtained if advocated by the public as a public safeguard, and the last, the most peaceful way whereby architects interested in architectural education may realize their ideals.

At present, we lack educational facilities. Mr. Horwood proposes that the Government provide well equipped architectural colleges and is prepared to assure the Government that if it do so the class-rooms will be promptly filled with eager students. He states that the younger generation does not now refuse to take advantage of the limited opportunities of self-improvement at hand as evidenced by their willingness to attend the few good ateliers which have been organized, where the flickering effulgence of midnight oil is substituted for the glare of the lights of the hockey rink or the glittering allurements of the vaudeville theatre frequented by less seriously-minded youths. He instances the many who make pilgrimages to such centres as New York with their many opportunities for study. I know something of the conditions existing in New York, and even in that centre of the hundreds and hundreds of architectural students, there is but a very small proportion who, once outside the range of vision of the man who pays their salaries are worried by ambitious desires to study and work. There will always be the elite in any body of men, old or young, those who are willing to do more than their fellows. These will take care of themselves, but it is the greatest good for the greatest number that, I am told, educationalists as well as statesmen must consider.

Were there some universally impelling motive in a new condition to arise, the number of students prepared to take a proper course of study would automatically be so increased that the Government would be *warranted* in providing proper educational facilities, thus bringing about a state of affairs we all agree should exist.

It is sometimes said that compulsory education involves a system of study and examination, which produces machine made graduates, whose individuality has been crushed in the process. If this be the result, it merely indicates that the system has not been properly worked out. An architectural school should encourage in every possible way individual talents and proclivities, by special courses, study, scientific and artistic, outside the regular courses, by special atelier work, presided over by enthusiastic practicing architects, by travelling scholarships, and by many other means which are even now being adopted by architectural colleges.

The conclusion of the whole matter seems to me to

be that it is the duty of all architects to advocate a system of architectural education which is suitable to the needs of all architectural students, and must be followed by all, a system providing in the fullest manner for the encouragement of individual talents and by advocating such a system support the public in its demand for a higher standard of efficiency in the profession.

Yours very truly, A. H. GREGG.

Toronto, January 16, 1908.

TORONTO HAS BEAUX ART SOCIETY.---Atelier System of Study Inaugurated by Draughtsmen of the Various Architectural Offices.

THE ATELIER system of study, so decidedly in vogue in France, has to all appearances become a fixed mode of education in Toronto, where a number of draughtsmen from the various architectural offices have banded themselves together in what is known as the Beaux Art Society of Toronto. The object of the Society is to provide a better opportunity for the pursuit of knowledge in the theory and application of the laws of building design than is to be obtained in the average office, and up to the present time the movement is evidently meeting with a deserved success.

Although this system of study does not meet with the approval of many members of the profession in Canada, nevertheless the end more than justifies the means and it will answer the purpose admirably in the absence of a more efficient or better method of architectural education.

It will at least enable the students to match their ability by actual competition, give them an opportunity for a greater diversity of subject matter on which to test their skill, and broaden their knowledge by a closer association and a mutual interchange of ideas. Futhermore it will ground them more thoroughly in the ethics of their calling by bringing about a feeling of fraternalism which should in after years reflect to the honor and dignity of the profession.

The Society at the present time comprises thirty members, and at Atelier Lyle, corner of Yonge and Yorkville Sts.—so styled in honor of their patron, Architect John M. Lyle, who is generously devoting two nights a week in giving instructions and setting problems—a large class of young men each night grapple earnestly and enthusiastically with the work that has been placed before them.

With the selection of each subject, the students make a preliminary sketch which is turned in to the Secretary, Mr. I. Feldman, within a limited time on the night the problem is set. These sketches are gradually developed on subsequent nights (a limited time being set for each portion of the work), until the plans, elevations and drawings have been completed and are ready for criticism.

While the Society has only been organized three months, it is making excellent progress, as the students are now working on their fourth problem in competition for a prize offered by one of the local architectural bodies who are in sympathy with the efforts the draughtsmen are making to qualify themselves for the important duty of the profession of Architecture.

CONCRETE TELEGRAPH POLES.

IN CONTINUANCE of the declared policy of the Pennsylvania Railroad system to provide against timber scarcity, the lines west of Pittsburg have just completed and placed in experimental service a line of concrete telegraph poles through New Brighton, Pa. Its construction followed a series of elaborate experiments which have been conducted during the past two years.

Owing to the fact that wooden poles are constantly becoming more expensive and more difficult to obtain, the Pennsylvania in 1906 began to test the value of concrete as a substitute for wood. Fifty-three reinforced concrete poles were set up in line along the Pittsburg, Fort Wayne & Chicago Ry. near Maples, Ind. A year later they were giving entire satisfaction and showed no evidence of decay.

According to the experiments made so far, it is thought that a concrete telegraph pole will last for many generations, thereby doing away with the frequent changes necessary with wooden poles. Much importance is also attached to the increased strength of the new poles, which hold the strain of the line, even on curves, without any braces.

The poles at New Brighton are of graceful proportions, being about 30 feet long, 14 inches in diameter at the bottom and 6 inches at the top. Their general appearance is particularly pleasing on account of the uniformity in size, shape and color.

ARGENTINE REPUBLIC offers a market for waterworks machinery, sanitary supplies, bridge materials and machinery and appliances used in railway construction, that should advert the attention of Canadian manufacturers and supply dealers in these lines, who are looking for outside business. The government of that country has just authorized a large number of public improvements that includes principally that class of work for which the above named machinery and materials will be required. Besides numerous new railroads and extensions to be constructed in various sections, four towns are to be provided with sanitation works which will cost from $175,000 to $1,100,000 in each instance; three towns are to have water supply works at an expense of $225,000 to $350,000, according to their relative importance; and two new bridges are to be constructed on the road from Santa Fe to Santa Rosa, one over Arroyo Leyes and the other over Arroyo Potero. A decree has also been passed authorizing the construction of docks, wharves, warehouses, grain elevators, transporters, etc., at the mouth of the Arroyo Pareja, near Puerto Belgrano, Bahia Blanca; and plans for similar improvements at Mar del Plata have been approved. It is understood that most of the material necessary will be admitted duty free.

RELIGION AND BUSINESS are to be combined under one roof, according to plans made public by the trustees of the First United Evangelical Protestant German Congregation of Pittsburg, for what will be one of the most unique structures in history, a fourteen-storey joint office building and church. The part to be devoted to church purposes will occupy the middle portion of the building, while around it are to be suites of modern offices. The reason given for this novel undertaking is that a restrictive clause, inserted by the donor in the deed of conveyance made many years ago, provided that the ground on which the building is to stand, "must always and ever be used for church purposes." Several churches have come and gone on this valuable plot at the corner of Sixth avenue and Smithfield street, in the heart of the downtown district, while skyscrapers have grown up all around it. The congregation cannot sell and rebuild in the suburbs, as it would like to do and could do at great profit, so the happy thought was struck that an office building and a church could be combined. The front elevation of the new edifice shows a beautiful cathedral style facade in the centre. The church effect rises with the building for about seven storeys, then permits the office part to continue skyward. There is to be a great chime of bells in the church, and the whole edifice will cost not less than $1,500,000. The Board of Trustees obtained legal advice before taking this step in erecting an office building on property set aside for church purposes.

CANADIAN DELEGATION VISITS CLEVELAND.---Attends National Cement Users Convention with Good Results.---Many U.S. Firms to Exhibit in Toronto.---C.C.C.A. Convention and Exhibition to be a Big Success.

THAT THE FIRST Convention and Exhibition of the Canadian Cement and Concrete Association will be an unqualified success beyond even the most sanguine expectations of its organizers, was proven by the enthusiastic and wide-awake delegation from the C. C. C. A. to the convention of the National Association of Cement Users, held January 11 to 16, at Cleveland, Ohio.

This delegation, headed by Mr. Peter A. Gillespie, lecturer on the theory of construction, of Toronto University, was between twenty-five and thirty strong. Quebec, Montreal, Toronto, London, Brantford, Mitchell and Windsor were among the cities represented in the Canadian delegation. Among these were represented the most prominent firms in Canada, engaged in almost every branch of the cement industry. Some 200 badges, containing the insignia of the association in red and blue, announcing the C. C. C. A. Convention to be held at Toronto from March 1 to 6, and about the same number of small silk Union Jacks were taken along by the delegates, most of whom went in a private car from Toronto on Tuesday evening, January 12; these were pinned upon the coats of the delegates in attendance at Cleveland, and were much in evidence everywhere during the entire convention.

We are safe in saying that nobody who attended the National Convention at Cleveland, went away without being thoroughly impressed with the fact that the C. C. C. A. is soon to hold their convention in Toronto. Our American friends were profuse in their praise of the progress that Canada has made in the past few years, and all appeared very much interested in conditions in this country. Mr. Nixon, assistant manager of the coming Canadian Cement and Concrete Exhibition, was successful in inducing a large number of exhibitors at the National Show, to bring their exhibits to Toronto.

ST. LAWRENCE ARENA, TORONTO, WHERE THE FIRST CONVENTION AND EXHIBITION OF THE CANADIAN CEMENT AND CONCRETE ASSOCIATION WILL BE HELD FROM MARCH 1ST TO 6TH.

The Canadian firms engaged in any branch of the cement industry, should by all means make arrangements at the earliest possible date, to exhibit at the Canadian Show. Those who took the time to carefully view the large number of exhibits at Cleveland, could not fail to be impressed with the importance of such exhibits, and also with the material, direct benefits gained by the exhibitors in actual sales made on the floor, let alone the advertising value for future business.

St. Lawrence Arena is an ideal auditorium to hold such an exhibition. Its solid concrete floors of great area, and its large entrances make it possible to arrange any nature of exhibit desired.

For further information, plan of Exhibition Hall, etc., prospective exhibitors should address Mr. R. M. Jaffray, manager, 1 Wellington street west, Toronto.

THE EATON MAUSOLEUM RECENTLY ERECTED AT MOUNT PLEASANT CEMETERY, TORONTO. ARCHITECTS SPROATT AND ROLPH, DESIGNERS.

THE EATON MAUSOLEUM, MOUNT PLEASANT CEMETERY, TORONTO, SHOWING SCAFFOLDING USED IN ITS ERECTION. ARCHITECTS SPROATT AND ROLPH, DESIGNERS.

THE EATON MAUSOLEUM.---Massive Structure Recently Completed at Mount Pleasant Cemetery, Toronto.---Designed in Roman Corinthian Order.---Contains Twenty-Two Catacombs.---Built of Stanstead Granite.

THERE HAS JUST been completed in Mount Pleasant Cemetery, Toronto, a mausoleum of unusual size and beauty, which is to contain the remains of the late Timothy Eaton, and which was erected by his family. As shown in the accompanying illustration the structure is of the Roman Corinthian order, modified in detail somewhat to suit the material of which it is constructed, every member being carefully and accurately proportioned and finely finished. The dimensions are 48 feet 6 inches long, 29 feet 2 inches wide and 32 feet 3 inches high.

The foundation is built very deep of solid concrete, from which rises the pedestal with finely molded base, the cap extending under the main wall line forming a wide platform of unusually large and heavy stones, assuring the perfect stability of the superstructure.

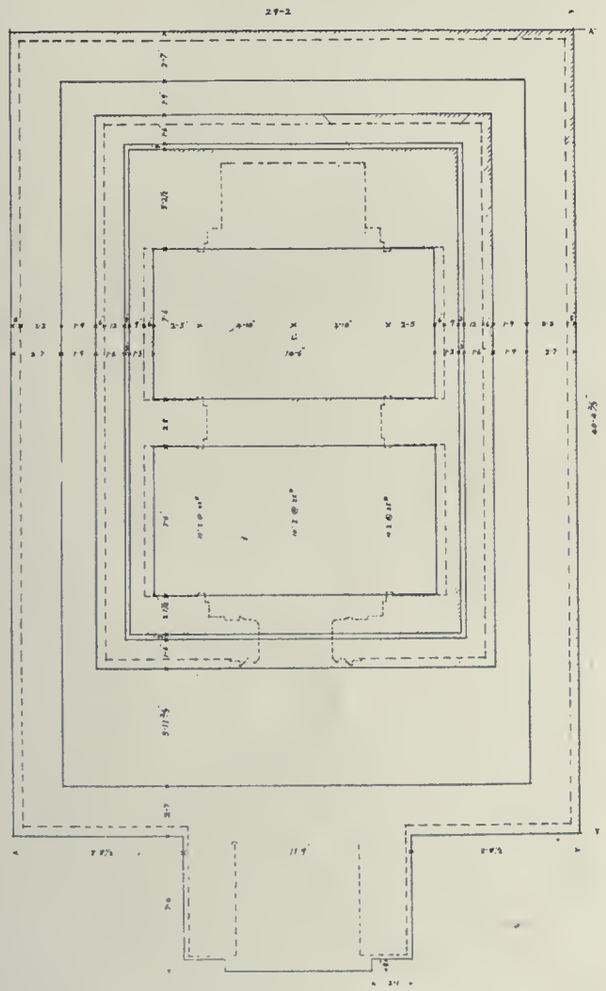
On this platform are set the twenty-eight columns in perfect alignment throughout ,and the detail and workmanship shows a most perfect rendering in cut granite; the care and skill displayed in the undercut foliage of the capitals and the artistic excellence of the entire work being especially noteworthy for this material. The fluted columns stand in pleasing contrast to the plain walls of the cella, the architrave and entablature of the doorway only being relieved by carving of severe conventionality.

Above the columns and molded architrave the wide heavy stones forming the frieze again connect the colonnade and the main wall in solid bond to carry the tremendous weight of the thirty-three roof stones, which run from five to twelve tons each. The whole roof is set on a solid mass of heavily reinforced concrete (100 cubic yards in quantity), each stone so lapped and jointed as to be perfectly weathertight under any conditions. The accuracy with which these stones are cut is attested by the straight lines and fine jointing throughout, no trimming having been necessary in the setting. The work is entirely executed of granite from the quarries at Stanstead, Quebec.

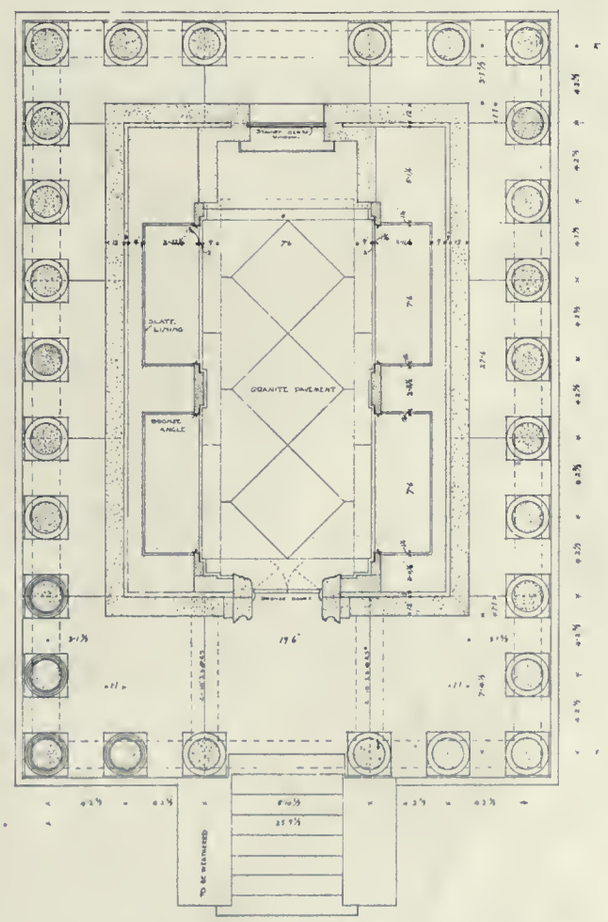
An unusual feature of the mausoleum is the interior, the shelves and every exposed surface, including floor and ceiling, being of highly polished Stanstead granite, some of the stones being very heavy.

There are twenty-two catacombs (none being below the floor) lined with heavy slate and each closed with a slab of polished granite weighing nearly one-half a ton.

The interior is almost a structure by itself, being entirely separated from the outer wall by an air space of 3 inches, carefully ventilated, so that no dampness can come through and cause staining, and each crypt when sealed up will be practically air-tight. The somewhat sombre effect of the interior (not out of place in such a



FOUNDATION PLAN, EATON'S MAUSOLEUM, MOUNT PLEASANT CEMETERY, TORONTO. MESSRS. SPROATT AND ROLPH, ARCHITECTS.



FLOOR PLAN, EATON'S MAUSOLEUM, MOUNT PLEASANT CEMETERY, TORONTO. MESSRS. SPROATT AND ROLPH, ARCHITECTS.

structure) is relieved by handsome bronze fittings and a fine stained glass memorial window, which add a note of rich color to the polished surfaces. The window is protected by a bronze grille, the doors, too, being of bronze, their plain surfaces being of a modelled or matt finish and the grille work machine finished for contrast.

In erecting the mausoleum, a trestle 90 feet long and 34 feet wide and 36 feet high was built, carrying two travelling cranes of 15 tons capacity each. On each of these was used a Yale and Towne 10-inch chain hoist, and for the heaviest stones the chains were doubled.

The mausoleum was designed by Messrs. Sproatt & Rolph, architects, Toronto, and carried out under the direction of Mr. W. R. Mead, supervising architect for the owners. The McIntosh Granite Co., 1119 Yonge street, Toronto, were the contractors for the entire work.

CONRCETE FREEZING TANKS.---An Experiment in the Refrigerating Line.

AN EXPERIENCE in the construction of reinforced concrete freezing tanks was referred to in a paper before the recent meeting of the American Society of Refrigerating Engineers by Mr. Wm. M. Torrance, New York. The tanks are 27½ ft. wide by 39½ ft. long and 4 ft. deep, inside and have a floor and walls 8 in. thick. The latter are reinforced with cold twisted steel bars, 5-8 in. square, placed 12 in. center to center in each direction, so that the entire area of base and sides was gridironed with these bars. By calculation for range of temperature or from —10 degrees F. to +90 degrees F., these rods were found sufficient to take care of temperature strains. The vertical rods in the side were made continuous with those crossing each other in the base, the bend at the corner being made cold so as to preserve for the steel the extra strength due to twisting the rod in the first place. This bend is near the inner surface of the concrete, while the general location of rod is near the centre of the slab. This is brought near the inner surface to take care of the stresses induced at the corner by the hydraulic pressure of the brine against the sides of the tank.

In these tanks the insulation consisted of screened cinders filled with coal-tar pitch, a kind of insulation that is not recommended by some, but, nevertheless, it has much to recommend it. Cinders cost nothing but transportation, as a rule, and coal-tar pitch, besides being comparatively inexpensive, is impervious to moisture, as well as a fairly good insulator. There can be little question but that, being a mineral substance, its life as an insulator will exceed that of a purely vegetable substance, as cork. Being incapable of absorbing moisture, it will always remain insulating. If the cinders are well screened of all dust and the spaces between the individual pieces of cinders deposited loosely, are well filled with the boiling hot pitch, one could not ask for a better result than will be obtained, provided, of course, that sufficient thickness of the insulation be used. Of course, another great advantage of this type of insulation, whether used outside a steel tank or outside a concrete tank, is its additional property of non-absorption of moisture, being, if well placed, a waterproofing. Thus, if the brine or any portion of it could find an opening through the steel or concrete it could not leak away through or into the insulation, thus being wasted and spoiling the insulation at the same time, if this form of insulation were in use.

This insulation was for the floor, placed on the top of the foundation, before the tank was built. That on the sides was placed afterward, the outside concrete forms being moved back and the cinders and tar being placed in the space between them and the finished concrete wall. It was decided that the concrete itself has about the same insulation coefficient as a brick wall or about half that of the cinders and tar, so that for the same degree of perfection in insulation several inches of the thickness of this cinders and tar mixture were saved.

Oftentimes steel tanks are worn out after only a few seasons of use. This is often due, as is well known, to the habit of the operatives of strengthening their brine by adding common salt (NaCl) instead of the calcium chloride (CaCl2), which they should have on hand, but which is either lacking or, from the operatives' standpoint, too expensive. This common salt, of course, rusts the tank out very rapidly. While to many this might not be considered a recommendation for concrete, this practice, Mr. Torrance states, would not injure a concrete tank, as neither NaCl brine, nor CaCl2 brine would have any chemical effect on well-made concrete. In fact, with a concrete tank installation it might be found to be cheaper to use NaCl altogether and not get the more expensive CaCl2.—ENGINEERING RECORD.

MONTREAL'S GREATEST TROUBLES seem to lie in the erection of police and fire stations. Following the wrangling, indefinite delays, inconvenience, and adverse criticism when the building was completed, of No. 5 Fire Station, comes another mix-up in the shape of the new No. 13 Police Station at the corner of Frontenac and Forsyth streets, which may lead to the appointment of a royal commission to enquire into alleged irregularities in connection with its erection, and also into the general civic administration of the city. The difficulty in this particular instance is apparently due to the fact that the architect, when he found the land upon which he was authorized to build, ten feet shorter than the measurement of the site as given him from the deed of sale by Notary Morin, modified the length of the structure so as to conform with the available ground area, without notifying the Police Committee. This has brought forth the question as to whether the cost of the building would have been proportionately reduced had the fact not been discovered, and things are astir. The architect, in defence of his position, states that he acted strictly within the limits of his contract, which gave him power to make any modification in the plan found to be absolutely necessary by unforeseen contingencies, and that he had also brought the matter to the attention of Alderman Proulx, chairman of the committee, and Chief of Police Campeau. Had this been the first affair of its kind in Montreal, it could possibly be ascribed to the unlucky number to which the building is heir. Something is seemingly wrong, however, and has been wrong for some time. It might be suggested that Montreal bring about a state of reform by installing a new body of officials, making all buildings fireproof, doing away with the necessity of fire and police stations, and thus obviate exasperating circumstances of this kind in the future.

IN A COMPARATIVE REVIEW of the imports of machinery into Japan, an Osaka newspaper comments upon the peculiarities of the times. It refers to the fact that the value of machinery imported into this country in 1905, $10,400,000, fell to $9,235,000 in 1906, but rose to $13,845,000 in 1907. The tendency to increase is still more pronounced this year, the value for the first seven months of 1908 reaching $11,185,000, exceeding the figures for the whole of 1905 and being only about $2,500,000 less than the value for the whole of 1907. If it continues unchecked, the value of the machinery imported in 1908 may amount to as much as $17,500,000. The figures for the first seven months of the years 1906, 1907, and 1908 were $5,568,698, $7,419,478, and $11,188,890, respectively. The bulk of the machinery now being imported consists of lathes and other machines for iron, electric, and steam works, and spinning, dyeing, mining, and mineral-smelting machinery.

MACHINERY AND TRADE

AN UNEXPECTED FIRE TEST.

THE OLD saying "that it's an ill-wind that blows nobody good" was strikingly illustrated in the recent conflagration which swept Pembroke. Regrettable as a misfortune of this kind is, i thas not been without its element of good in that it not only emphasizes the fallacy and prodigality of shoddy construction and the use of inflammable materials, but it brought forcibly before the people of that town the virtues of cement concrete as a barrier against fire.

In the very heart of the burnt district, with ruin and desolation on every side, stands the carriage and wagon factory of Alexander Barr, a two-storey structure cov--ering a ground area of 102 by 40 feet. The building was erected in 1905, and its remarkable preservation to-day is due to the fact that it was constructed of cement concrete.

Surrounded almost entirely by a seething mass of flames, which beat unsuccessfully against its walls, and situated at a point at which no water was used, the admirable manner in which this building withstood the fierce onslaught of heat and fire, is best shown in the accompanying illustration, reproduced from a photograph taken after the smoke of the conflagration had cleared away.

The test while unexpected at the time was a practicable and convincing one as regards the fire resisting qualities of Portland concrete cement. The adjoining buildings which stood within eighteen inches of this structure were entirely destroyed, and the heat from these buildings was intensified by five cords of blazing wood which were piled against the factory's wall. The cordwood was completely consumed, but the wall remained uninjured

Representatives of the International Portland Cement Company, whose cement was used in the construction of the building, upon going to Pembroke in order to fully ascertain the action of the fire on the building, found the structure standing intact without the concrete showing the slightest indication of disintegration.

The building is but another substantial proof of the fire-resisting properties of well made concrete. It is a lesson which will, or should at least appeal to the intelligent residents of Pembroke in rebuilding their structures, and be of benefit to the cement and concrete interests throughout the Dominion.

A SERVICEABLE OFFICE CALENDAR

AN ESPECIALLY splendid wall calendar, particularly well adapted to general office use, is being mailed to the trade by Mussens, Limited, of Montreal. In general character and typographical conception, it is perhaps the most conspicuous offering of the year in this respect.

The calendar is printed on rich cream tinted paper with well selected type, and highly illustrated with high class half-tones of the company's products. The month, days and numerals stand out strongly and can be readily seen from any point of the average office. These are printed in black, with the exception of the cardinal dates, which like the intersecting lines and the firm name at the top, are brought out in a vivid red.

The illustrations throughout serve to give an excellent idea of the general character and magnitude of the various lines carried by this company, whose name in Canada has become inseparably associated with everything which pertains to machinery and supplies for contractors, railroads, mines, municipalities, factories, mills, etc.

On the first page is featured a portable Smith concrete mixer with patent loading device, which can be supplied in sizes capable of turning out from 50 to 350 cubic yards per day; while other equipment, shown in convenient spaces throughout the calendar, which is of interest to contractors and structural engineers, includes hoisting engines, derricks, portable light, ball-bearing wheelbarrows, and Ideal concrete block machines.

There are also displayed a large array of machinery and supplies for municipal work, such as street sweeper and sprinklers, rollers, scarifers, scraper and plow, as well. The Mussens, Limited, is the most complete ma-

VIEW OF DISTRICT RECENTLY SWEPT BY FIRE AT PEMBROKE, ONT., SHOWING THE CONCRETE BLOCK CARRIAGE AND WAGON FACTORY OF ALEXANDER BARR, WHICH WAS THE ONLY BUILDIND THAT SUCCESSFULLY STOOD THE ONSLAUGHT OF THE FLAMES.

chinery and supply house in the Dominion and the success which has attended its efforts speaks highly of the company's aggressive method and the high quality of its various lines.

The company has a competent staff of engineers in all departments and make a specialty of designing rock crushing, concrete mixing, mining and hoisting plants. Branches are maintained in Toronto, Cobalt, Winnipeg and Vancouver.

LEST YOU FORGET.

FOLLOWING their annual custom, the B. Greening Wire Company, Ltd., of Hamilton., have just issued a particularly fine calendar for general office use during the ensuing year. It consists of a large date pad mounted on highly colored lithographic back, which shows a panoramic view of the company's splendidly equipped plant, set off artistically with a pleasing border design, and half-tones of the present president and early founders whose names it bears.

The month, day and dates are printed in large bold type, while all unused date spaces form to make a series of "gentle reminders" with line cuts of the company's products, such as foundry supplies, wire door mats, galvanized iron strands, light and heavy wire cloth, wire rope, etc.

Underneath the pad are a number of useful tables giving the size, weight, length and strength of wire, wire ropes, sheet zinc, sheet wrought iron and steel, bar iron, and also a table showing the necessary size and speed of wheels and rope to obtain any desired amount of power by wire rope transmission.

Within a fortnight the company will issue a series of new catalogues dealing with the various lines which they manufacture, which in addition to the forementioned products include wire netting, counter railing, window guards, steel wire reinforcement for concrete, wire lath for plastering and kindred lines.

These catalogues are comprehensive in their scope, having been carefully compiled and profusely illustrated. Architects and engineers will find of immeasurable benefit the large number of reference tables and other valuable information which they embody, in specifying any of the above enumerated materials, and anyone interested in products of this character, should make it a point to be on the company's mailing list when these handy volumes are ready for distirbution.

A BURNING SUCCESS FOR 20 YEARS.

THE PROBLEM of warming and ventilating the church, the school and the home in a proper, even and sanitary maner, is at all times a most important one, yet it is one that has been and is being successfully solved in all parts of Canada and the United States by the "Kelsey System."

Owing to its many individual features and its special and patented construction, the "Kelsey Warm Air Generator," has much to recommend it to the consideration of the architects, and those who are contemplating the installation of heating apparatus for any character of building.

The fire pot and combustion chamber of this generator, being formed of long, hollow, corrugated section, affords an area of heating surface greatly in excess of that of the ordinary furnace, and three times as much in circulation. This result in the supplying of large volumes of pure, fresh air—and not the scorched, burnt, vitiated kind from which every vestage of moisture, that is so injurious to health and destructive of furniture and hangings.

As an conomize of fuel, it is said, that the "Kelsey enerator" canot be excelled, and by capping the section in groups of two or three it will readily heat distant room, which is an exceptional advantage in residences of large dimensions.

Users of this system speak most highly of its absolute dust and gas-proof qualities, and the fact that there is no radiation of heat in the cellar.

Perhaps the most convincing argument regarding the merits of the "Kelsey" is the fact that since they were first made in 1889, when three were sold, the demand has so steadily increased, that to-day there are 32,000 in use.

The exclusive makers of the Kelsey System in Canada, are the James Smart Manufacturing Company, of Brockville, Ont., and the highly satisfactory performance of its product is borne out by a large reference list which the company has on hand. The company employs conipetent heating engineers who furnish plans and

ONE OF THE MANY FINE HOMES IN WHICH THE KELSEY WARM AIR GENERATOR HAS SUCCESSFULLY SOLVED THE PROBLEM OF HEATING AND VENTILATION.

estimates for the warming and heating of any kind of building, and who are at the services of the architect and builder.

ONE OBJECTION TO GLASS ROOFS is, that if they are not very steeply inclined the water of condensation collects on their under surface, and instead of running down along the separating ribs of the panes or plates and being led off, drips upon persons or objects below, which is inconvenient and may be very expensive. Even where the panes or strips are short, the path to the trough is too long. The increase in length and width of the plates now used makes the difficulty of more and more importance each year, according to a correspondent of the National Builder.

One way of getting around it is, however, similar to that employed in forests and parks to prevent washing away of the hillside paths; namely, making inclined grooves towards the sides; only in this case the grooves are of horseshoe shape and form a series of parallel corrugations which carry the drops to the ribs which separate the plate; they then follow these without much difficulty down the slant to the trough below. This system may be employed either with glass sheets in which wire is embeded or with plain plates.

A CONCRETE BOAT, 65 ft. long and schooner rigged, is said to have been built several years ago by Mr. Daniel B. Banks, engineer of the high pressure water service of Baltimore.

THE OLD METHOD—20 men 8 days on 3,500 sq. ft.

The Calkins Tile and Mosaic Company LIMITED

458 Bleury Street, MONTREAL, Que.

MOSAICS FLOOR AND WALL TILING TERRAZZO

THE NEW METHOD—3 men 42 hours on 3,000 sq. ft.

We are fully equipped to handle our business. Twenty-five years of practical experience. Mechanics who have specialized each branch of our work. We import direct, carry large stocks, manufacture our mosaics, all of which enable us to fill orders promptly at the lowest market prices. We are prepared to handle contracts for our work, set complete in your building, regardless of distance.

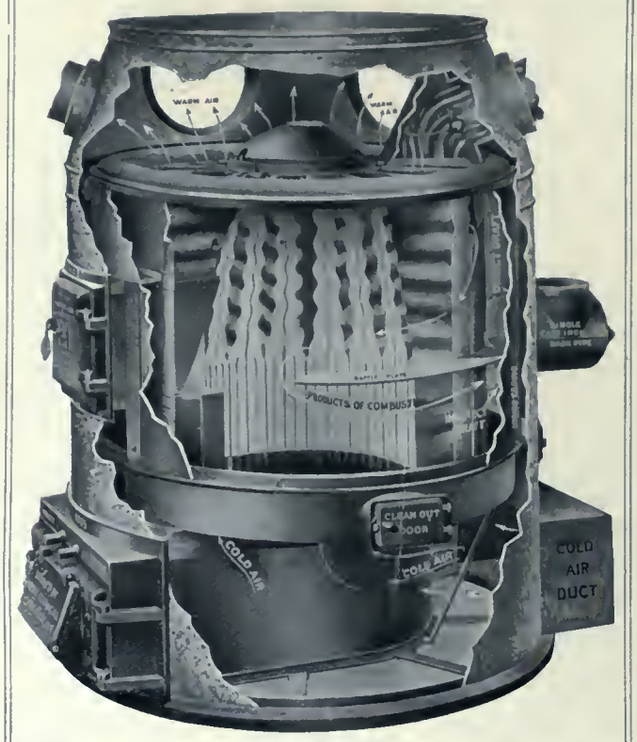
We Can Save You Money

Do the Work in Less Time

And Do It Right

It will cost you nothing to let us estimate on your work, furnish you samples and designs, or to give proper specifications for mosaic or tile work. If you want any information regarding mosaic or tile work we will be glad to assist you.

Panoramic view of new plant of Wood Product Company, Dysart, Ont., taken from the west, Dec. 15th, '08, showing the plant completed with the exception of the water tower, which remain only to be stripped. E. D. Pitt, designing and constructing engineer.



Sectional View—Showing Inside and Outside Casings, Cast Iron Back Pipe, Formation of Fire-Pot, Combustion Chamber, etc.

KELSEY
Warm Air Generator

The Kelsey System of Heating is acknowledged the finest and most up-to-date warm air system on the market to-day.

THE SECRET OF THE KELSEY SUCCESS IS THE SECTION SYSTEM, PROVIDING AN ABUNDANCE OF PURE, WHOLESOME, WARM, FRESH AIR.

Corrugated section.

Some Kelsey Facts

Most heat with smallest fuel consumption.
Large volumes of pure, fresh, properly warmed air.
Freedom from escaping gas, smoke and dust.
All rooms properly and evenly warmed, at all times.
No perceptible radiation of heat in cellar.
No waste of heat through smoke flue.
Are made in six different sizes.
Have fire-pots from 14 to 30 inches in diameter.
Having warming capacities from 5,000 to 100,000 cu. ft.
Weigh from 900 to 3,000 pounds, according to size.
Have a water heater for laundry or bath-room purposes.
Do not have caldron fire-pots to bulge, crack and burn out.
Most sanitary and satisfactory results.

There are 33,000 KELSEY Warm Air Generators in use to-day.

WRITE FOR LITERATURE ON THE HEATING PROBLEM.

Showing how Attachment is Applied and Operated.

If you want to install a Heating System that fulfills (better than any other) every requirement for comfort and ventilation, we'd like to tell you more about the Kelsey Warm Air Generator.

SOLE CANADIAN MAKERS:

The James Smart Mfg. Company
LIMITED

Head Office and Works:
BROCKVILLE, ONT.

Western Branch:
WINNIPEG, MAN.

"TORY TORONTO," "TORONTO THE GOOD" HAS PLANS SEIZED FOR $5,000 DUTY. PLANS FOR $800,000 WORK VALUED AT $5. - - - - - - - -

PLANS PREPARED IN NEW YORK, for an Eight Hundred Thousand Dollar filtration plant, to be erected in Toronto—Found under a berth in a sleeper while crossing the line—Worth Five Dollars—Engineer with them, didn't know they were dutiable—Plans seized by Customs Officer and held for Five Thousand Dollars' duty—Controller Harrison to Ottawa to get them out—Mayor Oliver would give Two Hundred Dollars "but no more"—City Engineer says they are not worth Five Thousand—Will beat Government by redrawing them in Canada.

A brilliant procedure is this. Toronto ought to be proud of this outfit. "Tory Toronto," with all its energetic advocacy of high tariff. "Toronto the good," with its boast of honesty and cleanliness in municipal politics.

Never was there a more flagrant attempt to avoid the rightful payment of duty, by a municipality, during the history of our Customs Tariff Laws.

We realize and have pointed out from time to time that individuals and private corporations have no compunction or even difficulty in smuggling into Canada blue prints of plans prepared in the United States, for Canadian buildings—a traffic that is as despicable, and in the same category, as the smuggling of diamonds.

But it is almost unthinkable that the city of Toronto has at its municipal head, officials who not only attempt to get plans of an $800.000 job, into the country on a valuation of $5.00, but that, when the plans are seized, they would take steps to get a special dispensation from the Customs Department, to get them released at a small nominal sum.

The officials responsible for this indignity to which the city of Toronto has been subjected, are guilty of one of two things, a crude attempt at smuggling, or gross ignorance. We believe it is the latter, for the absurdity of the statements several of the officials have been credited with in the daily press, shows what a well informed, brilliant set of men the City of Toronto has chosen to handle this important project.

Mayor Oliver has decreed that he will condescend to allow the city to pay Two Hundred Dollars for the release of these blue prints, for an $800,000 job, but, it may be that the Mayor should be excused, in so far as his private business is not such as would acquaint him with the details of our Customs Tariff, nor its importance to the country.

City Engineer Rust, however, is very resourceful; he has struck upon the brilliant idea of having the plans redrawn in Toronto, if the Dominion Government will not come to the city's terms. There is no excuse for Mr. Rust. He should know better. The duty of 25 per cent. of the commission of the Architect or Engineer, on the plans of a building to be erected or an engineering project to be undertaken in Canada, is levied to protect the Canadian Architect or Engineer, in the same manner as a duty is placed upon a manufactured product to protect the manufacturer, and the Customs Department has no more right to allow the plans for a building or an engineering project to be admitted into the country duty free for the city of Toronto, than it has to allow a piece of machinery to come in duty free, because it is for the City of Toronto.

A highly intelligent argument put forth by Toronto's worthy officials, is that they are not paying Mr. Hazen, the New York engineer, $20,000 for the drawing of the plans, but that this sum is paid him for his ideas. What does any Architect or Engineer get paid for? They get paid for their ideas, their knowledge, and their services. They have draughtsmen to make drawings, tracings and blue prints. What measure of protection would these professions get if a duty of 25 per cent. were charged only upon the value of the actual labor in preparing plans? The law would be absurd.

But Mr. Rust has a scheme. He is going to have the plans redrawn in Toronto. We do not know what ruling the Customs Department will make in this case, nor are we sure whether any distinct ruling, entirely covering such a case, was ever made by the Customs Department at Ottawa, but we do know that in the United States and in other countries where an import duty is levied upon plans, that duty may be collected at any time, even after the work has been completed, if it can be proven to the satisfaction of the Government, that the work was erected after imported plans.

In Canada, one is liable at any time for duty on an imported dutiable article, if it can be shown that such duty has never been paid. It is not simply a case of get past the Customs Official.

It would, therefore, appear that Mr. Rust's scheme will not work out so nicely as he anticipates, for, in accordance with the regular procedure of the Customs Department in Canada, in the collection of duties on other articles, and in accordance with the ruling of the Customs Department of the United States, on imported plans, even though Mr. Rust proceeds to redraw the plans, the city will still be liable for the rightful amount of duty, if it could be shown that the work was carried out in accordance with plans prepared in the United States.

This smuggling of plans into Canada must be stopped; they are sent through the mails, by express, carried across the Niagara Bridge in overcoats, and brought over in the luggage of individuals. Toronto now has several buildings erected after plans prepared in the United States, upon which never a cent of duty has been paid. Every building has its architect, and every engineering project its engineer; if that engineer or architect comes from

the United States, investigation should be made. The architect or engineer, as well as the contractors and owners, should be examined under oath, if a suspicion exists.

Something should and must be done to stop this perfidious smuggling of plans into this country.

MR. J. C. B. HORWOOD'S AND MR. A. H. GREGG'S LETTERS ON "ARCHITECTS' LICENSE LAW" IN JANUARY "CONSTRUCTION."

TWO LETTERS dealing with the question of the Licensing of Architects were published in the January issue of CONSTRUCTION, one by Mr. J. C. B. Horwood in which two editorials in November CONSTRUCTION, recommending the adoption in the Province of Ontario of what is generally known as an "Architects License Law," were strongly criticized; the other by Mr. A. H. Gregg, who took issue with Mr. Horwood on the question of Compulsory Education in architecture, and strongly indorsed the policy of CONSTRUCTION, as voiced in the editorials in question. Although written before the receipt of either of the letters from Mr. Horwood or Mr. Gregg, the two editorials, *Architects' License Law Makes Architect Responsible to Public as Well as His Client*, Etc., and *Three Objections to Licensing Law*, Etc., in January CONSTRUCTION, deal with most of the points brought up in Mr. Horwood's letter.

Briefly, Mr. Horwood has declared himself as opposed to a Licensing Act because of the following reasons, First, because he maintains it will not give the public the desired protection, to prove which he points to the close corporations of the medical and legal profession, and asks what measure of protection is given the public against incompetence and dishonest practice through the existence of these legally recognized organizations. He asks what guarantee of competency would be given the public by the fact that a man at one time in his life passed an examination to secure a license to practice. He recommends in lieu of a Licensing Act, a Provincial Building Code, which he maintains would examine an architect every time he prepared plans for a building.

Secondly, he intimates that law to raise the standard of the profession is not required, by quoting from the "BUILDER," London, Eng., as follows: "It must be apparent to all observers that Canada is a well built country, whose buildings reflect the intelligence and good taste of its people. There is neither extravagant display nor neglect of interesting features."

Thirdly, he believes in the qualifications provided for in a Government Examination, would set up a false standard for the architect, and would thus operate against the permanent welfare of the profession.

Fourthly, he contends that adequate educational facilities should be provided, before any compulsory examination should be established. In other words, we should provide the supply before we create the demand. In connection with this contention, Mr. Horwood believes that proper educational facilities would so inspire the student of architecture that without the incentive created by a compulsory standard of qualifications, he would exile himself from the world of sport and pleasure and voluntarily burn the midnight oil of ambition.

Mr. A. H. Gregg in his letter, agrees with Mr. Horwood, that Ontario should have stringent, well enforced buildings laws, and that it should have better facilities for architectural education, but takes issue with him on the question of compulsory education. He contends that, while there is the elite in every body of men, the only practical method of inducing the student or prospective architect to properly qualify himself, before he starts out as a practitioner, is through some compulsory method of education. After a standard has been established, then the necessary facilities for education will be provided.

Mr. Horwood and Mr. Gregg agree upon two points. First, that the public has a right to be protected against the operations of the incompetent. Mr. Horwood suggests Provincial buildings laws. Second, that some attempt should be made to raise the standard of the profession in the Province of Ontario. Mr. Horwood suggests better facilities for architectural education, and Mr. Gregg, compulsory education.

In answering Mr. Horwood's first objection wherein he states that such a law would not give the public the desired protection, and in which he compares the examination provided by such a law, with that of the Ontario Law Association, we would say that there is no such comparison. The examiners of the Ontario Law Association are responsible to the profession and not the public. In this association exists an "esprit de corps" which forbids to a great extent the harsh handling of wrong doers. The examiners and the members are fellows in the same association. On the other hand, an examining board such as would be provided for in an Architect's Act, would be appointed by the Government, and would be responsible to the Government, and not the profession. Their appointment would be entirely independent of any architect's association.

In the second place, in answer to Mr. Horwood's objection that examining a man once would not be a guarantee that he would keep abreast of the times and be competent to design buildings according to new methods of construction that would be adopted from time to time, we would point out that the examination, in the first place, is only a means to determine if a man has knowledge of the basic principles of the profession, such as entitles him to call himself an *architect*. Each year, however, he has to renew his license. He is not given a diploma or a license for an indeterminate period, as is the case with the law and medical associations. If in his practice he is found guilty of gross incompetence or dishonesty, an appeal can be made to the Licensing Board, which has the power to take evidence under oath, he stands to have his license revoked or to have the board refuse to renew it. This surely gives the public a much greater measure of protection than it now enjoys. It might be stated here that several licences were revoked in the State of Illinois during the past year; one for the illegal use of his seal in stamping the plans for a three-storey building in Chicago prepared by a draftsman without a license, for the purpose of enabling said draftsman to secure a building permit.

As to provincial building laws, we are highly in favor of the adoption of a provincial building code, and the appointment of provincial building inspectors, to strictly enforce same. While we are sorely in need of this legislation, such laws will not act in lieu of a Provincial Architect's Licensing Act. In the first place, while all plans for buildings to be erected in the Province, could be inspected and approved by a provincial building inspector, it would be impossible to establish a system of building inspection such as would permit of the personal inspection of buildings when under course of construction. The plans of a proposed structure may be all right, but will the building be erected in strict accordance with the plans? It is this difficulty that forces our city building departments to have an inspector regularly visit a building while it is in the course of erection.

But, even though this were possible, building inspection exists only in the interests of the community. The inspector has nothing to do with design, merit of investment, ventilation, comparative adaptibility of materials, or method of construction. He does not inspect for the purpose of seeing that the owner has a competent architect or that his architect is giving him in a building, the best value for his money. If building inspection were all that was required, why is it that in the City of Chicago, still greater precaution is taken by the building de-

partment in insisting that all plans presented for permits, should bear the seal of a licensed architect.

Mr. Horwood's contention that Ontario is progressing very creditably in the character of the architecture of its buildings, without a Licensing Law, is rather a poor excuse why such a law should not be enacted, especially in view of Mr. Horwood's fervent appeal for better facilities for architectural education. In the editorial referred to in "CONSTRUCTION," it was not stated that architecture in Canada had degenerated, but that "the *practice* of architecture had degenerated to a very low point," and Mr. Horwood must agree with us that such is the case, when a man absolutely untrained and without knowledge of the first principles of the profession, can pose before the public as an *"Architect,"* and accept his two or three per cent., beside the educated and competent practitioner who has spent much money and time in properly equipping himself for the conducting of a legitimate practice.

This evil does not exist so much in the larger cities as in the smaller towns and cities, where the public has less to do with the architect and consequently has an even more vague conception of the real meaning of the term, than city folk. We would advise Mr. Horwood, therefore, not to take too seriously the compliments of friendly English visitors, who, as a rule on their trips to Canada, only see the more substantially built portions of our larger cities.

We have discussed in these columns, on several occasions, the oft repeated objection to an Architects' License Act, that it would tend to create false standards in the profession, and will only say here that we cannot understand how the raising of the lower strata of the profession up to a certain standard, is going to operate as a levelling process. We cannot see how the fact that a man must have certain qualifications before he can call himself an *architect*, is going to have any other effect than create a desire, yes, a demand, for a better class of trained men who are ambitious to excel.

It is as practical to say that because the province of Ontario establishes a minimum standard of qualifications for the school teacher, that none will have any desire to better train themselves to qualify them for positions open to the most competent, to which is attached a salary in proportion to the importance of the position.

The Ontario Medical Society has a minimum standard of qualifications that must be complied with, but, do we not find the ambitious practitioner making trips to New York, taking clinical lectures, and to Germany and the United States, taking post-graduate courses? Do we not find in the medical profession an energetic desire to excel?

If a minimum standard so operates in one instance, it will in another. There is nothing about the architectural student that renders him constitutionally different from those in any other profession. We have reason to believe that there are just as many ambitious men among architects as in other professions. It is not the ambitious, the energetic man who needs attention. It is the man who hopes with a little smattering of architecture, gleaned from courses in correspondence schools, or procured by his previous connection in some branch of building, who must be made to understand that the term *architect* means something. It is the draftsman who continues day after day to simply do as he is bid by his employer, without an effort or a desire to study more than is required, to permit him, when the opportunity presents itself, to hang out his shingle as an architect, who is the object of Compulsory Education.

It is the man who, without any especial love for the profession (apart from its being a means whereby he may make a livelihood) wants to take the short cuts, who must be made to understand that to be an architect, he must prepare himself to qualify before a competent board of examiners.

Then comes Mr. Horwood's plea for additional facilities for architectural education. We agree that there is much to be done along these lines, and our contention in favor of a Licensing Law is based upon our belief that it is a practical step towards creating a condition that will demand better educational facilities. We cannot see, however, why a Licensing Act would interfere with an agitation for better facilities for architectural education. The two should go hand in hand, the Licensing Act creating an imperative demand for better educational facilities, and increased educational facilities, pointing the way to higher education in architecture.

While Mr. Hrwood's problematical deductions deserve careful consideration by those who have interested themselves in this question, the fact still remains that all his contentions are purely problematical.

The manner in which the Licensing Law has operated in the three States in the neighboring republic, where it has been adopted, does not bear out a single one of Mr. Horwood's several contentions. Who would say that the standard of the architect in the State of Illinois has been lowered by the existence of this law? There is not a civil law on the statute books of the State of Illinois that would be more difficult to repeal. It has operated most successfully for eleven years, in the interests of the public, the contractor and architect alike. Would it not be unreasonable to say that because of the existence of this "so-called" low standard, that Illinois architects have not found it expedient to seek higher education in architecture?

The success of the Illinois law has caused two other States to adopt measures practically identical with that of Illinois, and it is approved of, supported and highly commended by the most prominent architects in all three states. Agitation is now being made in several other states to have the law adopted, and the movement is being supported by the most eminent men in the profession in these states. It is true that in three or four states unsuccessful attempts have been made to pass a Licensing Act, but in no case was this defeat the result of opposition from the architectural profession. The defeats were due to some technicality, ill advised methods of presenting it, or because of purely political reasons.

In England, where architectural monuments exist upon every side, where there are museums, where excellent facilities for architectural education exist, and where building inspection is carried on in a much more thorough and efficient manner than we can expect to obtain in Canada for some time to come, we find practically all the architectural bodies of Great Britain united in an effort to enact a most elaborate system of government examination known as the "Architects' Act." The objects of this law are almost identical with that of the Illinois License Law.

"The Architects' Act" would have been passed more than a year ago, had it not been for a clause objected to by municipal officials, which related to the employment of registered architects to do certain municipal work. This clause has been struck out, and according to recent reports the "Act" will be passed when next submitted.

In the face of these *facts,* we cannot see why we should be worried over *problematical deductions.*

COMPULSORY EDUCATION is not a problem with which the architects only are confronted. At the recent annual meeting of the Canadian Society of Civil Engineers at Toronto, the necessity of a central examining board, such as exists in the legal and medical profession, was widely discussed, with the result of it being made evident that a very strong feeling existed among the prominent members of the Society in favor of some measure that would tend to raise the standard of the engineering profession, bar the incompetent and unqualified, and protect the Canadian engineer against the incursion of foreign members of the profession.

Dean Galbraith pointed out the necessity of some such law in his address at Convocation Hall, and several members made strong appeals in the business sessions of the Society for the adoption of some method or means whereby the competent engineer would be given some measure of protection.

Mr. George W. Gouinlock, Toronto, Newly Elected President for The Ontario Association of Architects

MR. E. L. HORWOOD, OTTAWA, 2ND VICE-PRESIDENT.

MR. A. F. WICKSON, TORONTO, 1ST VICE-PRESIDENT.

MR. GRANT HELLIWELL, TORONTO, TREASURER.

Newly Elected Officers of the Ontario Association of Architects.

ONTARIO ARCHITECTS' CONVENTION.---Condensed Proceedings of Twenty-First Annual Assembly of O.A.A.---Architectural Education and Evasion of Duty on Foreign Plans Among Important Subjects Discussed.

THE ANNUAL convention of the Ontario Association of Architects, held in Toronto on January 12-13, was one which in many respects will enjoy a distinctive place in the annals of that organization. Of the many important matters considered, there was none which evoked a more lively interest and broader discussion than the question of architectural education. This discussion fully demonstrated that the members were giving this vital subject earnest and serious consideration, and while there was still a wide divergence of opinion, the conciliatory spirit which prevailed in general, clearly indicated that gradually an approach was being made towards the solution of this vexatious problem.

Two other important subjects which were discussed at length was the evasion of duty on imported building plans, and the question of seeking further legislation from the Ontario Government regarding the matter of architectural registration. In regard to the former, it was agreed that a united effort should be made to bring about a more strict interpretation of the customs tariff; while as to the latter, it was quite evident that nothing could be accomplished as long as a lack of unanimity existed among the members.

The programme of the convention was excellently arranged, and in addition to the discussion of these important questions, included a number of unusually interesting papers and addresses, together with a splendid exhibit of photographs and sketches representative of recent work done by members of the association.

The officers of the association as chosen for the ensuing year are: President, George W. Gouinlock, Toronto; 1st Vice-president, A. Frank Wickson, Toronto; 2nd Vice-president, — — Horwood, Ottawa; Treasurer, Grant Helliwell, Toronto; Registrar, Wm. R. Gregg, Toronto.

President's Address

By H. B. Gordon

THIS being the twenty-first annual convention, we are reminded that the Association is now of age. I hope we feel the full responsibility of manhood and are willing to enter fully into the obligations of our position.

How much has been accomplished for the profession and for the bettering of architecture in Ontario during that period, and what a large share this Association has borne in bringing such things to pass, I need not take time to relate. Those who have been members from its inception and remember the condition of affairs before that time, can fully understand what progress has been made. Then, mutual distrust between the members of the profession, the cutting of fees, the stealing of one another's clients and the slandering of other's professional reputation. Now, at least, some measure of brotherly feeling and of ethical and professional conduct, certainly a higher scale of remuneration, and a position of greater esteem in the eyes of the public. Then no formulated educational standard and few adequately trained men. Now a clearly defined standard for general efficiency and a considerable number of men seeking to attain it. These and a great many other benefits can largely be traced to the work and influence of this Association. Even those who are most indifferent to the success of the Association or are openly opposed to some of its aspirations, must be glad of the measure of progress that has synchronized with the history of this organization.

We have had, in the years that have passed, many matters of importance to deal with. Questions greatly affecting the welfare of the profession, and in the manner of the solution of which there has been room for honest difference of opinion. Some of these have received a partial settlement and others are yet facing us. We cannot all expect to think exactly alike upon these questions, but undoubtedly the best way to secure a workable solution is by calm conference among the various members of the profession, rather than by a wordy warfare before the public. I trust the Ontario Association of Architects will always be broad enough to admit of all reputable architects, however divergent their opinions, meeting together and evolving from that very conflict of opinion, the best solutions of the problems that make for the uplifting of the profession.

Architectural Education.

Prominent among these problems is the matter of Architectural education, and how best to secure that those who are aspiring to enter the profession shall be adequately educated. Every one admits that it is for the benefit of the public that all architects be properly educated. Certainly it is for the benefit of the young men who obtain such an equipment. Undoubtedly it would be for the uplifting of the profession and incidentally this would be a benefit to the older practitioners. So we are all interested, and perhaps because of this our discussions about the matter have been somewhat heated, and instead of drawing the members of the profession together have been a cause of division. But while heat temporarily separates the molecules, it is most necessary for the process of welding, so we may hope to see out of it all a united profession in a united organization accomplishing greater things than any of us may have hoped. Meantime we must thresh over the ground, gather up all the wheat of practical utility, reject teh chaff of mere theory, and garner the results into an effective system of education and examination.

As superior education and general culture become more common, architects will require a more extended education if they are to occupy their proper place in society and uphold the status of the profession. Our students must not only have a higher educational standing before studying architecture, but they must also cultivate a wider rage of study along with that which is purely professional.

The value of the scientific part of architectural education appeals to all men. Building operations are becoming more complex and the demand for scientifically trained men to direct the work is apparent. Each failure of a building that occurs, especially when accompanied by loss of life, loudly proclaims this necessity.

But architects are bound not only to design buildings that will not fall down. They should plan their buildings in such a scientific manner that the proper use of each material in its due proportion and correct relationship shall produce the best permanent result. The health, comfort and convenience of the public are largely in the hands of the architects, so that the best scientific education available is none too good for a member of our profession.

Designer's Duty to Educate Public.

The architect has yet a higher duty, viz., to so plan, proportion and decorate his buildings, so as to make them object lessons that will elevate the taste of the community. The creator of a badly proportioned or vulgarly decorated building commits a crime against society—a crime that may last for many years and vitiate the taste of many generations. Anything, therefore, in the way of education that will prevent men from committing such errors, should be hailed by both the profession and the public. While it is true that we cannot educate men to be artists, it is equally true that all artists are the better for being educated. And almost any man can be educated to avoid the gross inaccuracies of style and proportion which so often mar even expensive buildings.

And this leads to the vexed question: How shall this education be accomplished? Shall it be left a purely voluntary matter or shall it be made in some measure compulsory? If the former, how shall it be made so attractive as to enlist the co-operation of all or nearly all who are entering the profession? Moreover, how can it be made practically available to all or nearly all who are studying in the various parts of the province. Some say, strengthen and enlarge the architectural department of the University of Toronto, and this will solve the problem. Others aver that if atelier clubs or other means of associated study be provided, the necessary stimulus and help will be given. Both of these would prove a most desirable addition to our present educational equipment, but at best they would be largely local or selective in their influence.

The number who are able to spend three or four years at the University of Toronto in preliminary architectural education must necessarily be limited. It certainly would be ideal to have all our architectural candidates, graduates of a university, but times are not yet ripe for such an advanced step. The feasibility of carrying on atelier classes must necessarily be restricted to the large centres of population. Possibly Toronto is at present the only place in the province where such a class has any hope of success. A certain measure of class work and instruction has been carried on by this association during each winter at the rooms in Toronto. While these classes are well attended, especially this winter, they cover but a small proportion of those in training for the profession. So what can we do for those who are left to the uninviting field of individual study and the isolation of personal effort? Anyone who has attempted an individual course of study along any line, or anyone who has attempted to interest a young man in such a course, knows how hard it is to secure continuity of effort. A few, a very few may persevere, the majority are sure to fail. And the sad part of it is, that whether they persevere and educate themselves or are lazy and neglect their opportunity, they all pass on into the ranks of the profession. And the profession is no higher than the average of attainment of its members.

Licensing of Architects.

At the present time there are some who are advocating a government examination and licensing of architects, so as to compel at least a measure of education in those who would practice architecture. This may be welcomed as an acknowledgment of the practical fact that the majority of men require some compulsory measure to induce them to qualify properly for the practice of architecture.

If we could all agree that this is the actual fact with which we are confronted, we would be better able to discuss how this compulsory test should be applied.

The licensing acts as operated in some of the States, means practically handing over the examination of candidates and the disciplining of all practitioners to a small body of men appointed by the government then in power. Were our governments ideal, possibly this might be the best way of solving the problem. But the democratic glamor of "The Government" fails to stir response in the hearts of those who see things as they are. The government consists after all of fallible men, necessarily strong partisans and more or less influenced by what is popularly called "practical politics." The particular minister in whose department the administration of the licensing bill belongs, may very likely be ignorant of the requirements of architectural knowledge and possibly prejudiced in favor of the so-called "practical man" who does most things by rule of thumb. Such a government might possibly make the best appointments to such a licensing board, without any political bias whatever, but it would be very unusual. The licensing board might be composed of the very best men available for such a purpose, but the chances are very much the other way. Why intelligent men should prefer to put themselves in the hands of a small body of politically appointed architects for the purpose of either examination or discipline, in preference to being in the hands of a widely representative body of architects with a popularly elected executive, I cannot imagine. Perhaps it is a concession to the popular clamor that the government should undertake all and sundry offices for the people. Perhaps it may be because they have never thought out the practical working of such a measure. More likely it is because it seems the only way to accomplish compulsory education and escape the insinuation of personal interest.

And here it may be well to consider the insinuation that the Ontario Association of Architects wish to lord it over all the members of the profession in this province, whether they wish it or not. I presume that no matter what form compulsory education and professional discipline takes, and no matter by whom enforced, there will be some who consider it irksome and resent being subject to it. So that whether it emanates from the government or from a professional body, the fact of such control will be a cause of opposition from some.

The progress of society, however, has been along the line of curtailment of personal liberty for the general benefit of the community. So if we want progress in architectural education we must be prepared to consent to the cost. If architecture was merely a fine art, then we might resent as unnecessary any limitation of individual liberty. But as it is both a science and art that enters very largely into the daily life of the community, the law of its progress must conform to the general law of society's progress. If by legal enactment, all architects now practicing are enrolled in an architectural body to whom is entrusted the examination of the candidates and the discipline of the practitioners, then each member has a much larger proportional voice in the matters of his profession, than the infinitesimal influence he could exert in a general political contest for the upholding or overthrowing of a government who appoint a licensing board. It is consideration of things like this that makes me wonder that any architect should prefer handing over the affairs of the profession to the control of a small board appointed by a party government, rather than have the examination and discipline administered by a representative body elected by the votes of the profession at large. If the fact of government control be advanced as a reason in favor of a licensing board, it is easily retorted that the same measure of government control, in revision of the proceedings of the professional body may be exercised as is proposed for the licensing scheme.

Public Needlessly Suspicious.

I am aware that some are advocating the licensing scheme, not because they think it the best solution of the problem of compulsory education, but because they think it is the only form of professional control that the public will sanction or the government grant. Unfortunately the public are needlessly suspicious in some things and remarkably credulous in others. It is our duty to enlighten them and secure what is best rather than weakly compromise on what we know will be less advantageous.

Some of the public seem to think that we as individuals have a great deal to gain by forming what they are pleased to call a close corporation. Let us see what that amounts to. We in the profession are seeking means whereby those who are to be our competitors shall be better educated than we are. Were we as selfish as some imagine, we might well frown down all efforts to give our coming competitors such great advantage over us. We might well rest content to see the rising generation of architects grow up without the equipment that will make them dangerous competitors. What little incidental advantage may come to us from the gradual uplift of the profession will be more than offset by the unequal competition we may be subjected to by the younger and better educated men. There are

however, many architects who love their profession apart from personal gain and who would delight to see it placed on a higher level irrespective of the results to themselves. Such generally are the men who spend their time and thought in seeking a solution of the educational problem. Men may differ from them as to methods and may not agree with their conclusions, but surely they should be freed from any imputation of self-seeking.

But what have the public to fear from placing the matters of architectural examination and professional discipline in the hands of such a body as the Ontario Association of Architects? Supposing that the legislature granted our desired amendments, made all bona fide practising architects in Ontario members of the association, and imposed reasonable government control over the decisions of this body, what would happen. Builders and others might go on making plans and charging for them. Any amateur might draw designs and specifications and any other fool might employ him without let or hindrance. No limitation of freedom would be felt in any direction save one, viz., no man might call himself an architect unless he honestly had a right to do so. I have heard somewhere that it is the highest function of law to make it easy for a man to do right and hard for him to do wrong. Judged by this standard our proposed amendment is of very high order, for it would prevent some men from acting a lie and would enable the public to do right in choosing men who had the necessary qualification. After twenty or thirty years' operation of such a law, when those who had come in without examination had retired from practice, any one employing an architect might be quite sure that the man he employed had an education that might enable him to rightly discharge the responsibilities of his position. Think of the incalculable benefit to the public if all our buildings were designed and carried out under the supervision of competent and trained men.

Affiliation with A. I. C.

Since our last convention the Dominion Association of Architects has been incorporated under the title of "The Architectural Institute of Canada." This larger body with a membership from the various provinces will naturally attend to architectural matters that are common to the whole country, while the provincial bodies will deal with the affairs that are more distinctly provincial. Many architects are members of both the Ontario Association and of the Dominion Institute and see possibilities of great usefulness for both bodies. The ultimate aim of each is to raise the standard of the profession. There need be no conflict in the operation of the two organizations. In order, however, to preserve a spirit of harmony and utilize to the best advantage the functions of each association, some scheme of affiliation or co-operation must be evolved. No doubt your attention to this matter will be requested at an early date.

Provincial Building Law Necessary.

Another matter that should receive attention from this association is the desirability of some general building laws covering the whole province. To what extent this is feasible in view of our municipal form of government is yet to be discussed. The necessity for it cannot be doubted by any one who gives due consideration to the matter. While some of our cities have building laws, more or less complete, the major part of the province is entirely without restrictions, so that each builder is a law unto himself. The safety of the public from insecure construction and unsanitary arrangements demands some broad general laws. The danger to life and the enormous waste of property by fire make such laws imperative. Canadians are among the most extravagant of peoples in the annual offering they make to the fire fiend. We need not wonder at occasional hard times when we are allowing so many millions annually to go up in smoke.

While more stringent regulations are possible and necessary in the large centres of population, there are a great many restrictions that can be wisely imposed upon building operations all over the province. Take for instance our schools where often hundreds of children are together in buildings that are little more than fire traps. The appalling loss of 150 children in the Collinwood school fire on the other side of the line, and the somewhat similar catastrophe at Hochelaga call loudly for some amendment to our present happy go lucky methods. Some general laws covering requirements as to exits, fire protection, materials and disposition of staircases, &c., are urgently needed. The average school trustee or the average council man who votes the money for schools has neither the knowledge or discernment to insist upon these necessary requirements in school buildings, and most likely is moved principally by the matter of cost. The average man who designs or constructs schools throughout the province even if he understands the need of protection against fire and panic, may yet lack the force of character necessary to impress his views upon a penurious school board or council.

Some of the town halls and many of the places of popular amusement throughout the province where large crowds assemble seem specially constructed to invite a catastrophe. Inadequate exits, flimsy wood construction and dangerous methods of lighting and heating are common. The same dangers are being constantly faced in many manufacturing establishments and, even in our midst, the large departmental store affords a field for some terrible disaster. The immense open area of floor space with piles of light inflammable goods, the open staircases, well holes and elevator shafts, and the crowds of customers and employees, present most favorable conditions for a dreadful holacaust.

If we wish to retain that part of higher civilization that insists upon the value of human life, something more must be done to protect both public and employees. There is a financial as well as a humanitarian aspect to the matter. When we are informed that about 78 per cent. of the loss by fire during 1907 was caused by reason of the open stairways, elevators or light shafts, it is business folly to go on heedlessly providing more facilities for conflagration.

The question of limiting the height of buildings to some relationship to the width of the street on which they face, is one that should receive discussion and pronouncement upon by this body. The unfairness of allowing anyone to literally put the surrounding property owners into the shade while he utilizes their property area to give lighting scope to the upper parts of his building, is an ethical question that can be discerned by all. But the artistic, sanitary and constructional sides of the question should be pronounced upon by men who are able to form a sound technical opinion.

Expert Testimony.

There is another matter to which I would like some attention paid by this association. Many of us, especially those living in the cities, are called upon from time to time to give expert evidence in the courts upon building matters. First we are instructed by the employing counsel as to what kind of evidence he wants us to give and what he wants to avoid. Then in court we are subjected to the cross examination of the opposing counsel who by inferential questions and a demand for monosyllabic answers seeks to make us contradict ourselves. All this is bad enough, but altogether likely we are confronted with the evidence of a brother architect which goes to prove the very opposite of what we have stated. Hence the low estimate placed on expert evidence, and the sneering insinuation that experts can be hired to prove almost anything. No self respecting architect cares to be placed in such a position, and there is no doubt that the profession as a whole suffers in the eyes of the public from this condition of affairs. This association should co-operate with other professional bodies in a movement either by petition or popular agitation, seeking to have all professional experts who give evidence in court, appointed by the judge and thus placed in a perfectly impartial attitude.

Your attention will be drawn to an omission in our by-laws and a proposed amendment seeking to remedy it. At present there is nothing in our by-laws to prevent a member of the association from acting as a contractor as well as architect. The incompatibility of the dual position must be apparent to all who have given the matter consideration. An architect's duty is to insist upon the correct fulfilment of a contract, and for him to act as a contractor for the work, gives ground for the suspicion that he may make the duties of the former position in some measure subservient to the interests of the latter.

Still further to express what has been an unwritten law among us, and to publish our ethical standard, a by-law is proposed stating definitely that "No member shall accept direct or indirect compensation for services rendered in the practice of his profession, other than the commission received from his client." We are glad to believe that this is the working rule of most of the men in the profession in Ontario, but it is desirable that such a plain statement be found in our by-laws, both as an educative and preventative measure.

Unprofessional Scramble for Work.

There is another matter which cannot be regulated by by-laws and yet should receive attention by this association; it is the growing tendency of architects to canvas for work. No sooner is it rumored that some one is going to build, than some men, who ought to know better, hustle around to him with all sorts of offers of sketches and estimates, and conceited claims of being specialists in the particular kind of building contemplated. Not content with immodest exploitation of their own abilities, such men are sometimes not above slandering their brother architects. Even when preliminary arrangements have been made with some other architect, there are men who still persevere in seeking to turn the job to themselves. Such conduct not only cheapens the men who engage in it, but also lowers the profession in the eyes of the public. To canvas one's own acquaintances is bad enough, but to call on strangers and possibly run down other architects in order to enhance one's own claims, is to prostitute the profession and make it the laughing stock of the public.

Cases are not uncommon where after an architect has spent much time and thought upon a problem, he is supplanted by some one else. Even though he be paid for his services and every legal claim settled, there yet remains the loss of professional reputation on his part and serious damage to professional ethics. The practice of architecture is not a scramble for work, but the calm studying of all the problems involved in the partcular job and their solution in the most scientific and artistic manner possible. And this should be carried on without the disturbing possibility that at any stage in the process the work may be taken away from the architect and given to another.

Employment of Foreign Architects.

The tendency in some quarters to pass by the local practitioners and employ foreign architects is one that not only is insulting to the profession in Ontario, but also detrimental to the progress of our art. If the work of these United States architects was a distinct gain to the artistic or scientific quality of our buildings we might pocket our pride and be pleased with the upward trend of affairs. But when we see Canadian buildings planned by foreign architects, which embody neither good planning nor artistic appearance, we cannot but feel hurt.

Private individuals may claim the right to go where they like for their designs, but even in such case it is poor business and poorer loyalty to pass by those in the community where they have made their wealth, and employ outsiders. But no adequate word of excuse can be given by institutions which are dependent upon the Canadian public for their capital and business, when they pass by Canadian architects and employ foreigners. In

the early days the Ontario government was a chief sinner in this respect with the unfortunate results that still point a warning in Queen's Park. Their bad example was followed by institutions which emblazon the word Canada or Canadian in their name. Rather a misnomer when they had important buildings to erect. Since then each year we are treated to some example of imported architecture. Even such institutions as the Y.M.C.A., which are so dependent upon the good will of the community, forget what is due to their constituency and import United States architectural service. I question however whether import is the correct term, for in a great many cases such plans are introduced to this country without paying duty. The Canadian architect is taxed by the Government on nearly all the things that go to make up his business outfit or his living expenses, while the United States competitor is allowed to introduce his productions free. A method which is now being used to avoid payment of duty, is to employ some Canadian as associated architect and issue the plans from his office. It is not only the Canadian architects that suffer. For it is the common practice of United States architects to import their own contractors and specify United States goods wherever possible. The owner of the building suffers for he gets a more expensive building and one no better planned or designed than many Canadian architects could provide. The only people that benefit are the United States architects, contractors and supply men who rejoice to keep up the fiction that "Far off hills are green" and to prove the proverb that "No prophet is without honor save in his own country."

Canadian Architecture Advancing.

However, after all, the better part of our progress depends upon our own endeavours, so despite all the handicaps, Canadian architects are winning out and Canadian architecture is advancing. One thing that makes for our progress is the educative effect of such exhibitions of drawings or photographs of our work, as we are holding at this convention. The value of such exhibitions is greatly enhanced if the designs are criticized in a frank manner by those competent to express a useful opinion. All men should welcome an honest criticism of their work. Indeed if it were possible to carry out some method of criticism of our designs before they were executed, there would be a distinct gain to architecture and also to our professional reputations. Even the best of men may at times produce designs containing ill judged mannerisms. The most are apt to run into grooves and the aspiring young man is very likely to blunder into crudities.

All have something to gain by a discerning criticism which while it may not flatter our vanity, will appeal to our judgment and help us to correct our faults. Where men are meeting together often, as in a chapter of this association, and the bond of good fellowship is more or less strong, such criticism can be indulged in without producing friction. The benefits that have accrued to the Toronto and Ottawa men by having a local chapter is so evident that the architects in other cities should seek to initiate some such form of organization in their own town. Even the busiest man in the profession will find that the time and thought spent in carrying on a local chapter or similar organization is repaid in the improved relationship with his fellow practitioners, the higher tone of ethical conduct and the incidental auvantage of a higher respect from the public for the profession. A man generally reaps what he puts into any movement. So when we spend time and thought on any organization for doing good, not thinking what we can get out of it but what we can put into it, we always find that it is more blessed to give than to receive.

Whatever may be the official standing of the Ontario Association of Architects in the future, I believe that it can and will be increasingly made a channel of professional help and stimulus to its members and a powerful factor in the uplifting of architecture in our province.

Committee Reports

Registrar's Report

The Registrar's Report shows that during the past five years the Association has enjoyed a steady annual growth. The membership at the present time was ninety, two of which are honorary members, forty-eight active members in Toronto, and forty members in other places. During the year there have been eleven meetings of the Council, with an average attendance of five members. At the examinations and supplementary examinations, held in April and October respectively, five students passed the first, six the second, and four the final examination. Prizes of architectural books of the respective values of $10.00 and $5.00 were awarded by the council and the trustees of the Architectural Guild Prize Fund to students, for general proficiency and for design. The Guild Fund trustees have on hand a Canada Permanent Company's debenture of $400.00, bearing 4 per cent. interest, and a savings account balance of $59.72. The eighth annual volume of the proceedings was issued in April, and 1,200 copies were distributed. The annual examination for Canada, of the R. I. B. A., took place in the Association rooms in November, and the Association was represented by two members in conjunction with two representatives of the Province of Quebec Association of Architects.

Report on Travelling Scholarship

The Committee reported that the prize of $50.00, offered by Mr. Edmund Burke, at the end of 1907, was not properly responded to, there being only three entries, and the work was not of sufficiently high standard to warrant the judges in awarding the prize. It was recommended that $10.00 each be given to two of the competitors; Mr. Burke had agreed to this, and had also generously renewed the offer, to be awarded for the same purpose during the coming year, under what was hoped to be happier conditions.

Report of the Educational Committee

The report showed that the mathematical classes held in the Association rooms on Monday and Wednesday evenings had in the past year a membership roll of twenty-five students, and that under the tutelage of Mr. Thos. Taylor, satisfactory progress had been made. Attention was called to the fact that there are several students in attendance who have not enrolled as students with the registrar, and that five others, who have registered as students in offices of the members of the Association, or in offices approved by the council, have not taken out articles of apprenticeship. It was recommended that approved articles of apprenticeship be deemed requisite for all students in offices of members of the O. A. A., who enter the Association examinations.

The Committee again urged upon the members the necessity of admitting to their offices only students who have scholastic attainments compatible with the qualifications of admission, as set forth in the curriculum; and also of the desirablity of requiring them to take the Association course. While mathematical classes were perhaps the most easily organized and conducted, for the study of design, the problem presents many more difficulties. Instruction could not be so readily obtained, and it is much more difficult to place the study on a similarly permanent and businesslike basis. Without Government aid, under the existing conditions, it seems impossible to secure other than voluntary instruction, and past experiences have demonstrated that such instruction had a tendency to be fragmentary and ephemeral. An attempt was now being made by a club of students and draughtsmen, somewhat on the lines of the Atelier system, and it was to be hoped that the students by good attendance and enthusiastic work would show their appreciation and encourage the architects who were devoting considerable time and thought to their interests as patrons and critics. It was suggested that if ways and means permitted, classes be established at other quarters, in order to better prepare students in these places for the examinations. Ottawa at least, with a flourishing chapter, should be able to furnish a sufficient quota of students to warrant the establishment of a class in mathematics, if not in design.

The committee desired once more to impress upon the members that the real solution of these difficulties seemed to be in the hands of the Government. Were the profession of architecture put on a plane with other professions, students could be required by law to take a proper course of training, and it was the opinion of the committee that the proper place for work of this kind should be such an institution as the School of Applied Science, Toronto University. The architectural students there at the present time were almost a negligible quantity. If the desired legislation was obtained, the number would increase to an extent which would warrant the Government in providing a full architectural staff, and that the best possible training could be given in design, as well as in other technical branches. The atelier system could be adopted, and practicing architects retained as patrons, whose interests in the work would not necessarily be wholly altruistic. One thing, however, was clear, that no matter what efforts were made to improve conditions at the School of Science, it was hopeless to expect that a sufficient number of architectural students would attend to warrant the Government in providing the professorial staff and the equipment which is needed, unless it were made obligatory for all desiring to become architects to take the course.

Report of the Ottawa Chapter

The year's work of the Ottawa chapter was reviewed in the report prepared by its Secretary, Mr. F. J. Alexander. In the past year the membership was increased by the addition of three new names, and fourteen regular and special meetings had been held. These meetings evinced no lack of interest in the work of the chapter, but on the contrary have appealed strongly to the members, as affording valuable opportunities for the interchange of ideas and the encouragement of the united effort for the common good. The question of duty payable under the Customs Law of Canada on imported architects' plans, as dealt with under a separate report submitted by the chapter, was a matter of grave importance, and one which called for prompt consideration and concerted action on the part of all Canadian architects.

In addition to being chosen as the headquarters of the Institute of Architects of Canada, Ottawa has had the pleasure of having the first annual convention of that body. It was to be deplored that the charter granted to the Institute of Architects of Canada, owing to short-sighted opposition from Provincial Societies and individual architects, is divested of the right to place any restrictions on the title of architect, and it is urged that continued and unrelenting effort be made by the Ontario Association to secure this status for the profession from the Provincial legislature. The chapter desired to go on record as being in favor of placing the student's professional education, qualifying examinations, and subsequent license to practice, under Government control, as the only solution to the problem that will protect the public and the profession. During the year, the chapter had draughted a new set of building by-laws for the city of Ottawa, which had every prospect of being carried into effect this year.

Report of the Toronto Chapter

The report of the Toronto chapter showed that there had been sixteen meetings in 1908, with a total attendance of 204. There was a greatly improved average attendance over the preceding year, and the regular chapter luncheons have had a

strong tendency to stimulate friendly intercourse, and to promote a broader spirit in general.

One of the important items dealt with by the chapter during the year was the matter of revising the plumbing by-laws. The recomemndations of the committee appointed to interview the Medical Health Officer were favorably received, and the committee was asked to draught such amendments as were deemed necessary. Two members of the chapter have been appointed to meet a committee from the Eighteen Club, to discuss ways and means to obtain a reduction in the assessment on architects' offices according to floor space. Nothing definite as yet has been decided as to the proper course to pursue.

Mr. Ivan S. Macdonald, Editor of "Construction," at the request of the chapter, gave an address on the charter applied for by the Ontario Association of Architects. He pointed out that as long as the Association retained the name "registered" in the chapter, forcing all practicing architects to be members of the Association, and to pass examination for membership, there would be very little likelihood of the Government passing the law, as there was too great a feeling among the people against incorporating closed professions, especially in some of the professions themselves who object to being forced to belonging to an association. In this case the similarity of the doctors' and lawyers professions was shown, where some of the members object to the system of taxation. Mr. Macdonald advocates making it compulsory for practitioners to pass Government examinations before being allowed to call themselves licensed architects. Others could practice architecture, but would have to make public that they were not of the required standard. Statistics were given of American States, showing that it had proved advantageous to make architecture this kind of a closed profession. It was also shown how difficult it was to take plans into the States, but how easy to bring plans from the States to Canada.

Report of the Legislative Committee for 1908

According to the report of the Legislation Committee, the matter of amendments to the Architects Act was taken up with the Ontario Government during the last year. Early in the year, the sub-committee appointed by the senate of the University of Toronto to consider conducting by the University examinations referred to in the Act, transmitted a resolution to the effect that it was not deemed advisable for the University to conduct examinations except according to its own curriculum, and after instructions approved and controlled by its own senate; and that they believed the University could most effectively promote the advancement of architecture by strengthening its present teaching faculty and enlarging its curriculum.

The bill had received its first and second reading and the committee had appeared before the legal committee of the house on several occasions. However, the presenting and further discussion of the bill was deferred from time to time and at the request of the Government, owing to negotiations pending with the University, was laid over until the next session. Surprise was expressed at the opposition met with from the University, in the person of their representative, Prof. Baker, especially so in view of the fact that no specific reason was given. In order to ascertain, if possible, the objections of the University, the committee had met Dr. Falconer, who, while admitting not being conversant with the opposition to the bill, stated that the University could not undertake conducting the examinations, but if sufficient students presented themselves at the University, they would consider starting night classes. At a meeting of the council in November, it was resolved that the legislation committee be instructed not to take further action towards amending the present Act until after the annual meeting. A special committee was also appointed to consider the best method of draughting an architects licensing act, and presenting it to the legislature, and their solicitor had been instructed to draught up alternate amendments. It remained to be consideed whether the bill as amended, excluding that portion relating to the University, or whether a genuine licensing act, similar to that adopted by the State of Illinois, should be presented at the forthcoming session of the Ontario Legislature.

Discussion

In the discussion that followed, Mr. Horwood, of Ottawa, wanted to know if there was anyone who could throw any light on the negotiations that had been carried on during the year, so that an intelligent opinion could be formed as to whether it would be wise to continue to press the matter or not. He said that according to the report, there was absolutely no information as to the state in which the bill was at the present time, or whether it would be wise to proceed with it.

Mr. Sparling asked if the word "registered" had been taken out, as it seemed doubtful whether it was still in the original draught or included in one of the amendments.

President Gordon stated that the question to be considered was whether the bill in the old form, or in an amended form, should be introduced, or whether supplanted by another scheme, one of compulsory education, a licensing bill, or something of that kind.

Mr. A. H. Gregg was of the opinion that the report should be adopted, as it was simply a statement of the legislative committee as to their actions during the past year. No recommendation was made, for the reason that it was thought best to leave the matter to the council or to the Association, to be acted upon at the annual meeting.

Mr. Watts stated that according to the report, it would look as if the Association should come to some decision as to what line of action would be adopted at the next session of Parliament. He believed that this was the information that Mr. Horwood was seeking, and wanted to know if the meeting was to make any decision on the matter.

President Gordon pointed out that the convention was the governing body of the Association, and the final court of appeal. It could either go into details and decide then, or it could express its opinion and pass on the workings of the details to the next council. The President then put the motion for the adoption of the report before the meeting, which was duly carried.

Affiliation with the A.I.C.

The following letter was received by Mr. W. R. Gregg, Secretary of the Ontario Association of Architects:

Dear Sir,—

The General Annual Assembly of the Architectural Institute of Canada was held in Ottawa in September last. At this meeting the council was instructed to take preliminary steps towards a movement for the federation of all architectural bodies in Canada. I have the honor to inform you that the council of the Institute met last week in Montreal, and instructed me to communicate with you and ask you to appoint a representative to meet and confer with representatives from various architectural bodies throughout Canada, "or if you are unable to do this, to instruct a proxy from some other architectural body, to act for you," so that a full discussion of this proposal may be held and future action decided upon. In the meantime, it is suggested that this meeting be held some time in Fefruary or March, 1909, in Toronto, but the council of the Institute will be glad to meet the views of the majority regarding the date and place of this meting.

Yours very sincerely,

Alcide Chausse,
Secretary, A. I. C.

With regard to the letter from the Architectural Institute of Canada, Mr. Baker stated that the communication disposed, to some extent of a notice of motion which he had given previously, and which had been printed in the Agenda, giving notice of the meeting. He thought that most of the members felt that the time was approaching when unity of action ought to be brought about among the architects of Canada. The scope of the architect seemed to be widening and new fields were opening out. He had discussed the question with a large number of members, and it seemed to be the consensus of opinion that if some manner could be devised to get down to a single basis of action, more would be accomplished with a large number than with a small number in individual groups. He referred to the importance of work along educational lines, and to the excellent results that had been obtained by the different provincial bodies. He believed that the action of the Institute was simply a suggestion to ascertain whether it would be possible to place a body like the Architectural Institute at the head of the whole profession in Ontario, and bring in all the provincial associations by affiliation or amalgamation with the Architectural Institute. There was a good deal of confusion at the present time, and it seemed that much could be said in favor of such a suggestion. He suggested that a committee be named to report on the matter, and, at the suggestion of the Registrar, read the notice of motion to which he referred, which is as follows:— "That in view of the establishment of the Architectural Institute of Canada, with objects identical with those of the Ontario Association of Architects, it be considered and, if found advisable, action be taken by the members to bring about affiliation or amalgamation of the Ontario Association of Architects with the Architectural Institute of Canada."

Report on Imported Architect's Plans

Mr. Horwood then read the report of the Ottawa Chapter, which, at the request of the Executive Council of the Association, had made inquiries at the Customs Department at Ottawa, relative to the duty at present payable on designs or drawings imported into Canada. To say that success, except in a limited way, had crowned the efforts of the Chapter would be misleading, but sufficient had been accomplished to justify and stimulate further effort, both individually and collectively. Mr. Alexander, Secretary of the Chapter, had been actively investigating the evasion of payment of duty on plans, and it had been their good fortune to be able to bring to the notice of the Department a number of instances where duty was not collected or being evaded, with a result that a very substantial sum had been subsequently collected by the Dominion Government. Similar cases of like success had been reported from other places in the Dominion, but there was still a number of instances where they were ignorant as to whether duty had been collected or not, owing to the non-committal attitude of the officials, who seem to maintain a strict secrecy as to the conduct of their department.

One of the greatest evils which militate against the interests of the profession is the practice of Canadian architects associating themselves, in the erection of large buildings, with outside architects, who open up temporary offices in Canada, in order to avoid the payment of duty, and in which the only reward that the Canadian architect receives is a share of the commission for local supervision of the work. It was the opinion of the chapter that some amendment should be made to the Customs Act, in order to deal with cases of this kind, and that the co-operation of the Canadian Manufacturers Association and other similar bodies should be asked in making representations to the Government. Although the present tariff gives 25 per cent. as the duty payable on the cost of imported plans and specifications, yet under the arbitrary ruling of the Customs Board which places the amount chargeable on the cost of the building as 2 1-2 per cent., apportions 1 1- per cent. as covering the supposed value of the specifications, which as manuscript comes in duty free, and so leaves only a balance of 1 per cent. of the commission on which to charge the duty of 25 per cent., which it is considered is just one-half the proper duty. The proper method of valuing imported plans should be finally determined not on the author's estimate but on the actual tenders received for the work. The absolute necessity for architects in all the

large towns and cities to exercise a constant vigilance and to notice and report to the Customs Department every instance of imported plans and attempted evasions of tariff was imperative. It could not be too strongly urged on the Ontario Association the need of prompt, united and vigorous action in this matter, in bringing it officially before all sister societies throughout the Dominion, and impressing upon them the necessity for concerted action, in order that every legitimate influence can be brought to bear on the Government to have the tariff amended and effectively enforced.

Congress of Architects, Vienna

By D. B. Dick

THE eighth Congress must be considered to have been a very successful one. Vienna is admirably adapted to be the scene; the hospitality of its people from the Emperor downwards was unbounded; and the weather could not have been finer, unless perhaps it had been somewhat cooler. The number of members in attendance was over 1,500, which was about double the number expected and prepared for; and if the business department seemed to be in some respects overtaxed, this circumstance amply accounted for it.

Difference of language is always a difficulty at an International Congress, and if a greater use had been made of French or English in the published literature, those who had had the misfortune not to be acquainted with German would have been able to follow the proceedings more closely. This was especially noticeable in regard to the papers read. No abstracts of these were issued although at the Congress of 1906 very full abstracts of all papers were prepared in English and French and issued beforehand to the members. It was therefore not surprising that on this occasion those meetings were but sparsely attended by the foreign members, and there was only one instance mentioned in the newspaper reports of an English speaking member having taken part in a debate.

The subjects discussed in the papers and lectures were as follows:—

The State and Art.
Legal qualifications and licensing of architects.
Building regulations.
Conservation of public architectural monuments.
Photometric survey of architectural monuments.
Historical architecture.
Competitions.
Architectural copyright.
Architecture and the Public.
The artistic improvement of Engineering Work.
Reinforced concrete.

In connection with this last subject, rupture tests on concrete iron pillars were made at the Laboratory of the Technical High School. All papers were in German except one which was in Italian.

Visits were arranged to a number of buildings interesting either in themselves or for the art treasures which they contained, as well as to some districts remarkable for their beautiful scenery. Some of these arrangements naturally overlapped so that it was necessary to make a selection. The visits included:—

Various Museums and Exhibitions.
The Semmering district.
Klosterneuberg monastery.
Several castles and palaces.
Shonbrunn with its park, menagerie, Palm house, etc.
The County Lunatic Asylum, "Am Steinhof."
The new Post Office Savings Bank.

The asylum is a very large institution consisting of numerous detached buildings served by a small electric railway. The pay wards, to which the visitors were admitted, are most comfortably and artistically fitted up. The whole institution is equipped with the most modern appliances for cooking, laundry work, baths and sanitation generally. All the buildings are of simple design except the church, which was designed by Herr Otto Wagner, the President of the Congress, in a kind of Syrian Byzantine style. Although small its external effect is exceedingly impressive. The interior however, although displaying much originality of detail, does not fulfil the promise of the exterior, owing chiefly to the unfortunate treatment of the dome.

If one may judge by the amount of public interest taken in the Congress, the recognition bestowed on it by the government and municipal authorities, and the preparation made for the entertainment of the members, it would appear that in Austria the profession of architecture is regarded as a highly honourable and important one and its members as an influential body.

The opening meeting was held at the Parliament buildings (the Reichsrath) in the Representatives chamber, a fine semi-circular room with galleries which were occupied by ladies and other spectators. There were present the Ministers of the Interior, Railways, Instruction, Agriculture, Public Works, also the President of the House, the Chief Burgermaster, the American Minister and other personages. The President, Herr Otto Wagner, welcomed the delegates and thanked the government for the interest they had taken in the Congress. The Minister, apologizing for the absence of the Prime Minister, then opened the Congress with an address of welcome on behalf of the Government. Replies were made by representatives of Hungary and several foreign States including Germany, France, Holland, Belgium and the U.S.A. Britain and her colonies were here conspicuous by their absence.

The Congress headquarters were in the rooms of the Architects' and Engineers' Societies, and papers were read in a hall in the same building and in one in an adjoining building.

Notable Exhibition of Designs.

A special exhibition of designs by old masters was arranged in honour of the Congress in the large hall of the Imperial Library in the Hofburg, and some 4,000 drawings and pictures were shown. It was a most interesting historical collection and included drawings by Bernini, Rinaldi, Borsomino and many others. Some of them were wonderful examples of draughtsmanship. The hall itself is an imposing room in the Baroque style, erected in 1722 by Fischer von Erlach, the leading Austrian architect of that day. It has a dome elliptical on plan, a peculiar feature which several of the churches also possess.

The exhibition of modern architecture was in the building of the Society of Gartleners which, being well lighted and containing numerous rooms, was well adapted to the purpose. As was natural, Austria, Hungary and Germany had the largest and best display. The Justice Palace at Buda Pest may be mentioned as a good design shown by a good drawing. But Russia, Italy, Belgium and France were well represented. The Committee of the U.S.A. had secured a large room which they had decorated with the national flag, and the walls were covered with drawings and photographs of buildings erected all over the country from Boston and New York to Seattle and San Francisco. So many of them were excellent that it seems invidious to particularize, but Mr. Cass Gilbert's fine wash drawing of the N.Y. custom house may be mentioned. The room allotted to England was small, but it was too large for the exhibit which consisted mostly of sets of small drawings and photographs in frames. Not a single important building was represented. The poverty of the British display was a matter of general remark, and it is to be hoped that on future occasions the Committee acting for Britain and her colonies will take the proper measures for ensuring an adequate representation in regard to drawings, preparation of papers, and speaking on such occasions as call for it.

Modern Architecture Cosmopolitan.

The cosmopolitan character of modern architecture is shown by the fact that with a few exceptions it would have been difficult, in the absence of titles, to tell which countries were represented in the different rooms. Russia was one of the exceptions, the characteristic style of the churches being unmistakeable. It is difficult therefore to compare the modern architecture of the different countries as a whole. Criticism would have to be of individual designs rather than of countries. There were many good designs and some fantastic ones from the strivers after originality, and unfortunately a good deal of l'art nouveau. There was much good draughtsmanship in every medium, and a free and effective use of models, most of which were admirably executed.

The social side of the Congress began on the evening of the opening day with what was modestly described in the programme as a 'reception by the Burgermaster' at the Rathans but was followed by a grand banquet in the magnificent banquetting hall, at which fully 1,200 guests sat down. The speaking was confined to the usual toasts.

An evening reception was given at the Kunstlerhaus (art gallery) by the Vienna Artists' Association and the Architects' Club.

Gentlemen attending the Congress were received at Court in the Hofburg, on which occasion the Arch-Duke Leopold Salvator represented the Emperor, who had that day received at Schonbrumm, in connection with his diamond jubilee celebrations, a great gathering of children, to which the ladies of the Congress were invited as spectators.

An evening fete was arranged by the Society of Austrian Engineers and Architects at the Kahlenberg, a favourite mountain summer resort of the Viennese, and from which there is a magnificent view of the city and surrounding country. It is ascended by a rack and pinion railway which winds through beautiful scenery.

At several of the places visited members were entertained to lunch or afternoon tea.

The farewell banquet was held at the Continental Hotel. The President occupied the chair and was supported by the Minister of Public Works and other distinguished guests. The usual toasts were proposed, and a representative of each of the nations taking part in the Congress replied on behalf of his country. The British guests were gratified that on this occasion Mr. Leonard Stokes, Vice-Pres. R.I.B.A., made an appropriate speech.

Next Congress at Rome.

It was decided by the Executive that the next Congress is to meet, by invitation of the Italian Government, at Rome in 1911 on the occasion of the inauguration of the great monument commemorative of the re-establishment of Rome as the Capital of united Italy.

For a city whose history dates back to the Celtic times before the Christian era it must be confessed that Vienna has wonderfully few ancient buildings. The only notable ones are the Cathedral, Church of St. Stephen, a glorious pile dating partly from the 12th century, and the small but very quaint and interesting Church of St. Maria Stiegen, dating from the 14th century. But many of the Renaissance and Baroque churches and other buildings are interesting. Most of the buildings not of a public character are coated with cement with the almost inevitable consequence of meretricious detail.

Description of Vienna.

The chief interest of Vienna lies in its general layout, the Ringstrasse, the parks and gardens, and the admirable manner

in which its public buildings are placed in relation to these. Ancient Vienna or the "Inner City" is of an irregular horse-shoe form with the heel resting on the Donau canal, which is really a large and rapid branch of the Danube. On the island between this branch and the river proper lies the great park—the Prater—which may be called the Hyde Park of Vienna. The fortifications which surrounded the Inner City were removed shortly after the year 1860, and the wide space which they and the moat had occupied was used to form a splendid street nearly 200 feet wide, and to provide sites for public buildings and gardens. It was a great opportunity, and fortunately the authorities were equal to the occasion and made excellent use of it.

The Ringstrasse consists of seven straight sections of varying lengths and bearing separate names, and is laid out with shade trees and wide walks, leaving ample space for roadways and electric car lines, which are here equipped on the underground system, although the overhead is used in the outer districts. All the important new buildings face the Ringstrasse, most of them on the outside. The ample sites and gardens give a great air of spaciousness and dignity, while the manner in which the buildings have been grouped in relation to each other and to the leading features of the old town is altogether admirable. For instance one section is laid out with a large oblong garden, at the back of which is the Rathans, a fine Gothic building, while at one end is the University, a large Renaissance pile, and at the other the Parliament buildings—a most successful Grecian design. On the inner side of the street and on the line of axis of the garden and the Rathans is the fine Imperial Theatre, the whole thus forming one group. The section opposite the Imperial Palace or Hofburg is laid out with a square garden with the axis in line with the main entrance to the Palace, and in the centre a statue of the Empress Maria Theresa, and at the sides two large buildings of similar design being the two Imperial museums of Art and Natural History. The Votive Kirche is effectively situated behind the angle formed by two of the sections and has a large triangular park in front. It is a Gothic church of Cathedral size with high twin spires of open stonework, and was built by the present Emperor as a thankofering for his escape from assassination in 1857.

The city is embellished with many admirable statues and monuments. That recently erected in the Volksgarten to the memory of the Empress Elizabeth is an excellent composition consisting of a formal garden with terraces, balustrades, statuary, fountains, trees, flowers and shrubs, the whole leading up to the principal feature, which is a group in white marble with a seated figure of the Empress. The site is admirably selected and forms a vista leading from the statue to the Hofburg.

Altogether, Vienna was a happy choice as the meeting place of the eighth Congress, and all who were able to attend it must have felt themselves well repaid, especially those who look beyond individual buildings to the under subject of making cities beautiful.

NOTE

A most excellent paper on reinforced concrete construction was presented by Mr. Walter B. Francis, C.E., of Montreal. Mr. Francis covered his subject in a most comprehensive and interesting manner. The address was illustrated with a series of lantern views, showing typical examples of the constructive and artistic application of this material. As space in this issue would only permit of a limited instaliment of Mr. Francis' paper, it was decided to omit its publication until the March issue, when it will appear in full, together with a large number of the views with which it was illustrated.—Ed. Note.

Annual Banquet

MR. BURKE, in responding to the toast of "Our Profession," which was proposed by Mr. Wickson, dwelt briefly upon the matter of architectural education, which he considered just then to be somewhat of a dry subject. The young men of to-day had greater opportunities by far, with regard to education, than the students in his day, when very little was thought about the subject. Then, if the students read Paley and Ryckman, that was about all that was expected of them, aside from looking out of the window when the boss was out. In the course of his experience, he had witnessed an enormous advancement in the profession. There was a different spirit now altogether, and this spirit he thought had been largely fostered by the Association. In the old days architects saw very little of each other, and he confessed that up to the time he had been in business three or four years, he was not acquainted with three-fourths of the architects whom he met on the street. To-day architects know each other pretty well, and have a kindly feeling towards each other, in ratio, he thought, to the frequency with which they met in the interest of the profession. Experience had proven that the benefits of association far transcend almost any other benefit that could be hoped or expected by the architect in connection with the pursuit of his work, and he looked forward to the day when all practicing architects in the Province would be united towards furthering the best interests or the profession.

Three Professions Closely Allied.

Mr. Gouinlock then proposed the toast "Our Guests," coupling with it the names of Dr. Galbraith, Dean of the School of Practical Science, and Mr. W. J. Francis, C.E., of Montreal.

Dr. Galbraith, in responding, pointed out the close connection that existed between the engineers, architects and artists. The engineers, he said, stand on one side, and the artists on the other, with the architects between them. He regretted that progress and length of time had caused more or less divergence between these three professions, and it was to be deplored that engineers have been getting away to a very great extent from artistic work. He thought the fundamentals of the three professions were the same in that they all had the same subject and the conditions surrounding it There was the work of composition and the bringing together of their ideas in the most effective form, in which the real joy of the work exists, whether it be the artist's work, the architect's work, or the engineer's work. They were dealing with elements that are ordinary, and the real creation was in the handling of the material, whatever it may be. That bond would always exist, and he felt that as time goes on, when the hurry and bustle which now exists, owing to rapid development, was ended that there would be more time to really enjoy artistic work.

The fault with the engineer and the architect at present was that they were being driven by the demands of the clients and business, and it was quite possible that that was also the case with the artist. It was the absolute hurry, the necessity of getting things done within a certain time, that prevented the thought that is necessary for the best work, and when there was more leisure time, if it would ever come, he thought that these professions would be united, as they had been in the early ages. There was one thing that all should certainly cultivate, and that was friendly and helpful feeling towards each other.

Mr. W. J. Francis, C.E., Speaks.

Mr. Francis, who followed Dr. Galbraith in replying to the toast, proved himself to be a raconteur of no mean ability. After regaling his auditors with a fusilade of witticisms and a number of humorous stories, he said, to be serious, that previous to coming to Toronto, he had been told in the strictest confidence that the members of the Ontario Association, and particularly the Toronto members, were opposed to reinforced concrete construction. It had not been his purpose to talk shop, but he had to protest most emphatically against the manner which the Association had adopted of "rubbing it in" by giving him a brick to eat, and especially a terra cotta one. To be consistent, he thought in his particular case, he should have at least been served with a reinforced brick.

The Sister Societies.

The toast of "Our Sister Societies," was proposed by Mr. Chapman, who named as respondents: Mr. Wyley Grier, President of the Ontario Society of Artists; Mr. Barry, President of the Engineer's Club, and Mr. Watts of the Dominion Institute of Architects.

Mr. Grier, in answering the toast, referred to the numerous occasions of late when those who are workers in the various arts have had an opportunity of co-mingling. These he regarded as being extremely important occasions, occasions not only of enjoyment, but more particularly of improvement and enlightenment. They brought the Sister Societies closer together by enabling their members to meet and individually converse, and were, therefore, the greatest factors in the betterments of their arts. There were moments when, in looking at an old picture by Fowler, with its broad, free wash of color, sepia tint and outline of extraordinary dexterity; or when he came across an old scrap by Jacobi or a perfect John Fraser, he had wondered if the painters of to-day were improving. As to the art of architecture, he was not well enough versed in it to know what progress was being made. In passing Osgoode Hall, he always metaphorically raised his hat, as it was an old building for which he had the greatest respect; and occasionally he saw a modest dwelling with a touch of what perhaps could be called colonial, that made him hope that the architects were advancing in the work. He expressed himself as being optimistic, and thought there were many evidences that the arts were going forward.

The first feature of Toronto, to which he had proudly called the attention of a New York artist, who was his guest for a fortnight, year before last, was its architecture. This gentleman, who was a person of rare aesthetic taste, was greatly impressed with the beauty of the city, and particularly with its suburbs, whose architecture he declared compared most favorably with the domestic architecture of any of the great cities in the United States. The tour about the city had prepared his guest's mind for the reception of whatever else was artistic, apart from the architectural; and, while there was no exhibition of pictures being held at the time, here and there among his friends, his visitor was able to see the work of the clever artists with whom he had the honor to associate.

Mr. Grier then alluded to the lofty influence which art in general exerted. In spite of the fact that the painter artists have from time immemorial been identified with ideas Bohemian, he had found in them and in the other artists whom he was gradually coming to know, something fundamentally serious—a something which is deep and earnest and stirring. He was sure that these professions were beautiful and ennobling—ennobling to those who work in them, ad ennobling to those who have an opportunity of seeing and enjoying their work and accomplishments. He thought that in this age of materialism, the members of the allied arts had a great responsibility; and in this country, with its extraordinary physical resources, it was especially incumbent upon them to carry forward, perpetuate, and to take into the unknown and unguessable future, the unbroken and untarnished thread of the spiritual idea. With all of them, it was a high privilege.

Engineer's Club and the Architects.

Mr. Barry, in replying to the toast on behalf of the Engineers' Club, said that the success of that institution was largely due to the close connection between it and the architects' association. It was through the co-operation, friendly advice

and financial aid of the latter that the engineers had to-day headquarters and a membership of about 300, which was exercising a certain amount of influence. A good many set-backs had been experienced, owing to the fact that the engineering profession in Canada had not been recognized to the extent it had been elsewhere. In some parts of the Dominion the Engineers' Association was a close corporation, but in the Province of Ontario anyone could call himself an engineer, and very often a corporation in seeking advice would engage the cheapest man that could be obtained.

The object of the club was to educate not only the public, but the corporations, and incidentally the Government, to the necessity of employing competent engineers. He thought that perhaps the public was now awakening to the situation. In conclusion, Mr. Barry said that the Engineer's Club considered themselves part and parcel of the architects, and he hoped that before long there would be an amalgamation not only between the architects and engineers, but other branches of the profession, so that they could have a central science building in which the different bodies could be housed. There would then be a greater oportunity for intercourse, which would certainly be for their mutual benefit.

Co-operation Essential.

Mr. Watts then briefly addressed the banquet on the objects and scope of the Dominion Institute, and in his remarks laid particular stress on the necessity for co-operation and support. The work they were doing was not alone for themselves, but for posterity, and the architects of to-day should be grateful for this opportunity. He called attention to the short space of time given in the convention sessions for business concerning the professoin, and gave as his opinion that each one should be given an opportunity to help his follow architect and spur him on to do his very best. In concluding, he expressed his thanks to the Association for the opportunity of speaking on behalf of the Institute, and assured them that he would convey to the Institute the pleasure it had given him to reply to the toast of "Our Sister Societies."

The Question of Legislation.

Mr. Baird, of the Toronto Bar Association, answered the toast "Our Legislature." After a few preliminary remarks, he took up the question of legislation and spoke of the lack of success in getting from the legislation what the architects wanted. The great difficulty was the want of unity, wherein the strength of the architect lies. Unless they were united and came forward with something which they actually wanted, and would consistently support, their efforts would be futile. As an instance of unity, he cited the case of a man who had applied to the legislature for a license to practice dentistry, which the legislature refused to grant, owing to the hue and cry that was raised by the dental profession from Ottawa to Windsor and from Toronto to Port Arthur.

Mr. Baird impressed upon his auditors that it was a difficult matter to get a bill through the legislature, where there were a number of men in the Association, no matter how small the percentage, who opposed it. The legislature would only consider a bill that the architects, as a unit, want. He spoke of the necessity of united effort, and said that the architects could get any bill they required, if they would only act in concert. This was essential, as there was no other way of obtaining favorable legislation.

Mr. Gordon's Response.

Mr. Gordon then arose in acknowledgement of the toast proposed to his health as President of the Association, and in a warm and appreciated manner thanked the members for the hearty way in which the toast had been received. The night, he said, had proved that brevity was the soul of wit. There had been a good deal of wit, and it had been in speeches that were brief and to the point. He desired to conclude by one that would probably be shorter than the rest, and he aroused the enthusiasm of the banquet to the highest when he proposed "that we all resolve from now on that there shall be the highest ethical standard, the most brotherly relationship one to another, the most earnest and studious attention to the details of our profession, and the earnest endeavor to get all who are aspiring to be architects to acquire that education and qualification which will in the days to come, raise the standard of the profession so as to place it in the eyes of the public, in that position which its utility, its duty, and its art, demand, and should receive."

He hoped that the members would unite in meeting, so far as it was possible, the views and opinions of those who differed from them. This he believed would give one another the intention of the highest and best motives for the uplift of the profession, and it was to be hoped that by their own conduct and associated conduct, and by the results of the educational policy, which would be adopted, that they would all live, even the oldest of them, to see the time when the profession of architecture in Ontario, and in the whole of Canada, would have attained that high position which he believed it was entitled to.

Business Session, Wed., Jan. 13th

Amendments to By-Laws

The two amendments to the Association By-Laws, as proposed and adopted, were as follows:

(1) "No member of the Association shall be either a building contractor or manufacturer of building materials, nor shall he have any pecuniary interest in any contract or work carried on under his superintendence, or in any materials used in the said work."

(2) "No member shall accept, direct or indirect, compensation for services rendered in the practice of his profession, other than the commission received from his client."

Discussion

A lengthy discussion followed the introduction of the amendments, as to whether they would be strictly understood or not. There was some fear that they might be misconstrued by an architect who intended to build for himself, for prospective profit. Several additional clauses were suggested, but, after debating the point pro and con, it was decided that this would only serve to make the amendments more complicated.

Mr. Gregg pointed out that the motion as it stood, did not cover the case in question, and did not affect such case; that an architect, as his own client, could do what he liked. He thought the matter was quite clear, as the explanation would be embodied in the proceedings, and would sufficiently cover that point. The term "building contractor" does not refer to a man building for himself.

The President put the motion that the two clauses, as read, be incorporated in the by-laws, which, on a vote having been taken, was declared carried.

Report on Future Legislation

The report of the committee, consisting of Messrs. Gouinlock, Watts, Burke and Gordon, appointed to consider the desirability of future legislation, recommended the following amendments:

(1) That the president, vice-president and treasurer be elected by direct vote of the convention.

(2) Any person who shall have been practicing the profession of architecture in the Province of Ontario for two years before the first day of May, 1909, may on or before that date, be admitted to enrollment as an architect with the privilege of uniting or declining to unite with the Ontario Association.

(3) Any person who has obtained a degree or certificate from the University of Toronto, or the School of Applied Science, or who may be a graduate on the course prescribed in the curriculum of the University for architectural study, shall be admitted to the practice of the profession upon serving two years as a student, without further examination.

(4) The striking out of the words "registered under this Act," in section 24 of the Ontario Architects' Act, and the substituting of the words "a qualified architect unless he is registered under the Act." (That is no one shall be allowed to use the title of "architect" unless he is registered under Act, whether he becomes a member of the association or not.)

(5) The insertion of a clause making the fees to be changed, subject to the approval of the Lieutenant Governor in Council.

(6) The insertion of a clause giving the right to appeal from the examiners to the council.

Discussion

Mr. Gordon, who presented the report verbally, stated that the majority of the committee felt that one more attempt should be made to get the bill passed in a revised form; as they believed that the amendments as suggested would not only eliminate the opposition of those who do not want to join the Ontario Association, but also overcome the opposition of the University and the popular idea that the association was seeking a close corporation and the arbitrary fixing of fees. To his mind the amendments covered all opposition, with the exception of those who were of the opinion that the profession should not be made subject to law. The opinion of the minority of the committee was that the association should seek a licensing bill somewhat similar to the Illinois Act.

Mr. Burke in vindication of his position as to the minority report, stated that he had been identified with attempts to secure amendments to the charter, ever since the movement began. Personally he had concluded that in view of the temper of the House and public, and the opposition of the newspapers, any further attempt would be useless. The best solution, he believed, would be to let some outside party move for a licensing bill protecting the public. This would incidentally raise the status of the profession, as all who would engage in the practice of architecture would have to pass an examination. However, he wished it understood that he would stand loyally by the majority report, if adopted.

Mr. Gordon, at the request of one of the members, then briefly outlined the main features of the Illinois Licensing Law, explaining the numerical strength of the Examining Board, the manner in which they are appointed, their jurisdiction regarding professional ethics, and the conduct of the architect, the methods of holding examinations, and the matter of examination and yearly registration fees, which are imposed by the State, to defray the expenses of the Board.

Mr. Sproatt was not in favor of a licensing bill. He thought that a good building law would practically cover the whole matter, and that an architect could not be made by legislation or licensing. A well defined building by-law would examine an architect in every building he erected, and the object of the association would be to govern the architects in professional standing towards the public.

Mr. Watts called attention to the fact that there were now certain fixed conditions which placed the Ontario Architect at a great disadvantage. Quebec and Alberta, as was known, had close corporation and he believed other Western Provinces would incorporate on the same lines at the coming sessions of the legislature. There was nothing to prevent the architects in these provinces from practicing in Ontario, while on the other hand, Ontario architects could not operate in provinces where close corporation exists; unless with the sanction of the governing council, and, even, then, they could be

debarred by the inimical attitude of two or three men. The Toronto members were not in a position to fully appreciate the circumstances as well as the architects who reside in the extreme eastern and western portions of the province. He contended if Manitoba and British Columbia and some of the other provinces legislated in favor of close corporation, that the architects of Toronto and Ontario would be narrowed down to the confines of their province, over which the architects from other sections could swarm at will.

Mr. Sproatt maintained that Mr. Watts had argued the points that he had advanced, in showing the law to be an injustice in Quebec. He could see no reason why the Ontario architects should perpetrate a similar injustice, and that some attempt should be made to overcome it, if it was a bad thing. Because they have a law in Quebec which was a bad law, was no reason why they should have laws all over Canada which were not good laws. There were other provinces where such a law had not been passed and if Ontario enacted an unfair law, they would naturally follow suit.

Mr. Gordon then stated that Mr. J. C. B. Horwood, of the Toronto Architectural Club, who was present, had read to him a letter which he thought fully covered the case. He thought that if Mr. Horwood could be prevailed upon to disclose its contents at the meeting, they would learn the opinion of the other society, which could be thoroughly discussed. Mr. Gordon's suggestion met with the approval of the members.

Mr. Horwood replied that the letter was a communication written to the Editor of "Construction," and that he doubted as to whether he was privileged to read it before the meeting, until after it had been published, as it had been given for that purpose.

Mr. Rolph thought that it would be doubly interesting to hear Mr. Horwood's letter, because afterwards the members could see it printed in "Construction," when they would go through it at their leisure.

Mr. Horwood stated that, belonging to the Toronto Architectural Club, and coming to the Association, that they got at the question from two different standpoints. The contention of the organization to which he belonged was that the attitude of the architect should be for the benefit of architecture, rather than for the benefit of the profession. He referred to a letter in "Construction" advocating a license law, which he thought was a one-sided view of the matter, and so had written the Editor accordingly. Mr. Horwood then read his letter, which was published in the January issue of "Construction."

Mr. A. H. Gregg declared that there were two ways of looking at the question. There was no doubt but that the Ottawa architects suffered a great injustice in connection with work which they might obtain in Quebec, but at the same time, to bring forward an amendment to the bill at the present time, would be a matter of practical politics. While personal and factional differences existed there was no hope of a change, and he believed there was not the slightest possibility of an amendment to the act being carried through for some time to come, and that the recommendation of the committee should not be adopted by the convention. As regards the matter of education, he took strong grounds that compulsory education was a necessity and that the matter of bringing it about was something which ought to be carefully considered at the present time. The method to be pursued was not as important as the result. It was necessary to consider the whole body of architects and the whole body of students, and he did not think that is was ever possible to obtain a proper standard of education unless there was a certain minimum qualification, which they were compelled to attain. This could only be brought about by some means such as the licensing bill or an act such as has been proposed in the past, making architecture practically a close corporation; or by making the membership in some association, like the O. O. A., of such recognized qualification that the general public would seek the services of only those who were members of it. He objected to the system as advocated by Mr. Horwood, in that there was no decided proposition which would insure all students taking such a course. It was unfair to compare the work done by students attending ateliers in the various large centres with the average of the work of students who pass the examination as was required by the State of Illinois. Naturally the work of a few students in some of the big cities, who were enthusiastic and were encouraged by enthusiastic architects to attend some atelier, was far superior to the average student who was passing some minimum standard. There were always certain ambitious students who would improve their qualifications in matters of design, and attend the ateliers over and above all the examinations which they would be required to take. It was true that the passing of any set examination was not a continued guarantee that the architects would keep up with the times, but the establishment of stringent building laws, as favored by advocates of compulsory education, would to an extent make the architect conform to the times in the matter of building construction. It was necessary that every student should attain a certain standard to begin with. It was impossible to have the same results from the work of a student who had not received sufficient primary education, as it was from one who had a good fundamental training. One of the arguments against compulsory education, he continued, was that it could not be expected of an artist to pass through certain dry courses of study with which he had no sympathy, that it was possible to have an architect, one who could not mathematically qualify, who was a good designer and builder, and who could get the necessary assistance to enable him to carry out the structural part. An artist should not be prevented from practicing architecture if he wanted to, not any more than a man of good impulses should be prevented from entering the ministry. Yet it was found that all leading denominations insist on a certain standard of education. Mr. Gregg agreed with Mr. Horwood that school and museum should be established to enable students in architecture to carry on their studies properly, but claimed that until there was a compulsory education demanded, there was no hope of getting such institutions. A license law or a law requiring all students to take a prescribed course, would make it mandatory for the government to provide a proper professorial staff and appropriations necessary for the proper equipment. The objections advanced that a college course debarred the poor man's son, Mr. Gregg did not think held good. There was an abundance of evidence to prove that he generally succeeded in some manner. If any person doubted the point, they could examine the rolls at the University, which he felt would ably bear out his statement in this respect.

Mr. Watts stated that he had paid close attention to Mr. Horwood's letter, and thought that it would have been better to have compared the architect with the doctor than with the lawyer. He thought the close corporation of the medical men was a guarantee that the doctor had received a training which safeguarded the public. It seemed to him that the public was equally entitled to some guarantee from the architects that their interests would be properly guarded in the erection of buildings. There were incompetent men who should not be practising architecture. Reinforced concrete was a factor to be considered, and there was a greater need to-day for a thorough knowledge of mathematics than ever before. The clamor for schools and museums, and the talk of the student life in New York offered no solution to the question as its exists in Ontario. The conditions were entirely different. Even take the Architectural Association, the greatest educational establishment for architects in London, which he had attended, and out of a membership of 400 or 500 in the class, the largest attendance to his memory would not exceed forty. In a scattered country like this, it was impossible to have students unless there was something to compel them to qualify for practice. Mr. Watts then cited the case of the accountants who had applied for close incorporation, which was denied them. Instead they got "Chartered Accountants," and by use of that word became as close a corporation as could be desired, because they receive exclusive recognition from all the big financial institutions. He could safely say that in nine cases out of ten the general public would prefer a man who was registered, to one who had simply the name of architect. It would be a guarantee to the public that the student would be versed in all that was necessary to insure the safe erection of buildings. As regards the draughting of building laws he thought the matter should rest with the profession, and in support of this contention pointed to the new code prepared by the Ottawa Chapter, and to which no great objection has been taken to any particular clause. Mr. Watts declared the Association's motives were more altruistic than selfish. Whether or not they had close corporation would not affect the interests of most of the present practitioners. It was more of a work for posterity and an effort to place the profession on a higher plane. If the members would unite they could get anything they wanted from the government.

The convention, on the motion being put by the President, then voted in favor of receiving the majority report. Both the motion for receiving the minority report, and the motion for the adoption of the majority report, were defeated.

Report on Affiliation with A.I.C.

(1) The membership of the Architectural Institute is now about two hundred and fifty, including many members of the Ontario Association of Architects, while the membership of the Ontario Association numbers about ninety.

(2) The Architectural Institute is not an examining body and does not contemplate obtaining a bill protecting the word "architect."

(3) Owing to its charter and wide spread membership, its influence will extend to all parts of Canada. Negotiations are now under way looking to its affiliation with the Royal Institute of British Architects.

(4) If an arrangement could be made whereby the Ontario Association of Architects could as a body be made members of the Architectural Institute, and the matter of fees arranged so that members of the association would not pay any entrance fee to the Institute, and that the annual fee to both bodies would not exceed by much the present annual fee of the association, and could at the same time retain its individuality as "The Ontario Association of the Architectural Institute of Canada, or the Provincial branch of the Architectural Institute of Canada," and carry on its educational and examining work, receiving financial support from the Architectural Institute in connection with this, your committee believes that an improved condition could be brought about, especially if the Architectural Club of Toronto, and other architectural clubs would join the Institute in the same way and devote their efforts more particularly to the training of the students in design and the art side of the profession, thus preventing the duplicating of effort in any locality.

(5) Your committee is of the opinion that if such a condition as above suggested, could be brought about between the various Provincial bodies and the Architectural Institute of Canada, the power of the architects as a force for good in the building of this young country, whose destiny it is not possible to estimate, would be greatly increased.

(6) Your committee would also recommend that a standing committee of five members, with power to add to its number, be appointed to consult with the Architectural Institute of Canada regarding the possibility of some such arrangement as above cited. This committee to appoint a representative to attend the proposed conference of all the Provincial bodies, as per letter of the Architectural Institute, just received, and that the Architectural Institute be communicated with to this effect. This committee to report to the annual convention of the Ontario Association in 1910.

The report was then adopted, and in accordance with the motion, a committee consisting of Messrs. F. S. Baker, E. Burke, E. L. Horwood, W. A. Langton and A. H. Gregg, was appointed to consider the question of affiliation with the Architectural Institute of Canada, with instructions to report at the next convention.

Following the business session Mr. W. A. Langton delivered an illustrated address upon "Style in Architecture." Mr. Langton's talk was enthusiastically received and the views which he used for illustration were greatly enjoyed by all present.

The Training of an Architect

By Prof. C. Francis Osborne

If I venture to take part in your discussion this afternoon it is because your very kind invitation assures me that in Ontario, as elsewhere, the best minds in the profession are aroused to the importance of securing for the architectural student a systematic course of training, and that when your Association is ready to suggest such a course, it will carry with it all the weight of your official recognition and support.

I have, therefore, as my contribution to the occasion, endeavoured to embody very briefly in the following paper certain conclusions to which I have been led by my experience in the field of architectural education, together with some indications of the reasons which have seemed to support them; but as time and space alike forbid a detailed consideration of the many difficult questions which are involved in the problem, it is suggestion rather than argument which I have the honour to offer for your consideration.

Whoever strives to formulate such a programme will soon discover that no progress is possible until one's objective is clearly defined. It is not enough to say that the training of the architectural student is our objective because back of that lies the question "What is he to be trained to do?" and back of that again is the insistent demand for a fundamental definition of architecture itself.

Architecture I would define as the art of building; contrasting it, for illustration, with engineering which is the science of building. Any for myself I cannot understand any other definition of an architect which will clearly differentiate him from all other professional men than that he is a designer of compositions which are to executed in building materials. The fundamental difference between the architect and the engineer may be made clear by two examples taken from that vast field of building operations in which both the architect and engineer are engaged at their respective tasks. Let us first consider the case of a great dam, to be erected near the headwaters of a river, miles away in the wilderness. This is a typical engineer's task, and the only considerations which determine the lines of the structure are those which arise from meeting the stern demands for resistance to the mighty stresses of the stream in flood, taken in connection with the materials available for its construction and the opportunity for securing an adequate foundation. Every line of the profiles in plan, section, and elevation, is determined by the strictest requirements of utility and economy.

Let us take, by way of comparison, some structure completely typical of the architect's work—say a memorial monument. Here, neither utility (in the engineer's sense) nor economy are concerned. Any materials the architect may regard as appropriate are at his command, quite regardless or negligibly so, of considerations of the relative hardness or specific gravity of these materials, to each of which qualities the designer of the dam had to pay the closest attention. Every line of the memorial is determined purely as a matter of feeling, the architect having regard only to this question:—"What effect or expression in the finished monument and its setting will be most appropriate to the time, place, and purpose of its erection?"

There is of course a neutral zone where the interests of the architect and the engineer commingle, and where co-operation is necessary. This has already taken place, under the pressure of enlightened public sentiment, in such matters as civic bridges, harbour approaches, railway stations, and the like. It is interesting to note for instance, in connection with the gigantic operations of the Pennsylvania Railroad in New York, that the company's engineers, while engaged in their underground affairs, have encountered some new problems of construction on a scale of unusual magnitude and have been able to meet them in the most skilful manner, but that as soon as they emerge to the surface, where their operations become visible in the heart of a great city, they call to their aid one of the most distinguished architectural firms in America to give to the great terminal station an expression suitable to the occasion. There were no constructive problems in the building of the station which the engineers could not have solved, but the feeling they sought for was beyond their powers of expression, and so it was placed in the hands of men who were professionally trained for such expression.

Art the Architect's Function.

We are abundantly justified, then, in the conclusion that the faculty which differentiates the architect from all other men engaged in the field of building operations, is the faculty of imparting to his structures, by means of the attributes derivable from form, color and texture, such an expression in each particular case as shall stir the beholder to an appreciation of the fact that the building is pleasingly and appropriately indicative of its function. But when I say this, I do not refer to the exterior or elevation of the composition alone, for the elevation is inextricably linked with the plan; and when you have an orderly, convenient, and economical plan, a good elevation must follow. To those conversant with design methods it is not necessary to call attention to this detail, but I do so because I desire to avoid any interpretation of my point of view as assenting to the idea that architecture is construction plus decoration. On the contrary, those qualities which make for good design are fundamental to the solution of the problem and are developed in the original choice of scheme, quite as much as in any details of the plan or elevation.

If ability to design be the distinctive test of the architect, the teaching of design must be the paramount objective of his course. On this point some strange proposals have been made. It has been suggested, for instance, that the theory of design should be taught in the schools, and the practice of design—that is, the working out of design problems—should be under the direction of practicing architects in the office. It has not needed some recent experiments in this direction to show that no good results can come from such a course of procedure. It is based upon a fallacy which has been fully exposed by the Engineering Record in a recent editorial dealing with the subject of engineering training.

I quote one paragraph:—"There is a ridiculous idea prevalent that a man who is successful as an engineer is necessarily competent to teach undergraduates in an engineering school; the fact is, nobody can be a successful teacher who does not make a careful study of pedagogics, a subject calling for as much thought and detailed consideration as any course in engineering." This testimony from an engineering source is especially significant.

Personally, I am convinced from long observation that there is only one effective method of stimulating the highest powers of the undergraduate for the solution of any design problem, and that is the method of teaching design which has unfortunately come to be known as the French method. I say "unfortunately," because this word "French" seems to act as a curious irritant to many people who are not at all familiar with the thing criticised. These, either through such unfamiliarity, or because of an inability to understand the system when it is presented to their scrutiny, fail to discern its real spirit, and suffer their attention to be distracted by such superficial characteristics of the method as might be likely to develope under the skies of France.

Good Design a Matter of Feeling.

This system is based upon the idea that the only way to learn to design is to design. Theories of design are not for undergraduates, and even when discussed by mature minds are usually unfruitful. Good design is purely a matter of feeling which eludes definition, but which can be cultivated by assiduous practice. Problem after problem must be presented for solution to the student, who must work under the eye of a master whose chief vocation is criticism in the atelier. The problems may be of as practical a character as you like, but worked out without too much consideration of how many tenpenny nails go to a pound.

The second question is, "what comes next in importance after design?" The fact that the architect uses building materials to develope his compositions might seem to place a study of these materials and their combinations next on the list. You may be surprised to hear that I relegate this subject to third place in our curriculum and rate drawing next. If we assign, of the total number of hours in any undergraduate architectural course, fifty per centum to design, I should allot twenty per cent. to exercises in drawing from the cast and from life, with an ancilliary course in modelling. Such practice greatly increases the student's powers in design, and though it is not always true that a good draftsman is a good designer I have never known a poor draftsman who was so. This fact has so often come under my observation that it is impossible for me any longer to question it. Practice in drawing from the figure and modelling should continue during the entire course, so soon as the student, from his previous practice from the cast, is prepared to take them up.

We now come to the subject of building materials and construction, and I will explain why I have placed it as third in importance in the undergraduate course of study. Up to this point the subjects in the course have been included in the field of art. Construction, however, lies within the field of science, and from a pedagogical point of view its teaching must be undertaken in a different manner. Where the teaching of applied science is concerned all experience goes to show that in his undergraduate studies the student should be thoroughly grounded in fundamental principles, and theory, and that no attempt should be made to render him expert in the office sense in their application to all imaginable cases. If we attempt to teach theory by the medium of manifold examples, the average student proves unable to see the forest for the trees.

This subject is best taught in an undergraduate course therefore, by courses of lectures, fully illustrated, and supplemented by sketching in the student's note book of typical examples. Building materials should be fully developed, so that the student may know the characteristics of each, its usual applications, and what may be expected of it in practice. The study of building construction should proceed from simple to the more complex assemblages in all materials, still with continuous sketching.

Finally, there should be a course in theoretical and applied mechanics lasting a full year, with special stress laid on graphical statics.

The only stated exercises in drawing that I should recommend, in connection with such a course, (aside from the exercises in graphical statics) would be just sufficient practice in scale and full-size detail drawing, as will enable the student to correctly grasp the principles of such work, and prepare him to take up with confidence that side of the office routine. No attempt should be made to make him familiar with all possible kinds of details, for it is futile to attempt to train the undergraduate, even if it were at all desirable to do so, to a point where he can produce working drawings and scale

and full-size details under office conditions, with facility and precision.

Academic Training an Advantage.

The fact should never be lost sight of, and especially in this connection, that the student's training is to be obtained in two places:—one the school, but the other, and equally important, the office. It is in the school that he will learn most of his design, but it is in the office that he must acquire most of his practical knowledge of construction. But his undergraduate course in this latter subject will enable him, if it has been properly taught, to very rapidly assimilate the practice of whatever office he may happen first to enter after his school work is completed, and by the end of three years' office experience he should be a first rate all round man, far in advance of a man of similar capacity who entered the office when the student entered the school. It is matter of common observation here, that the school man ultimately attains a far higher professional position than is ever possible for the office trained man. This fact is being so generally recognized with us, that experienced office men are coming to the schools in increasing numbers, in an endeavour to overcome this handicap. They labor under one disadvantage however with regard to the study of design, and that is most of them have waited too long—for you must catch your designer young.

Allowing twenty per cent. to the subject of building materials and construction, there yet remains ten per cent. of the undergraduate's time to be accounted for.

This I would allot for the most part, to the history of architecture and the allied arts, reserving a small modicum of the time for a course of lectures dealing with professional ethics, office organization, contracts, and kindred matters, and a special course given by practising architects of the highest professional standing, who will present to the student's attention instances drawn from actual practice. It is of great benefit to the student to bring him in contact with such men.

A brief word should be said as to the amount of preparation to be required of all students who present themselves for such a course of study as I have here outlined. The requirements are few, but insistent. Sound training in English; the fundamentals of general history (ancient, mediaeval, and modern); mathematics up to and including trigonometry; the fundamental principles of elementary chemistry and physics; and descriptive geometry, including shades, shadows, and perspective. No further instruction will be given in any of these subjects in the professional school, but the student's knowledge of them will be tested from the first moment he takes up his architectural studies.

My paper, gentlemen, would be incomplete, did I not include some notice of another theory of architectural education which has had some distinguished advocates, but which I am unable to approve.

No one knows better than those of us who are engaged in the field of architectural education how extensive are the boundaries of that field. Indeed it seems at times to some of us as if no other profession could be so comprehensive and inclusive.

Training of the Students.

Mother of the arts and issue of the elemental forces of nature acting upon the varied materials of construction, architecture, springing from a vast historical background, touches on every hand the bounds of human knowledge. It is natural therefore that to some of those who have concerned themselves about the adequate training of the young architect should have seemed not only desirable but possible that such a course of study should be devised for the undergraduate as will enable him on its completion to meet any demands which the complexities of his chosen profession may make upon him. To this end it has been proposed that he be taught not alone the technicalities of his profession, but that he be brought into sympathy, through courses in general academic subjects with all that is best and most broadening in the world of culture.

To carry out this comprehensive programme several expedients have been proposed. It has been suggested, for instance, that the usual four-year undergraduate course in architecture be lengthened to five years, of which the first two shall be devoted exclusively to academic and cultural subjects, and the last three to professional subjects exclusively. Two, at least of our universities offer a six-year option in a combined course in arts and architecture, whereby the A.B. degree may be taken at the end of the fourth year and the first degree in architecture at the end of the sixth. This is accomplished by permitting the student to take all of the elective hours in the arts course in the course in architecture.

One other university requires the equivalent of two years' work in an arts course as a preparation for admission to its course in architecture. Still another has had the courage to carry this doctrine to its extremest development, and now requires the degree of A.B. of all its architectural matriculates. It is worth while to note that the president of this last institution has recently declared it to be his opinion that the future welfare of that university demands that it be made the most difficult to enter and the most difficult to remain in of any institution of learning in America. Each of these tentative schemes of education strives to attain the same end, viz:—to prepare the student not only for the practice of his profession but for speaking and writing with learning and discernment on all its collateral interests, as well.

The Unattainable Idealistic.

It is not difficult to picture for ourselves the paragon of architectural virtues which the well meaning promoters of these schemes of professional training have in mind—though the vision of his activities is somewhat overwhelming. Prepared to discuss with the archaeologist the Semitism of the Sumerians or the significance of the abrys supporting the altar of the gate slab of Mycenae, he is equally at home with the epigraphist in an interpretation of the dowel holes in the Parthenon epistyle. Representing his profession at the annual dinner of the Society of Painters, he takes an intelligent part in a discussion regarding the inexplicable phenomenon of Duccio's art, and later in the evening makes a formal and eloquent plea for the subordination of the mural decorator to the controlling and directing mind of the architect. With the general historian he holds his own in a discussion regarding the correct definition and interpretation of universal history, and yields nothing to the Egyptologist on the point of Iknaton's brilliant witness to the truth of the Semitic conception of the oneness of the Divine Ruler of the Universe. Descending from these transcendental realms to the sphere of practice, at the office next day he learns from his morning's mail, though without too much surprise, that his design for the new National Art Gallery upon the Mall in Washington has won a famous competition. Annoyed by the appearance of an extensive efflorescence upon the brickwork of his Carnegie Library, to which he has endeavoured to impart a XIVth century Veronese air, he writes forthwith to his brickmaker for analyses of his clays and to his cement maker for an analysis of his cement in order that he may determine the source of the annoyance and apply the proper remedy. Pending the arrival of this necessary data, he turns his attention to the designing of the reinforced concrete cantilevers for one of the walls of his Mining Building at the impending World's Fair at Jumeau—a difficulty having arisen from a pocket of quicksand which has manifested itself in a most inconvenient quarter of the site. In his fifty-four story warehouse for the Universal Providers (Limited) he has devised a new method of wind bracing for wide panel designs in structural steel which bids fair to revolutionize engineering practice in that particular as soon as his method becomes known through publication in the professional journals. He next reviews the sketches of his head draftsman for the ball room of the American Embassy at Paris, where he points out the incorrect profile of the consoles of the rosace which strike an incongruous Louis Quatorze note amid a Louis Seize harmony. He remembers, also, to caution his assistant to correct the contour of the buttress weatherings of the new half-million-dollar chapel of ease of St. Simeon-by-the-Waves, where the full-size detail shows them to have taken on a too pronounced Edward III. character. Leaving his office for his daily exercise at the Racquet Club, he ruminates on his way thither, on the essential points of his paper for the Electrical Engineer's Club regarding a new method of closing the solenoid and relay circuits of a type of remote control switch which he has devised for large private installations. After a couple of hotly contested games of squash and a bath, he dresses for dinner, but foregoes an evening of relaxation at the opera to dine with the Sculptors' Society where he makes an address on the vitality of Donatello's art, with special reference to the qualities of architectural sculpture as exemplified at Reims and Athens. On his return home, he concludes his day's labours by revising proof of a forthcoming article in The Builder on "The neutralization of the action of atmospheric carbon dioxide on building stones; after which, he retires to his virtuous couch and is soon lost in a profound and well earned slumber. As he sinks to his repose, we awaken from our own dream to a realization of the fact that he has been but a product of our imagination, for modern conditions have made him impossible. We part from him with reluctance, for he has been a stimulating companion, but we have taken his measure and may allow him to depart in peace.

Do not mistake me, gentlemen. It is not the cultivated architect whom I ridicule, but the impossible product of an impracticable scheme of professional training. There is something more fundamental than modern conditions which makes him impossible.

Critical and Executive Ability.

There are two laws of intellectual development which preclude him. First, because critical ability—the power of mental analysis in any art—bears an inverse relation to the power of execution in that art. There are exceptions, it is true—but they remain exceptions. Turner paints and Ruskin expounds. Whistler does both, but his contemporaries are the first to admit that he was rara avis, and posterity will confirm their judgment. If Berenson has painted a masterpiece it has not yet been catalogued; and we have yet to hear of an edition of L'isle des Pingouins with illustrations from the pencil of the distinguished author. In ancient Egypt, the king's architect was a man of war and of affairs, whose varied activities make his architectural labours seem incidental. This is possible where the art of building, as in ancient Egypt, has been reduced to its lowest terms. But as art becomes more complex and refined, it compels undivided attention; and we do not hear that Ictinus distinguished himself in the Euboean campaign.

The operation of the second law is perhaps exaggerated by modern conditions. It has to do with the direct relation between efficiency and specialization.

It was my good fortune during a recent journey to fall in with a distinguished army officer on detached duty at one of the government's advanced schools of instruction for officers. It was evident from his conversation that he was not only a man of the highest character but very skilled in his profession. As a brother pedagogue, I naturally enquired in what subjects he gave instruction in the school. I must confess that I was momentarily taken aback by his unexpected reply "Retreats." A brief period of reflection served, however, to make clear the vital importance to the soldier of knowing how to safeguard his command in the event of not attaining his objective, and that it is better to learn before rather than after the event. Napoleon, doubtless, could have given valuable advice in this matter on his return from Moscow, but the more modern is the better way.

(Continued on Page 56.)

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW SHOWING THE TEN STRUCTURAL STEEL COLUMNS AND STEEL TRUSSES USED IN THE BUILDING, AND THE PROGRESS OF THE WORK MADE UP TO JULY 22ND. W. S. PAINTER. ARCHITECT.

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN AUG. 14TH, SHOWING THE GENERAL FLOOR CONSTRUCTION, TOGETHER WITH THE CONCRETE COLUMNS IN THE FOREGROUND WHICH ARE DESIGNED TO CARRY THE TOWER PORTION OF THE BUILDING. W. S. PAINTER, ARCHITECT.

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN IN THE MIDDLE OF NOVEMBER JUST BEFORE COMPLETION OF THE BUILDING. NOTE THE ABSOLUTE HARMONY OF THE OLD AND NEW SECTIONS OF THE BUILDING, WHICH SHOW THE TRANSITION OF THE WORK OF ONE DESIGNER TO THAT OF ANOTHER. W. S. PAINTER, ARCH'TECT.

NEW ADDITION TO CHATEAU FRONTENAC.---Large Reinforced Concrete Extension at Famous Hostelry Nearing Completion.---Architectural Lines in Accord with Original Structure.---Features of Its Design and Construction.

By GUSTAVE KAHN

THE NEW WING now in course of completion at the Chateau Frontenac, the famous hostelry of the Canadian Pacific Railway, in the City of Quebec, is of more than usual interest, in that it not only represents the successful retention of absolute harmony in the transition from the work of one architect to that of another, but because it also affords a more noteworthy example of the application of reinforced concrete to building construction.

The original structure has long been regarded by students of building design and architectural enthusiasts as one of the best examples of its class to be found on this continent, the inspiration for the design coming from the French Chateau; while the picturesque beauty of its site is only too familiar to those who have visited the Ancient Canadian French City.

Owing to the fact that the site is not a level one, it was found necessary to build the additions considerably higher than the original building, and the problem of grouping the new so that it would be strictly in accord with the old was an exceptionally difficult one, and the architect before proceeding with the work, made a special trip abroad for the purpose of thoroughly familiarizing himself with the best examples of this class of structure.

The accompanying illustrations show the addition at various stages during the process of construction, the entire structure as it appears to-day, and the study that has been given to the general grouping of future additions. To assure a uniformity of material and color between the two parts, it was decided to use the same materials for the exterior of the additions had had been used in the original portion of the building, the original walls consisting of Terrabone Stone, which is a native Quebec stone that might be classed a granite, and Scotch fire brick.

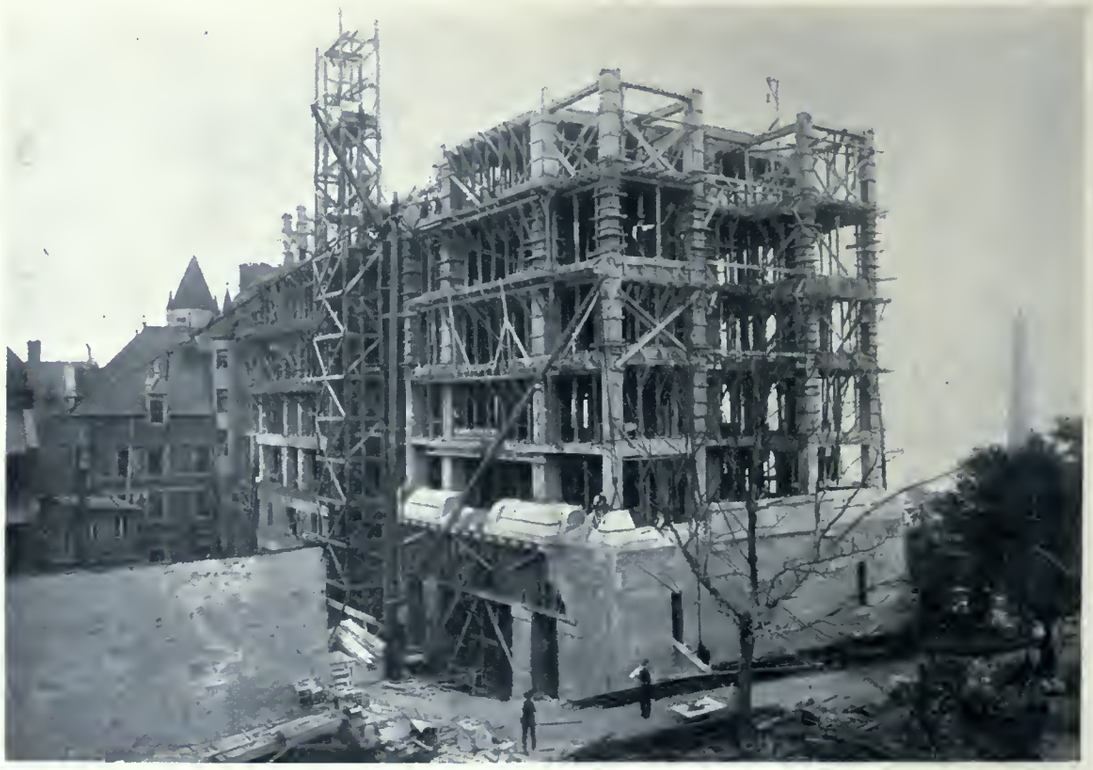
In carrying out the work, many novel effects, both architecturally and structurally, have been produced, and possibly one of the most happy solutions of a difficult problem is the manner in which the usually ugly scheme of fire escapes have been overcome, the scheme adopted really adding to the architectural beauty of the building instead of detracting from it as is frequently the case.

The original site of the building was not sufficiently large to accommodate the additions, and it was, therefore, necessary to arch across two public highways so as to connect the additions with the old structure. These arches have been exceptionally well treated, and the detail of the entire structure, though very simple, is most effective, the architect depending more upon the grouping of the openings than upon ornamental detail for the desired effect.

It is hard to conceive how the contour of the original roof line could be more symmetrically preserved. The roof of the new wing, the same as the original part of the building, is finished in copper. In order to properly utilize all the space within the enclosure, two living floors besides an attic floor are taken care of in the roof portion of the main addition. In the tower roof four floors were provided, two of which are used for living rooms, one for taking care of the water tanks, and one for general storage—the latter floor having been necessary to procure the desired air space.

The new building is 150 feet long and 55 feet wide, and the top of the tower, which is at the end farthest from the old building, is 170 feet above grade. The main portion of the building has nine floors, and the tower extends four storeys higher. In the construction of the building, the Kahn System of reinforcement was used throughout, the reinforcement of the beams consisting of Kahn Trussed bars, while for columns cup bars were used. With the exception of the attic floors, which like the roof are of solid concrete slab construction, the floor system in general is a combination of concrete and hollow tile; this method of construction giving flat ceilings of large span throughout the building. The columns along the corridors in the lower storeys of the main portion

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN AUGUST 20TH SHOWING THE MANNER IN WHICH THE CONCRETE SKELETON WAS WALLED IN WITH BRICK AND STONE, AND HOW SOON THIS WORK FOLLOWED THE CONSTRUCTION OF THE CONCRETE FRAME. W. S. PAINTER, ARCHITECT.



NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN SEPTEMBER 14TH FROM THE SIDE OF THE BUILDING WHICH WILL EVENTUALLY FACE THE INNER COURT. IT SHOWS THE CONCRETE SKELETON OF THE TOWER PORTION COMPLETED UP TO THE 6TH FLOOR, AND THE RAPID PROGRESS THAT HAS BEEN MADE IN THE SPACE INTERVENING AUGUST 20TH AND THE ABOVE DATE. W. S. PAINTER, ARCHITECT.

of the building are of structural steel, this being done to economize space. These columns are fireproofed with concrete, the outside diameter of the finished columns being 18 inches. The structural steel columns are stopped off at different levels, none of them extending above the sixth storey, while all other columns are hooped concrete.

In the tower portion of the building, the top of which is 53 feet higher than the balance of the building, the concrete columns begin right at the footings, the largest column being 34 inches in diameter and carrying a load of about 550 tons. These are reinforced with ten 1 1-4 inch Kahn Cup Bars vertically and are spirally wrapped with 7-16 inch diameter round rods on a pitch of 1 1-2 inches. In addition to the structural steel columns there are in the building two steel trusses and two box girder beams over the lower driveway which passes through the ground floor of the building, and steel I beam lintels over the arched openings in the first storey; while structural steel girders supported on concrete piers underpins the end of the old building. In the former case, sufficient depth could not be obtained for concrete girders strong enough to carry the concentrated loads of the columns above, and in the latter case, the heat from the boilers in use in the old building during the time of construction made it unadvisable to use concrete owing to the fact that the heat would cause the concrete to set too fast and thus prevent its obtaining full strength.

All other structural portions of the building throughout the structure are of reinforced concrete as before noted. The concrete skeleton is enclosed with brick and stone masonry, the brick and stone walls being carried on reinforced concrete beams at each storey, these beams framing generally into wall columns and in some cases into cantilever brackets.

'In calculating the stresses, the live loads figured for all floors excepting tank and attic were 100 lbs. per square foot, tank floor 600 lbs. per square foot, attic and roof 30 lbs. per square foot and a wind pressure of 40 lbs. per square foot horizontally was provided for.

The following specifications were used in designing the concrete structure:—

Stresses.—The Unit Stresses shall not exceed the following values:—

(1) Reinforcing steel in tension 12,000 lbs. per sq. in.
(2) Concrete in beams and girders, average compression 375 lbs. per sq. in.
(3) Concrete in shear, 50 lbs. per sq. in.
(4) Adhesion of concrete to steel, 50 lbs. per sq. in.
(5) The ratio of the coefficients of elasticity of concrete and steel shall be taken at 15.
(6) Maximum bearing of steel on concrete must not exceed 400 lbs. per sq. in.
(7) Maximum bearing of concrete beams on steel brackets must not exceed 300 lbs. per sq. in.
(8) Beams, girders and slabs should be figured on the assumption that a plane before flexure remains a plane after flexure.
(9) Care must be taken in erection to see that bearing angle of brackets are absolutely horizontal and has perfect bearing on stiffener angles.

SPECIFICATIONS FOR BEAMS AND SLABS.

Concrete for beams and slabs must be proportioned for a ratio of 1 of cement, 2 of sand and 4 of broken stone. Floor slabs generally shall be of concrete and tile construction and shall have concrete joists not less than 4 inches wide, and shall have 2 inches of concrete on top of tile. Slabs shall have at least 3-4 inch concrete fireproofing below the reinforcing steel; beams and girders shall have at least 1 1-2 inch of concrete fireproofing on both bottom and sides. Steel beams and columns shall have at least 1 1-2 inch of concrete fireproofing reinforced with No. 12 gauge 2 1-2 inch wire mesh around same to support concrete. In beams and girders one-half of total live load and dead loads shall be assumed to act continuously, and the other half on a simple supported beam. The results of these two methods of loading shall be combined. In slabs one-third of the load shall be taken as acting continuously and the other two-thirds as acting on a simple beam (where adjoining spans are within 20 per cent. of equal lengths). Sufficient reinforcement must be provided near the top of beam or slab, to provide for negative bending moments, over tops of all beams. Wherever T beams are penetrated by pipes or other openings, the beams shall be reinforced with top reinforcing at these points.

SPECIFICATIONS FOR COLUMNS.

Concrete columns shall be proportioned in the ratio of 1, 1, 2, except where structural steel is specified, and shall be of the type designated as hooped. That is they shall be banded with continuous steel rods, spaced not more than 1-6 of the core diameter and not less than one inch clear and of such area that when stressed at 12,000 lbs. per sq. in. tension, the resulting radial pressure on the concrete core shall not be less than 65 lbs. nor more than 130 lbs. per sq. inch.

In addition to this hooping, the column shall have vertical reinforcement of Kahn Cup Bars, to the amount of not less than 1 per cent. nor more than 3 per cent. of the area of the concrete core. The verticals shall be wired to the hooping. The area of the concrete will be considered as that of a circle whose diameter equals the inside diameter of the hooping coils and 4 inches less than the least outside diameter so as to provide at least one and one half inches of concrete fireproofing.

Hoop columns shall be figured by the following formula:—

Total load equals

$$750\ Ac + 10500\ Av + 4.8 \times 12000 \times 2\ Ah \times \frac{d}{4\ p}$$

where

Ac equals area of core;
Av equals area of vertical steel;
Ah equals area of hoop;
P equals pitch of hooping, centre to centre;
d equals diameter of core.

Where loads are very light, columns may be figured with hooping 12 inch pitch, in which case concrete shall be stressed at not more than 500 lbs. per in. and the vertical steel at not more than 7,500 lbs. per sq. in.

Vertical reinforcement in columns shall be spliced at each floor at the ends held in contact by pipe sleeves about 10 inches long. Vertical reinforcement shall be wired to dowels embedded in the concrete footing, or attached to the steel girders or columns.

CONSTRUCTION OF ROOF.

The roof construction proved to be an exceptionally interesting one, as the pitch of the main roof is 60 degrees, while that of the tower is 75 degrees, the reinforcing running in the direction of the slope. The slab is supported on concrete purloins at the level of each floor which in turn are supported at the ninth floor by concrete cantilevered beams extending on the corridor columns and at the eighth floor by beams running from the corridor columns to columns at the side of the large dormers. The ridge beam is supported on concrete posts, and the columns supporting the tower roof become rafters after they intersect the sloping surface.

At elevation 264 and 273 above datum (datum being approximately 100 feet below the basement floor) they are braced with concrete struts which in turn are knee braced both vertically and horizontally. The floors throughout the tower are also knee braced as is also the main building at two points. Above elevation 273 there is no concrete, this portion of the tower roof being all skylight having structural steel frame. In concreting the roof the forms for same were necessarily doubled. The outer forms were not stripped but were left in place to

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN OCTOBER 1ST, SHOWING THE EXTERIOR OF THE LOWER PORTION OF THE BUILDING FINISHED, AND THE FORM WORK OF THE ROOF IN COURSE OF PREPARATION. NOTE THE MANNER OF MAKING THE CONNECTION BETWEEN THE OLD AND NEW PART, THE GENERAL TREATMENT EFFECTING A PERFECT ASSIMILATION. W. S. PAINTER, ARCHITECT.

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN OCTOBER 31ST, AT WHICH TIME THE CONCRETE PORTION OF THE BUILDING HAD BEEN FINISHED. THE ONLY EXTERIOR WORK WHICH REMAINED TO BE DONE BEING THE CURTAIN WALL OF THE UPPER PORTION. W. S. PAINTER, ARCHITECT.

be utilized for wooden sheeting under the copper finish. On account of this 7-8 inch tongue and grooved boards were nailed in panels to battens on the side next the concrete so that when the slab was poured these battens were solidly embedded in the concrete. The outer form or sheeting was held at the proper distance from the inner by 1-2 inch bolts with gas pipe separators. As the battens run in the same direction as the reinforcing, they do not weaken the slab.

EQUIPMENT AND PROCEDURE OF CONSTRUCTION.

In the carrying out of the concrete work, the materials were dumped into a hopper with gates controlled by a lever, the hopper being flush with the ground outside the building. This hopper fed into a Smith mixer of 1-2 yard capacity, which after properly mixing the material, dumped the concrete into a bucket hoist, the bucket in turn being elevated to the floor under construction, where the concrete again was dumped into a hopper, from which it was fed into wheelbarrows, which deposited the concrete into its final place.

For the construction of the roof portion however it was found that handling the concrete by means of wheelbarrows was unsatisfactory and consequently the concrete was conveyed by means of chutes from the discharging hopper onto platforms immediately over the various points along the ridge. The columns and roof slabs were puddled with long poles, the steel being placed before any concreting was begun. Special care had to be taken in the columns and roof slab to prevent separation of the stone from the mortar in its long drop. The concrete in floor slab and beams was puddled merely by spading same, the reinforcement being placed in this case as well as in the former before the concreting was begun. The men placing the reinforcement material followed immediately after the carpenters had finished the form work, and only after all steel and form work had been carefully inspected by the superintendents in charge, was concrete permitted to be placed.

Owing to the short season in which concrete work can be done in the City of Quebec, and the contractors being under bonds to complete the building within a limited time, the work had to be considerably rushed, and it was found necessary to do a great deal of night work. In removing the forms, the columns were first stripped and inspected, then the floor slab, centering and sides of beam boxes were removed and examined, the supports under the beams being left in several days longer than the balance of the form work. The forms generally were not removed until four weeks after concrete had been poured.

An interesting feature in the building is the overhang of the walls at elevation 176, 198 and 220, being one foot six inches, one foot nine inches and one foot nine inches respectively; also the large cantilevers next the old building at elevation 142, supporting the overhanging tower at the intersection of the new and old building, and the cantilever slabs supporting at each floor the towers on the north side of the building.

The entire building stands practically upon a solid rock, the footings resting on uptilted strata of trap rock. The excavation necessary in itself being a large undertaking owing to the fact that a great deal of it had to be done by blasting close up to a building already finished and during a time of year when it is most occupied by tourists, special precautions had to be taken against injuring adjoining property. It was begun in the early fall of 1907, but when the contractors were ready to begin actual building work in May, 1908, it was found that the excavation was filled practically with solid ice, which occupied considerable time in its removal and was the source of considerable expense.

Concreting the footings of the building proper was begun on May 26th, and the under pinning the old building and erecting structural steel columns and trusses occupied considerable time. Through various delays the concreting of the ground floor was not finished until June 29th, when another delay of six weeks ensued, owing to non-delivery of cut stone for arches and piers at driveway, which it was found necessary to place in position before proceeding further with the concrete structure. And again following this, the work was also considerably retarded on account of the Tercentenary Celebration, which practically brought about a general cessation of operations in the City of Quebec. According to the records of the superintendents in charge and the daily reports made by them to the architect and supervising engineers, the second floor concreting was not finished until the 11th day of August, after which date the work proceeded with as great dispatch as could be wished for under any conditions.

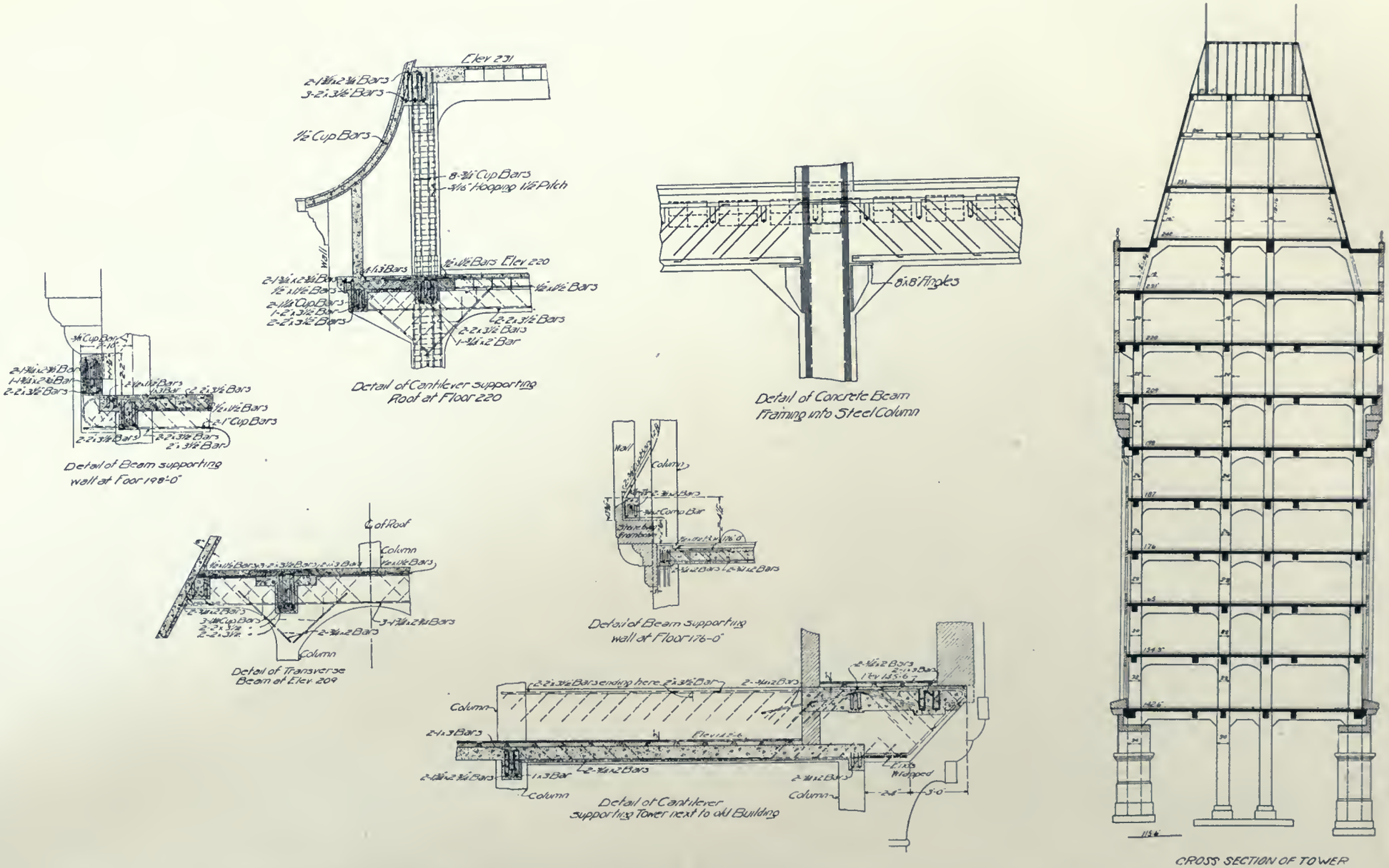
The dates on which the different floors above the second were finished show the despatch and speed with which the work on such a large and important structure was proceeded with. On October 31st the final concreting was done on the extreme high point of the tower roof, in other words, from the second to the thirteenth storey, counting the roof above the attic floor as one storey, the work was finished in 81 days, not deducting Sundays or holidays. According to the contract, the building must be completed ready for occupancy in May, 1909.

Every possible precaution was taken during the construction of this work to assure its ultimate success, all the materials used being carefully inspected and tested by engineers specially appointed for the purpose, and all work done throughout the structure received the most careful possible inspection. The cement used (a Canadian brand) was first inspected and tested by the architect's engineers in the bins at the mill. After having been tested the bins were sealed and only cement from these bins was furnished to the job. To further insure against any error being made, the cement was again tested upon arrival at the site, where it was stored for a number of days before being permitted to be incorporated into the work.

RECORD OF COST.

In addition to the careful inspection of the work, the architect deemed it advisable to keep accurate records of the cost of this form of construction for future use. The records were kept separately for each floor. We are publishing one of the typical floors, being floor at elevation 187. It shows that there were required 255 8-10 cubic yards of concrete in floor and beams, 43 5-10 cubic yards of concrete in columns, and reinforcing steel amounting to 25 9-10 tons, being an average of 7.55 lbs. per square foot of floor surface. There were also required 28,000 pieces of 8 in. x 12 in. x 12 in. terra cotta tile, and for the necessary form work 45,000 board feet of lumber, which included all the necessary shoreing as well as clamps. The cost records show that the concrete materials for the beams and floors cost $5.65 per cubic yard or $1,445.27 for the floor. Concrete materials for the columns $9.21 per cubic yard or $464.00. The labor for placing this concrete $173.60 or 58 cents per yard of concrete. The steel was figured at $75.00 per ton for 25 9-10 tons, $1,942.50. Cartage from the railway to the building on the steel for this floor, $20.72, or 80 cents per ton. The cost of handling the steel and placing it in position after it reached the site was $129.50, or $5.00 per ton. The lumber for the form work cost $990.00, or $22.00 per thousand board feet. Cost of labor for placing this form work, $615.70, carpenters being paid 25 cents per hour. The hollow tile cost 10 cents per piece f.o.b. cars Quebec, or $280.00. Carting same from cars to building, $32.48; handling and laying same, $42.00, or 1 1-2 cents per piece.

Thus the total cost of the concrete portion of this floor of the building was $6,072.41, being equal to .883



DETAILS OF CONSTRUCTION AND SECTIONAL ELEVATION OF TOWER OF THE NEW ADDITION NOW NEARING COMPLETION AT CHATEAU FRONTENAC, QUEBEC CITY. W. S. PAINTER, ARCHITECT.

dollars per square foot. Classifying the total cost of this floor therefore resulted in the concrete costing 33 per cent., steel 35 per cent., forms 26 per cent., and tile 6 per cent of the total.

Every precaution has been taken to make the building as fireproof as possible. All the floors excepting cafe and bathrooms are finished in cement, the cafe floor being wood, the bathrooms having terrazzo floors. The dividing partitions throughout the building are of terra cotta tile. Bathrooms, both shower and tub, adjoin practically every bedroom in the structure.

The stairs throughout are of cast iron and steel and are covered with marble, and hydraulic elevators communicate with all floors.

The proper installation of heating system in itself was found to be quite an engineering problem, the structure making it difficult to place the chimney near the boiler room, and necessitating the building of a smoke flue under ground, running a distance of about 100 feet, to the end of the building before it reaches the stack.

The plumbing throughout is the most modern type, all fixtures being solid porcelain. In planning the structure, provision was made so that all piping is kept in specially built flues, easy of access, so that any pipe or pipes may be easily repaired or replaced should occasion require. The ventilation for the structure is treated in the same careful manner.

The late Mr. Bruce Price was the architect of the original building. Mr. W. S. Painter was the designing as well as supervising architect for the described additions, all drawings being prepared under his immediate care. The structural engineers were the Trussed Concrete Steel Company of Canada, Limited, who prepared their structural drawings under the immediate supervision of and in the office of the architect. The Canadian Stewart Company were the contractors. The architect had two inspecting engineers on the work during its progress, the Trussed Concrete Steel Company two, the Canadian Stewart Company one general and numerous assistant superintendents.

NEW ADDITION TO CHATEAU FRONTENAC, QUEBEC CITY. VIEW TAKEN FROM REAR OF THE NEW PORTION, LOOKING TOWARDS THE OLD, SHOWING THE MANNER IN WHICH THE ARCHITECT SUCCEEDED IN PROVIDING FOR A FIRE ESCAPE WITHOUT MARRING THE ARCHITECTURAL BEAUTY OF THE BUILDING, THE FIRE ESCAPE BEING PLACED IN THE DEEP RECESS TO BE SEEN IN THE FOREGROUND OF THE PICTURE. W. S. PAINTER, ARCHITECT.

THE DISPLAY OF MACHINERY and appliances at the Cement Exhibition to be held at Toronto in the first week of March, will, it is said, cover more floor area than any previous exhibition of its kind held on this continent.

CONVENTION OF ALBERTA ARCHITECTS.

---Members of Provincial Association Discuss Important Matters and Elect Officers for 1909.

THE THIRD ANNUAL meeting of the Alberta Association of Architects was held in Edmonton on January 29 and 30. The officers elected for the present year were as follows: Hon. president, Jas. E. Wize, Edmonton; president, R. Percy Barnes, Edmonton; 1st vice-president, E. C. Hopkins, Edmonton; 2nd vice-president, Jas. A. Macdonald, Lethbridge; secretary, H. M. Widdington, Strathcona; treasurer, Jas. Henderson, Edmonton; council, W. S. Bates, Calgary; H. D. Johnson, Edmonton; J. Llewellyn Wilson, Calgary; C. Lionel Gibes, Edmonton; Roland W. Lines, Edmonton; Jas. E. Wize, Edmonton.

Among other important subjects discussed was the present unsatisfactory Mechanics' Lien Law, and a recommendation will be forwarded to the Attorney-General embodying the suggestions of the Association for certain amendments.

The regulations governing architectural competitions was another important matter dealt with, and copies of the same are to be sent to all public boards and architects throughout the province. These regulations are in accord with those which have been adppted in the United States, Great Britain, Eastern Canada and Ontario.

The meeting also decided upon a uniform contract for all architects practising in the province of Alberta, which will be printed immediately.

A self-governing chapter of the Association has been established in Calgary, and others of a like nature will be established in other parts of the province as the occasion demand. The proceedings of the convention will be published in what will be known as the Year Book, to be issued in the near future.

IN VIEW OF EXTENSIVE IMPROVEMENT now being begun, Brazil seems to offer an excellent market for the sale of cement. The projects to be carried out include the construction of large port works and other great public undertakings, and it is said that the importation of cement in 1909 will in all probability exceed that of any previous year.

MR. GEORGE A. MOUNTAIN.---Newly Elected President of Canadian Society of Civil Engineers.

MR. GEORGE A. MOUNTAIN, of Ottawa, the newly-elected president of the Canadian Society of Civil Engineers, is one of the best known and highly respected members of the profession in Canada. He was born in Quebec in 1860, and was educated there for the practice of civil engineering. Mr. Mountain served his apprenticeship with the City Engineer of Quebec and Messrs. Kinipple & Morris, of London and Greenock. In 1878 he was transitman on the first surveys of the Quebec & Lake St. John Railway, and in the following year became instrument man on the original surveys of Prince Louise Embankment, Quebec and the Graving Dock at Levis. His next advancement was in 1880, when he was appointed first assistant on Division E of the Island Railway of Newfoundland, with which company he remained until March 31, 1881, when he joined the engineering staff of the Canada Atlantic Railway, under Walter Shanley, with whom he served as assistant engineer until 1886.

Upon the resignation of Mr. Shanley in that year, Mr. Mountain became his successor, and was chief engineer in charge of the steel bridge, which was at the time, built across the St. Lawrence at Coteau.

In 1890, Mr. Mountain commenced the surveys of the Ottawa, Arnprior & Parry Sound Railway, from Ottawa to Georgian Bay, which was completed in 1897, and was afterwards amalgamated with the Canada Atlantic system. Together with his duties with the Canada Atlantic Railway, he assumed, in 1892, the position of chief engineer of the St. Lawrence & Adirondack Railway, from Valleyfield to Malone. Mr. Mountain resigned his position with the Canada Atlantic system after twenty-three years' consecutive service, in 1904, to accept the position of chief engineer of the Board of Railway Commissioners of Canada, which position he still holds.

Mr. Mountain is also a member of American Railway Engineering and Maintainence of Way Association, American Superintendents of Bridges and Buildings, Royal Astronomical Society, and Dominion Land Surveyors.

ONTARIO ARCHITECTS' CONVENTION.---

Continued from Page 47.

So it is in our own profession, gentlemen. Modern environment makes it a condition precedent to our attaining the highest degree of success that, while we may know something of many things, we must endeavour to learn everything of something.

Cultural Studies Secondary.

A few words more, and I am done. First, to remind you that the vast majority of practicing architects in America to-day are men who have received no systematic course of training whatever, and who are consequently forced to rely more and more on the trained men from the schools for assistance. It is upon the skill of these assistants that they especially rely when the importance of the work in hand must meet the requirements of a rapidly enlightening public opinion in matters of design. Such a state of affairs should make it quite clear that the immediate task of the architectural school is to fit men for such positions and not to repel students seeking a professional training by a prolonged and exacting course of study containing much irrelevant matter, which, if appropriate at all to such a course, should be relegated to the post-graduate curriculum. Those who have proposed the inclusion of such "academic and cultural" studies in an undergraduate course of architectural studies are evidently unaware of the fact, well known to experienced teachers in that field, that of all the courses of study offered in our universities to-day there is none so well adapted to soften the asperities which may have been acquired by the student in previous unfavourable surroundings, and to develope in him a sympathetic appreciation of all that is best in the world of culture, as is some such course in architecture as at I have proposed. I repeat, with the greatest deliberation and confidence, that as between a course in arts, for example, and a well balanced course in architecture, the latter will produce in the undergraduate student a much higher degree of fundamental culture than the former. The two courses in design, and the history of architecture and the subsidiary arts, will have a marvelous effect in that direction. This has been noted by experienced observers in the course in the Ecole des Beaux Arts in Paris, and striking cases have repeatedly fallen under my own observation here in America. Moreover, to take the student at the age at which he usually enters our professional schools, and devote even two years to sociologic and cultural studies, as has been proposed in one of the schemes I have recorded, is to lose two of the most vital years, at his most impressional age, for artistic training. It is between the ages of fifteen and twenty-one that the student can be taught the fundamentals of design, and the earlier the better if he is ever to develope a first-rate capacity in that field. After that, it is too late. And again, men in the Freshman and Sophomore years in college are not mature enough to derive much benefit from such courses. If they are to be given at all it should be in a post-graduate year. It is one of the soundest of pedagogical principles that a student does his most effective work in any subject if it is taught to him only after his previous work has shown him his need of it.

In conclusion permit me one word on the subject of foreign travel. No student should regard his professional training as having completed its first stage unless he has spent at least one year abroad, and has especially studied the architecture of Italy. Next in importance I rank France and England, but the student should take as wide a sweep at first as is possible, and include in his preliminary survey Constantinople, Greece, Egypt, and Spain. At some subsequent time he can look in at Vienna and some of the German cities, in order that he may make up his mind as to the real value of the Art Nouveau movement, but modern architecture in German lands outside of that influence is a negligible quantity.

Finally, gentlemen, it only remains for me to express again my appreciation of the honour conferred by your invitation, and to thank you for the very courteous attention with which I am sure you have received this paper; and to assure you that if it in any way proves to have furthered the movement you have undertaken, it will have accomplished its purpose, and the pleasure with which I have prepared it for your Convention will have been fully justified.

THERE IS A GROWING APPREHENSION in municipal circles at Edmonton that the new municipal producer gas plant which was recently put in operation will prove a failure, and consequently seriously affect the street car service and electric light system. The gas producer plant was purchased by the administration in 1906 on the advice of B. R. Keeley, who was then city engineer, but the city, owing to financial reasons, deferred the delivery until last summer. The complete plant, including the erection of the building, represents an outlay of $110,000, and of this amount $75,000 was spent on the producer plant proper and the gas engine. According to a leading Edmonton paper, a prominent engineer connected with the city, is authority for the statement that the plant will never work at greater than seven-tenths of its rated capacity, and even then it will have to be closed down one or two days a week. In his opinion plants of this kind of a small capacity have proved a success, but that larger ones are still in the experimental stage. However, until the thirty day official trial has been fully made, it will be difficult to determine as to what degree it will perform the work required of it. It is to be hoped that Edmonton is not the victim of misplaced judgment on the part of her former engineer, and it would be advisable for other municipalities which are contemplating the installation of a similar plant, to note carefully Edmonton's success or failure in this experiment.

TO PREVENT THE FLOODING of a low area at Southsea, England, in times of severe storm, an automatically operated pumping station has recently been built. It consists of a concrete pump and machinery lying entirely beneath ground level, and receiving the overflow from weirs at different points of the sewerage system in the flooded area. There are two motor-driven centrifugal pumps, each with a capacity of 200,000 gal. per hour against a head of 30 ft. The pumps are started and stopped by float-operated switches, one of the pumps being first thrown in and the other one later in case the first pump is unable to handle the flow coming to the sump.

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 February, 1909 No. 4

Current Topics

AT A MEETING OF THE COUNCIL of the Royal Institute of British Architects, held on the 4th of January, it was unanimously resolved that the request of The Architectural Institute of Canada to become an allied society of the Royal Institute be approved and that the necessary arrangements be made.

* * *

RAILWAY CONSTRUCTION in the Western part of Canada during the past year, it is estimated, amounted to about two thousand miles in new extensions. The Canadian Pacific and Canadian Northern Railways, according to the reports of their engineering departments, added 826 miles and 245 miles respectively, while the Grand Trunk Pacific completed and brought under operation 854 miles.

* * *

AN ASSOCIATION HAS BEEN ORGANIZED within the past month by the electrical contractors of Montreal for the purpose of bringing about a mutual understanding with a view of placing the trade in general on a higher status. The object of the association is to adjust trade grievances, both general and individual, raise the standard of electrical work in its various applications, and attain results that will be of benefit to its members, employees and the public alike.

* * *

THE PARISH CHURCH OF ST. BOTOLPH, Boston, England, popularly known as the Boston Stump, embodies in its construction a chronometrical significance that possibly entitles it in this regard, to the distinction of being in a class all by itself. There are 365 steps—one for each day of the year; 52 windows—one for each week; 7 doors—one for each day of the week; 12 pillars—one for each month; 24 steps in the porch—one for each hour of the day, and two flights of 60 steps leading to the roof—one for the number of seconds to the minute, and the other for the minutes to the hour.

EIGHTY-SIX PER CENT. of the new buildings erected in Ottawa during the past year were built either partially or wholly of brick, according to the annual report of Building Inspector Robert Fotheringham. The tabulated amounts show that $912,900 was expended on brick veneer buildings; $581.350 on solid brick buildings; $159,950 on concrete structures; $126,255 on frame buildings, and $13,850 for new-iron clads. It is gratifying to know that wood finds it place near the bottom of the list, and it is to be hoped that less of it will be used in the future.

* * *

IT IS SAID THAT AS A RESULT of the confusion and general dissatisfaction that has arisen from the selection of a Seattle architect's plan for the Vancouver Horse Show Building, the architects of that city will form an association for the purpose of "harmony, co-operation and defense." In such an event, it would be advisable for the Vancouver architects to unite with the provincial and Dominion associations, as it is only by concerted effor that legislation which will militate against the importation of building plans, can be obtained.

* * *

THE OFFICIAL ROSTER of the Toronto Builders' Exchange for 1909 as decided upon at the recent annual meeting is: President, A. Dinnis; First Vice-President, George Gander; Second Vice-President, Charles Bulley; Treasurer, James Crang; Directors, Robert Page, H. Jennings, John Chalkley, John Aldridge, O. M. Moore; Auditors, J. B. Thomson, W. Davidson. The members of the Exchange, in view of the general settling down of things during the past year, are extremely pleased with Toronto's good showing, and they believe that in the coming twelve months operations in the building line will be unusually active.

* * *

SEVERAL NEW COMPANIES have been formed to develop the new asbestos deposits recently discovered near Eastman, Quebec. The Orford Mountain Railroad is near these properties, and a spur will be built from the main line to the mills, which are already in course of construction. This discovery is important, as bearing on the extent of the asbestos fields in this province. The mines near Danville, Quebec, some 65 miles from this new find, and at Thetford Mines, Black Lake, and Broughton, Quebec, and several smaller places on the line of the Quebec Central Railway, about 100 miles from Eastman, are now the only producers of this mineral on this continent, with the exception of a small output in Vermont and a new mine in Georgia. The development of these new mines will induce more thorough prospecting all over the eastern townships.

* * *

HAMILTON IS LOOKING FORWARD to the best building year in its history. As forecasted by The Herald of that city, there is a vast amount of work in prospect, renewed confidence shown in real estate, and no indication of labor trouble manifest. The three-year agreement between the bricklayers and the bosses which will expire in April, is to be perpetuated for three years longer, both parties having recently signed to that effect. The men will receive 50 cents an hour, with an eight-hour day for the next three years, or exactly the same conditions under which they worked last year. There is a difference over a clause in the International Union rules which says that a bricklayer shall have charge of all cement work on the jobs. This point will be referred to Ald. Allan, one of the special referees. There is not likely to be any trouble with the carpenters, who will also get the old rate of 37 1-2 cents an hour, and it looks as though the painters and plumbers would have no cause to make trouble.

A ROUGH ESTIMATE made by Edwin C. Eckel, of the United States Geological Survey, places the total production of cement in that country for last year at 40,000,000 barrels, which indicates that there has been a falling off of about one-fifth the tremendous output of 1907. The cause of this decline is attributed to the depression prevalent during the early part of the year in a number of sections of the country, including some of the most important commercial centres.

* * *

IT MIGHT PUZZLE the ordinary mortal to state in legal form just how much time and how much money he would require to take down a tall brick chimney. The contracting engineer would make it take itself down. After doing a small sum of arithmetic on his cuff he would direct certain portions of the base removed. In the spaces thus left he would fit a lot of very stout timbers, then remove the bricks which remained between them. Then he would set fire to the timbers, and, watching from a safe distance with a camera, would take a snapshot of it as it fell.—Scribner's.

* * *

FIREPROOF CONSTRUCTION for moderate price dwellings has just been achieved in a row of nine 17 x 70-ft. three-story houses on New York avenue and President street, Brooklyn. They have brick walls, full-span I-beam floor and roof girders, hollow terracotta floor and roof arches and special thin cast partition slabs. The construction was adopted in competition with estimates of reinforced concrete, the conditions being such that the design accepted was the more economical. The designs were made by Mr. Arne Delhi, architect, and Mr. Bernt Berger, consulting engineer.

* * *

HOUSES WITHOUT FRONT ENTRANCES, it is said, are giving the post office department at Chicago no little concern regarding the delivery of mail. Section upon section of the dwellings have been built along Fortieth avenue, and it is contended that a carrier having a piece of mail for every house in a block, is obliged to walk nearly a quarter of a mile to and from back doors. The whole matter is assuming such proportions that the postal officials may be compelled to make a ruling which will require owners or tenants to put up boxes at the front for the receipt of mail.

* * *

SUCCESSFUL EXPERIMENTS recently made by the street cleaning department of Madgeburg, Germany, with a new sand-strewing wagon, an invention of Herman Fricke, of that place, has led to its adoption by the city. The wagon spreads rapidly an even layer of sand on the streets which, in the case of asphalt paving, is of great benefit, in that it minimizes the slipping of the horses when the streets are either extremely wet or frozen. This has heretofore been done in German cities exclusively by hand. The apparatus is worked by the driver and can be adjusted to strew a layer of sand or gravel from 6 to 16 metres (19.68 to 52.49 feet) wide.

* * *

THE GENERAL DEVELOPMENT OF JAPAN, together with the introduction of waterworks systems in all the principal cities, has brought about a largely increased demand for pipes and tubing of foreign manufacture. It is the opinion among foreign traders there that a profitable market offers itself for the sale of substantial pipes, which are not only strong, but are light and easily transported and installed; tubes of heavy design will not prove satisfactory as the water supply for nearly all cities and towns is conducted from the mountains and it is quite difficult on account of the primitive modes of conveyance to handle other than these types.

A BRIDGE, THREE MILES LONG, including its approaches, is to be constructed by the Pennsylvania railroad upon the completion of the company's terminal at New York City. It will connect the mainland of New York with Long Island, and its greatest span, over Hell Gate channel, will be a thousand feet long and 140 feet over the water. When the bridge and its connections are made through trains will be run from New England points to the south by using it and the Long Island tunnel and the Hudson River tube.

* * *

AN INTERNATIONAL EXPOSITION of Improvements of Cities and Resorts has been organized by the Society of Civil Engineers at St. Petersburg, Russia, and will be opened there on May 9, continuing to September 14, 1909. The exhibit is to be grouped in separate classes which will include the following: Building; ways and means of communication and transportation, lighting, heating and ventilation; sanitation; resorts and hospitals; school and education; protection against fire and insurance; charitable institutions; artistic decorations of cities and buildings, household effects; municipal government; water supply; accounts of cities and resorts

* * *

TORONTO TRUNK SEWER PROJECT has given rise to considerable discussion between advocates of brick and cement as to which material is best adapted for its construction. Both interests have advanced innumerable arguments to discredit the materials of the opposing side. These involve the question of cost, labor, time of construction, durability and the action of sewer gas on each respective material. Even ancient history has been resorted to in order to cite specific instances showing where brick takes precedence over cement and vice versa. Those who have been disinterestingly studying these materials know that both have their advantages and uses, and that it remains with the city to decide as to which will serve its purpose in the most durable, serviceable and economical manner.

* * *

CALABRIA AND SICILY, which were recently laid low by earthquakes, can ascribe the complete destruction which befell them, to the fact that their structures were built on the wrong system. This is the opinion of a Japanese commissioner who had been sent by his Government to investigate the methods of building construction in regions where convulsions of the earth are to be expected, as is the case in Japan. The Commissioner happened to be in Rome at the time of the catastrophe, and after making a special trip to study the ruins of the collapsed buildings, gave as his conclusions, that the whole system of architecture in the affected districts was in the highest degree unsuitable. The walls of the buildings were found to be weak, the walls heavy, and exactly the reverse should have been the case.

* * *

"POURED CONSTRUCTION" as reinforced concrete has come to be known in London, England, will be given a wonderful stimulus in Great Britain as a result of the Government adopting this system in erecting the great new wing of the general post office, which is to cost $1,250,000. In the opinion of a London publication, "now that the Government has gone in for 'pouring' its buildings, private contractors will more fully take up the work. There are already three or four big 'poured' buildings in London—the largest being at 38 Victoria street, a great office structure—but, so far, the English contractor has not taken to them very favorably. He has been hard to convince that they were not of a flimsy character, but it only needed the Government to set its seal of approval on the process to give the new scheme a chance."

A PROPOSED 12-STORY OFFICE BUILDING TO BE ERECTED IN TORONTO (OWNER'S NAME WITHHELD). CHADWICK & BECKETT, ARCHITECTS. THIS DESIGN PROVIDES FOR A STRUCTURE THAT WILL OUTCLASS ANYTHING IN TORONTO IN THE WAY OF AN OFFICE BUILDING, BOTH IN PLAN AND DESIGN. IT SERVES AS ONE OF THE MORE RECENT PROOFS OF THE FACT THAT WE HAVE ARCHITECTS IN CANADA THAT CAN EXECUTE DESIGNS EQUAL TO THOSE OF ANY FOREIGN ARCHITECT.

MR. G. A. MOUNTAIN, NEWLY ELECTED PRESIDENT OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS, AND RETIRING PRESIDENT GALBRAITH, DEAN OF THE FACULTY OF APPLLIED SCIENCE, TORONTO UNIVERSITY. MR. MOUNTAIN IS CHIEF ENGINEER FOR THE CANADIAN RAILWAY COMMISION. (SEE PAGE 56.)

ANNUAL MEETING C.S.C.E.---Canadian Society of Civil Engineers Convenes at Toronto.---Good Attendance and Spirited Meeting.---Broad Discussion of Problems Confronting the Profession. ---Condensed Proceedings of Business Sessions.

THE CANADIAN SOCIETY OF CIVIL ENGINEERS held one of the most successful meetings in the history of the Society, in Toronto on January 28, 29 and 30, 1909; this being their twenty-third annual convention. In view of the fact that the twenty-three hundred members of this, Canada's largest and most successful society of scientific men, are scattered from coast to coast, the attendance was considered exceptionally large.

The convention programme, in addition to the regular meetings, included a supper at Convocation Hall, where they were the guests of the Engineering Society of the School of Practical Science; a trip on the Grand Trunk Railway to Port Colborne, and the annual banquet held at the King Edward on Friday evening, January 29.

Among the more important questions discussed were, the establishment of a central examining board similar to that in the legal and medical professions, the raising of the standard of associate membership in the Society, and standard specifications for cement. The meetings were well attended, and the discussions were in the most part spirited and interesting, indicating the earnestness of the members in their endeavors to solve the problems with which the Society is confronted.

Morning Session, Jan. 28th

PRESIDENT GALBRAITH, who presided at all meetings, opened the Thursday morning session, and, before taking the Chair, he wished, as a citizen of Toronto, to welcome the Society and hoped that they would be encouraged to make another visit to the Queen City. He was satisfied that the Toronto people would do all in their power to make their visit enjoyable.

The minutes of the General Meeting, held in Montreal, on January 28th, 1908, were read by the Secretary and confirmed, after which the scrutineers were nominated by the President. For the election of the officers and members of the Council they were as follows: J. C. T. Crofts, chairman; S. Gagne, A. F. Wells, T. T. Black, J. T. Farmer and T. A. Rutherford. For the election of the nominating committee: O. W. Smith, chairman; W. E. Douglas and J. M. Oxley. For amendment of by-laws; E. B. Merrill, chairman; A. C. F. Blanchard and D. C. Raymond.

Members' Benefit Fund.

Mr. COUTLEE, of Ottawa, opened the discussion by referring to a paragraph on page No. 6 of the report, which read as follows: "The desirability of instituting some sort of insuranee or benefit fund for the members' benefit. It was found that an insurance scheme would require special legislation and that it's success was doubtful. The establishment of a benefit fund along the lines of that of the Institute of Civil Engineers was thought to be practicable and was recommended to the consideration of the incoming council." Mr. Coutlee referred to the large membership of the Society scattered all over the Dominion and to the fact that the engineers were taking a very great part in the development of the Dominion. He believed that each member should give some attention personally to this matter and that they should communicate to the council any scheme that they might think feasible. He was in favor of such a scheme and believed that it should have the active support of everybody in the Association.

MR STEAD, of Chatham, N. B., wanted to know if special legislation was necessary and suggested a plan of making an assessment of 50 cents per member in case of each death.

At the request of Mr. MURDOCK, of St. John, N. B., Col. ANDERSON gave some information as to the method of the Institute of Civil Engineers of Great Britain. He believed it was impossible for the Society to force any member to subscribe anything beyond his regular dues and that a separate organization would be necessary, as in the case of the Civil Service Association, where only members who contributed to the fund received any benefit from it. He believed it would be of material benefit to the members if they voluntarily enrolled themselves in such an organization.

The PRESIDENT then gave an outline of his recollection of the method of the British Institute and stated that theirs was a purely benevolent fund and was used for the benefit of those who needed assistance. He did not know of any similar institution that had such a thing as an insurance fund.

Mr. HARKOM believed that the Society would be assuming an onerous duty in attempting to distribute such a fund. A benefit fund appealed to him. He was of the opinion that the members of the Society would be willing to subscribe to a fund that was not only for the benefit of the subscribers and suggested that the matter be referred to a special committee. Mr. UNIACKE contended that the matter, when boiled down, would be nothing more or less than fraternal insurance. He did not think the scheme would be a practicable one and that the Society should not become a benevolent institution.

Mr. STEAD moved that the question be left over for further discussion on Saturday morning. Upon motion of Mr. MOUNTAIN the question of the insurance fund was deferred for the present.

Reports of Branches Received.

The report of the Library and House Committee was then adopted, as was also the Treasurer's report. Mr. MITCHELL read the report of the Toronto branch of the Society. The Secretary read the report of the Quebec branch. In view of the fact that there was no report from the Winnipeg branch, Mr. SCHWEITZER, at the request of the President, gave an informal verbal report. He reported that little had been done beyond getting well organized. They had held several well attended meetings and had had an annual dinner attended by forty-five or fifty members. He was satisfied that the branch was going to be a success. He stated, further, that they had found in the West a considerable feeling of liberty and a desire to cut loose from the parent body and form a separate organization. However, they had killed that feeling altogether.

The PRESIDENT read a petition from Ottawa addressed to the Council: "The undersigned members of the Canadian Society of Civil Engineers request the authority of the Council for the formation of a branch of that Society in the City of Ottawa, under the rules of the Society."

The report on Students' Prizes was read by the Secretary. He stated that in the general class two papers were recommended for prizes, one of which was not provided for. This report was adopted, including the award of two prizes.

A motion was then adopted regretting the loss by death during the past year of several members and to place on record the Society's sympathy with the members of their respective families.

Establishment of Testing Laboratories.

The report on the Establishment of Testing Laboratories was then brought under discussion. Mr. JAMIESON stated that, in view of the importance of this question, there should be a special committee appointed to take this matter up with the Government, or to empower the existing committee to so act.

The PRESIDENT, as a member of this committee, said that the question brought up by Mr. Jamieson was a very important one. One of the main difficulties was in the fact that the members had to make expensive journeys, for which there had been no provision made for remuneration. He did not believe that they would have any satisfaction until the Society was prepared to pay at least travelling expenses. Mr. JAMIESON concurred with the President in this view and believed that the Society was in good enough financial condition to reimburse members of the committees when on the Society's business.

The question then arose as to whether the Council had already powers to make such an appropriation. The PRESIDENT suggested a motion authorizing the Council to reimburse members of certain committees or all committees, as they may see fit for their out-of-pocket expenses. Mr. JAMIESON believed that such a course should be taken to provide for extra expenses. He was opposed to reimbursing members for their time. He believed that care should be taken in calling meetings of committees so that they would not prove too expensive. Mr. O'SULLIVAN concurred with Mr. Jamieson in his views and believed that disbursements should be approved and submitted to the executive head of the Society for payment.

MR. LEONARD believed, that in so far as a large number of the members were in the employ of railroads, they should get some concession as to railway rates.

Mr. CONDY agreed with Mr. L. W. Gill that the matter was provided for in the by-laws and it would be safe to leave the matter with the Council.

Mr. J. H. HUNTER also believed that it would be perfectly safe to leave the matter in the hands of the Executive Committee of the Council, but he did not see why the Society should not supplement those powers by a motion that would sanction anything that they might do in that regard.

Mr. GILL did not approve of that motion as he thought that it was unnecessary, but he thought that the suggestion as to reduced railway fares should be taken into consideration.

Mr. ARMSTRONG wished to move that the payment of travelling and other expenses which the Council might deem proper, be ordinary expenses in the discretion of the Council. This brought up a somewhat lengthy discussion on the point as to what might be considered ordinary and extraordinary expenses. This discussion was cleared up to some extent by the PRESIDENT who read the by-laws covering this subject, after which Mr. ARMSTRONG withdrew his resolution and suggested that the chairman should appoint a committee to consider the matter.

Col. ANDERSON did not believe that the Society should pay travelling expenses. He contended that the individual mem-

ber, in the interests of the Society, should be willing to give his time and pay his own expenses; that in beginning to pay such expenses incurred by individual members in the workings of the Society, it would be opening a door that there would be no closing to and would take away the profit that they might expect to make from membership fees. In matters of this kind it would be reasonable to appoint men who were at the centre where the work is required and thus obviate unnecessary expense.

A motion was then adopted that empowered the President to name a committee to report on the subject before the end of the meeting.

The motion for the adoption of the report on the Establishment of Testing Laboratories was then carried.

Mr. DION wanted to know if the fact of adopting a report was simply that it should be filed, or was the executive committee going to take some action and approach the Government, as recommended by the report and if a deputation was to be appointed should not the meeting appoint it. The PRESIDENT answered that the incoming Council should be asked to take action in this matter.

Mr. JAMIESON believed that it was a matter for the meeting and not for the Council. He was in favor of the present committee acting on this matter instead of allowing them to shift their responsibility to someone else.

Mr. MURDOCH seconded Mr. Jamieson's motion. The motion was then put by the President and was carried. Mr. KERRY wanted to know if the committee was to take action without reference to the general management of the Society. The PRESIDENT believed that that was so and explained that the meaning of the report was that the Society agreed to the principles of the report and that it was ready to ask that the committee should go on. Mr. KERRY asked if the Committee should not be required to get into communication with the Council and if the meeting was not asking the committee to take action outside of the Society and taking a position for and committing the Society. The PRESIDENT answered in the affirmative. This opened up a very lengthy discussion as to whether the Society should not constantly report to the Council and be governed more or less in their actions by the dictates of the Council.

Mr. COSTE did not think the Society should delegate power to a committee to represent the Society before the Government or any other body and that the Council should carry out the recommendations of the Committee. In his opinion it would not be diplomatic to approach the Government through a committee, however wisely selected.

Mr. STECKLE stated that the Government was spending some money to improve their laboratories and it would hardly be likely that they would consent to spend any money on the laboratories proposed by the Society. The PRESIDENT answered that he had gone very thoroughly into this matter and that the laboratory required was not along the lines of those already in existence. It was an investigating laboratory along the lines of that of the United States Geological Survey into properties and of materials in engineering interests.

Mr. JAMIESON explained that the intention was that the committee should be in touch with the Council, but not throw their duties on the Council. Mr. KERRY suggested that Mr. COSTE be asked to form a resolution covering this matter, so as to give a clear understanding of it. The meeting then adjourned until 3.00 o'clock.

Afternoon Session, January 28

The PRESIDENT named the following to act on the Committee of Out-of-pocket Expenses: Messrs. W. P. Anderson, of Ottawa; W. Murdock, of St. John; J. A. Jamieson, of Montreal; J. E. Schweitzer, of Winnipeg; C. H. Rust, Toronto; A. Leofred, of Quebec; J. G. G. Kerry, Campbellford.

Mr. COSTE again opened the question of the report of the Committee on the Establishment of Testing Laboratories. He stated he did not understand that a resolution was carried settling the matter continuing the committee in existence and giving it power to carry out its own recommendations. He did not believe that a committee was a proper body to represent the Society before the Government and that in an important matter of this nature the strongest members of the Society should take final action in following out the recommendations of a committee.

He believed that the President, flanked by the Council, was the proper body to wait upon the Government. He contended that such a committee should make its recommendations to the Council and not be empowered to carry them into effect.

Mr. Coste's position on this matter opened up a very heated discussion as to the meaning of the motion which adopted this report. A number of views were set forth by several members with the result that a motion by Mr. Coste, seconded by Mr. Kerry to rescind the former motion of the adoption of this report was carried and a motion by Mr. Armstrong providing "that the Committee be continued, with power to add to its numbers and that when they had a specific scheme to inform the Council which be authorized to approach the Government taking with them such other members on the deputation as they might select." This motion was seconded by Mr. Hunter and was carried unanimously.

After the PRESIDENT had made some announcements with regard to the reception at the Government House and the dinner to be given by the Engineering Society at Convocation Hall, the report on the Usefulness of the Society was declared open to discussion.

Usefulness of the Society.

Mr. J. N. RHEUME made some remarks upon the subject of professional ethics, precedence and courtesy in all branches of the profession. He believed that engineers should cultivate an "esprit de corps" such as exists among lawyers and physicians. Every member should be impressed with the fact that due courtesy should be shown, or precedence given to fellow-members of the profession and in so far as the constitution was not clear on this subject he would suggest that a clause effecting this purpose should be prepared by the Council.

The PRESIDENT stated that the character of this report did not call for a motion of adoption and a motion that the report be received and discussed was carried.

The most important clause in this report, or at least the one which brought forth the greatest amount of discussion was that dealing with the subject of providing some more restrictive measure as to the title "civil engineer" or as to admission of Associate Memberships to the Society.

Protection For Canadian Engineers.

Mr. LEOFRED referred to some remarks Mr. Frost had made at the last Annual Meeting relative to the fact that it was useless to try to form a close corporation in America and that he thought that the best man would always come to the top and the people would find out anyway after some time who was the most competent.

Mr. GILL spoke of the Alien Labor Law which would, if pressed by the Society exclude foreign engineers from being engaged on Canadian work. He, however, did not think that Canadian engineers required this and that the Society should be an international one.

Mr. MORRIS dwelt at some length upon the subject of young engineers coming from European countries who may even bring with them qualifications, in printed form which no young Canadian has and that these young men find their way into the Society because the standard of qualifications for Associate Membership was not sufficiently high.

Mr. Morris stated that there were young engineers in Toronto who to-day are not members of the Society for the reason that they felt that in spite of the fact that they had spent years and considerable money on their education they were in no better position before the Society than the great mass of young men coming to this country from Great Britain or foreign countries. He believed that the standard of qualifications for Associate Membership of the Association should be as high as that required for a degree from any of the schools of applied science.

Mr. SCHWEITZER did not believe that too great emphasis should be laid upon examinations. That there were many competent engineers with a creditable practical experience that would be unable to undergo an academic examination. He did not believe that a man's nationality should have any influence whatever. The only question was whether he was competent to do the work, and competence being equal the Canadian should be given the preference.

Mr. COUTLEE stated that this view was all right theoretically but that the fact remained that many young Canadians were in Ottawa trying to get work and could not. However beautiful the theory may be the fact remained that there were eighty million people to the south of us, very nice people, good workmen, but that eighty completely floods out our six or seven million during hard times.

Mr. A. W. ROBINSON believed that the Society should be broad enough to be an international Society. It might be true that there were many young engineers who had found difficulty in obtaining employment during the past year, but it must be remembered that last year was an exceptional one. He would welcome English or foreign engineers to Canada and if they have the required qualifications of the Society, welcome them to the Society.

Mr. JAMIESON agreed with Mr. Robinson and he thought the remedy would be to broaden some of the employers. It was a fact that preference had been given by employers to outsiders, but he did not believe there was any complaint outside of that. The meeting then adjourned.

Banquet at Convocation Hall

The Engineering Society of the Faculty of Applied Science of Toronto University entertained the Society Thursday evening, at Convocation Hall. Something over 900 members and guests were present, and a very enjoyable evening was spent.

President Galbraith read his address in the Auditorium, before the guests adjourned to the Banquet Hall. Dr. Galbraith spoke of the necessity for a broad education for the engineer, in view of the important part they work in our national development. He impressed his hearers with the importance of having the engineering profession under the control of some sort of a governing body, of very much the same nature as that of medicine or law. He referred to the great national resources of Canada, and impressed upon his hearers the fact that these resources should be fathered and taken care of. He called attention to Mr. Carnegie's statement that the iron ore of the United States would be exhausted in another forty years, and of England in seven years, and remarked what a great prospect this opened up for Canada in developing her natural resources. He referred to electric processes of smelting iron and steel, and showed that the future of these processes depended upon Hydro-Electric power. Portland cement was to become a great factor in the future development of Canada, as it will, not many years hence, take the place of steel and wood construction. He referred further to the importance of the regulation of rivers and maintenance of forest growth.

After Dr. Galbraith's speech, the guests repaired to the great draughting room, adjoining Convocation Hall, where the banquet was held.

One of the pleasing incidents of the evening was the presentation of a silver service to Dr. J. Galbraith, Dean of the Faculty, and of a gold watch to Dr. W. H. Ellis, Prof. of Chemistry. The two men have been teaching in the School of Practical Science for thirty years.

The Toast "Canada" was proposed by Mr. A. D. LaPan,

introducing Mr. Byron E. Walker, who wished to impress upon the great gathering of young men he saw before him, many of whom would be the engineers of the future, the necessity of conserving Canadian resources from the grasping hand of the world, which was growing poor in iron, timber, and other treasures, which Canada has in abundance. We, in Canada, are in great danger to-day, said the speaker. No other country of only 7,500,000 people has such great resources and has at the same time, lying to the South, the most profligate user of natural resources in the world, and one which to-day has practically exhausted all that it once possessed. Our problem to-day is not to develop Canada's wealth, but to conserve it. It is true that in a comparatively few years, the iron and timber of the United States will be exhausted. Do not think that when that time comes, we will be allowed to enjoy our own resources at our leisure. The United States will turn like lightning upon them and devour them as fast as it can, so I say "learn to conserve what we own. If you do, in future centuries Canada will be master of the steel trade, and rich in lumber and water power."

President Falconer, when he arose to reply to the toast "The University," was greeted with great applause from the students. He wished to impress upon them that it was necessary to be a man, as well as an engineer.

Annual Banquet.

On Friday, the Canadian Society of Civil Engineers went over by Grand Trunk, special train, to Port Colborne and Welland. At Port Colborne they were entertained at luncheon, and then viewed the Government's new elevator, and the public works in the harbor. On returning to Welland, the excursionists visited the Plymouth Cordage Works, but, for lack of time, were unable to inspect other local enterprises, which it had been desired to look over. Returning to Toronto in the evening, they attended their Annual Banquet at the King Edward Hotel.

Dean Galbraith, retiring President of the Society, presided, and among those present were Messrs. M. J. Butler, Deputy Minister of Railways; G. A. Mountain, chief engineer of the National Transcontinental, and President-elect of the Society; F. H. McGuigan, J. Oborne, general superintendent of the Ontario division of the C.P.R.; James Leitch, K.C., chairman of the Ontario Railway and Municipal Board; Prof. W. G. Miller, Provincial Geologist; J. P. Watson, president of the Toronto Board of Trade; G. H. Frost, New York; J. J. Salmond, C. B. Smith, C. H. Mitchell, chairman of the Toronto branch C.S.E.; J. J. G. Kerry, A. G. Van Nostrand, president of the Ontario Land Surveyors; A. W. Campbell, Deputy Minister of Public Works; C. H. Rust, City Engineer; W. McNab, assistant engineer G. T. R.; E. Marceau, Montreal; Gustave Lindenthal, New York. The programme and menu card was unique, the design being by Mr. C. H. Mitchell, chairman of the Toronto branch of the Society.

Mr. A. W. Campbell proposed the toast of "Our Guests" in a felicitous speech, coupling with it the names of Mr. J. P. Watson, Mr. W. McNab and Mr. G. H. Frost. "Canada and the Empire" was submitted by Mr. R. W. Leonard, and responded to by Mr. J. A. Macdonald.

"Kindred Societies" was proposed by Mr. M. J. Butler and responded to in suitable terms by Prof. Miller, representing the Canadian Mining Institute; Mr. G. Gouinlock, president of the Ontario Architects' Association, and Mr. A. G. Van Nostrand, president of the Ontario Land Surveyors. Mr. G. A. Mountain, in giving the health of the retiring President, referred to the great services of Dean Galbraith, who in responding expressed his wish to do all in his power to forward the interests of the Society.

DEAN GALBRAITH IS PRESENTED WITH A CABINET OF SILVER BY GRADUATES OF THE SCHOOL OF PRACTICAL SCIENCE.

Morning Session, January 30

The SECRETARY read regrets from Sir Sandford Fleming and H. J. Lambe, for their inability to be present at the dinner on the previous evening. The PRESIDENT stated that the Secretary was prepared to distribute the printed proceedings on Thursday in accordance with a resolution of the Meeting a year ago. Each member was requested to correct his own remarks and return his corrected copy to the Secretary as soon as possible. The PRESIDENT then called for a report of the Committee re Payment of Expenses of Members of Committees, but in view of the fact that the Chairman had left the city the night before, the matter was left over.

Mr. HUNTER re-opened the discussion on the Usefulness of the Society. He believed that this clause should not be further considered and was of the opinion, after reading Mr. Frost's statement of last year and after listening to the addresses at the dinner on the previous evening by eminent engineers, that the engineering brain should be allowed the widest scope. In history exclusion laws and retaliatory measures had never effected a good purpose. The greatness of the Empire was due to the fact that it gave freedom to men who being persecuted in their own country, came to Great Britain and assisted in the building up of the country and its industries. He believed in the open-door policy and he did not think there was a member of the Society who in the bottom of his heart favored any course of exclusion. It savored too much of trade-unionism.

Mr. COUTLEE disagreed with what he termed "this nonsense of the theoretical state of having a professional standing as broad as the four winds of Heaven." He desired to put himself on record as absolutely objecting to it. He pointed out that the constitution of men were the same on the south side of the line; the same in Great Britain as in Canada, yet a medical man cannot come from the United States to Canada and practice his profession. He cannot come from Great Britain to Canada. He cannot even go from one Province to another in Canada and practice his profession, and it was absolute nonsense that engineers should be on a different footing to them.

Mr. LEOFRED agreed with Mr. Coutlee on this matter and pointed out that the main questions recommended by the Council was to raise the level of the engineering profession and that the only way that the professions of law and medicine had been raised was by proper legislation. Mr. Hunter, said the speaker, seems to put a professional man on the same footing as the farmer and laborer coming to work as laborers in a United Empire. He believed if the Society continued to follow its present course young Canadian engineers whose parents had deprived themselves to put them through a regular course of instruction would be obliged to exile themselves to foreign lands to get work. He pointed to the high professional standing of engineers in France and stated that several had been elected to the Presidency of the French Republic during the past fifty years. The reason for this was the exceptionally high course of training provided for the engineer in that country. He believed that instead of spending money endeavoring to have civil engineers elected to Parliament they should endeavor to raise the level of the profession.

Mr. HUNTER believed that his remarks had been misunderstood. He believed the standard should be raised as high as posisble, but by the Society of Civil Engineers and not by legislation. The curse of engineering was the meddling of politicians. When a politician gets hold of an engineer's report he fits it to his own ends and then when failure comes, who gets the blame? He believed in keeping out of politics, but believed that the Society should legislate for itself and should set its own standard.

Mr. MORRIS made a motion, seconded by Mr. Coutlee, as follows:—"That it is advisable, owing to the large number of foreign engineers aplying for admission to the membership in the Canadian Society of Civil Engineers, to have a central board of examiners representative of all branches of engineering and that a committee be appointed to propose some different system of examination for the admission of Associate members and report at the next General Meeting of the Society. That the Committee report as well on all necessary changes or additions to by-laws entailed by the recommendations."

The PRESIDENT pointed out that the report dealt with this question to some extent. One of the committees after discussing the matter very thoroughly came to the conclusion that it was best not to discuss the question. The feeling was that professional experience of engineers should be looked into and if, in the opinion of the Society, the time had come when graduation from some recognized engineering school could be made a pre-requisite, action could be taken. It was thought also that an examination of some kind might be held for younger men without professional experience and who were not graduates of any school. The Society could organize a body of examiners for that purpose.

Mr. MORRIS stated that his ideas quite agreed with those of the Committee. This opened up considerable discussion on the subject which was concluded by an amendment to Mr. Morris's motion by Mr. McNab, seconded by Mr. McPherson, that the discussion be adjourned until the result of the ballot

MEMBERS OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS WHO TOOK ADVANTAGE OF THE EXCURSION ON THE GRAND TRUNK RAILROAD, TO PORT COLBORNE AND WELLAND, DURING THEIR RECENT CONVENTION AT TORONTO. VIEW TAKEN AT PORT COLBORNE. A SPECIAL TRAIN WAS PLACED AT THE DISPOSAL OF THE SOCIETY BY THE GRAND TRUNK, AND THE MEMBERS WERE GIVEN AN OPPORTUNITY TO INSPECT THE NEW ELEVATOR AND THE PLANT OF THE CANADIAN PORTLAND CEMENT COMPANY, AT PORT COLBORNE, AND THE PLYMOUTH CORDAGE WORKS AT WELLAND.

Construction, February, 1909.

dealing with the by-laws was announced, Mr. Morris's motion being left over until that time.

Clauses 4, 5, 6 and 7 Laid Over.

Other clauses of the report on the Usefulness of the Society were then discussed. Three and four being left over until after the balloting on by-laws, as was also five dealing with the question as to wnether the Society as a body should interfere in cases of dispute between a member and his client and under what conditions or authority.

Clause six, by motion of Mr. Hunter seconded by Mr. LeGrand, was left over to be discussed at the same time as the report of the Transportation Committee. Clause seven was also laid over to be discussed with the other clauses.

Report on Transportation.

The report of the Committee on Transportation was then taken under consideration. Mr. MOUNTAIN, Chairman, stated that Mr. Butler, the former Chairman, had requested him to take the Chairmanship of this committee owing to the fact that Mr. Butler had not the time to do the work. Mr. Butler had told him that the Committee on Transportation was appointed to look into the question of rails, fastenings, roadbed, transportation and routes. Mr. Butler had resigned in December when Mr. Mountain took the Chairmanship.

The Committee on Transportation had been divided into four-sub-committees, as follows:—Rails,, fastenings and tieplates, chairman, Mr. H. G. Kelly, Chief Engineer Grand Trunk Railway; ties, chairman, G. McPherson; roadbed and ballast, chairman, Mr. Sullivan. Mr. Mountain then outlined the larger sub-committee on "transportation routes." He reviewed the large amount of work connected with the duties of this committee and stated that they had had representatives of all the railway lines in Canada, all the steamship lines on the Great Lakes and of those interested in transportation by water, canals and terminals to co-operate with them. He then outlined the information that had been gathered together, but was imposible to get it in shape to give a report to the Annual Meeting.

This report opened up a very thorough and lengthy discussion which arose in the first place out of a misunderstanding as to the scope of the work of this committee. It was thought by several members present that the scope was altogether too great, but it was explained that while these several branches all reported to the Transportation Committee they each had their specific duties. Then the question arose as to the advisability of having a report covering such an important branch of engineering discussed at the Annual Meeting where, it was contended, sufficient time and thought could not be given the important subjects it dealt with and that the report of such a committee should be made to the Council in Montreal. The difficulty, however, was surmounted by a motion by Mr. Mountain, seconded by Mr. Murdoch, that the Committee be allowed to continue their investigations for another year, which was carried, and a motion by Mr. Kerry that the reports of all special committees apointed by this Annual Meeting shall be submitted to the Council and by it transmitted to the next Annual Meeting with such recommendations for action as it may deem advisable. This motion was seconded by Mr. Coste and carried.

Out of Pocket Expenses.

Mr. RUST, of the Committee on Out of Pocket Expenses gave the following report:—"Your Committee beg to report that in their opinion it is not advisable to make any recommendations; that the Council should have power to deal with this matter." The motion for the adoption of the report was carried.

Cement.

The next report that came up for consideration was that of the Cement Committee.

Committee's Report.

Mr. JAMIESON stated that the report of the Committee accompanying the specifications prepared by the committee was not printed for distribution. He wished to read the report of the committee in presenting the Specifications and Standard Rules for Testing Cement. Mr. COSTE very strongly objected to having Mr. Jamieson give this report because he did not feel that this was a matter to come before the Annual Meeting. The Annual Meeting was not for the purpose of lecturing the engineering profession as to what they should adopt in the way of a standard.

Mr. JAMIESON stated that he did not propose reading their recommendations for Specifications on Cement. He wanted to present the report of his committee. After some discussion in which the President declared he believed Mr. Jamieson to be perfectly in order in presenting his report, Mr. Jamieson continued.

The report strictly applied to the Specifications and Rules for Testing Cement. The Committee considered, up to date, that their work was at an end, but they felt that they had been deficient in the past. The late specifications of the Society were very much out of date.

The second paragraph of the report dealt with the question of establishing a standard package of one hundred pounds. He explained that the usual package was a bag and that the Canadian package was 87½ pounds, while the American was 94 pounds. The committee had taken this matter up with the manufacturers, and while they had not committed themselves, some seemed to be strongly in favor of the 100 pound package, others were against it because of the expense of making the change. Others were preparing to order bigger bags to meet the committee's suggestions, irrespective of the Association as a whole.

Mr. Jamieson had been advised by the Secretary of the Manufacturers Association that the cement branch of the Association had recently voted against making any change and requested the Canadian Society of Civil Engineers to act with them in endeavoring to obtain legislation towards standardizing 87½ pounds as the packages which he regretted the committee could not do.

Mr. COSTE interrupted stating that Mr. Jamieson was out of order; that these matters should not be discussed at the Annual Meeting, but should be submitted to the Society in Montreal.

Mr. JAMIESON, however, was permitted to proceed and he pointed out that the Cement Branch of the Manufacturers Association thoroughly recognized the importance of having a specification on which all can agree so that they will manufacture a good grade of cement and at the same time meet the conditions of the engineers.

The American Society issued their specifications and recommendations of thir Committee on Cement with the names of the Committee behind it to give it standing, without guaranteeing it as a Society. This was what the Committee was endeavoring to do. A great deal of progress had been made in getting the manufacturers to agree on their specifications. The method of testing had been finally agreed upon with the manufacturers, which was a great step in advance.

In presenting this report, while he did not think it possible to discuss it generally, the members might have some point that they would like to refer to.

The PRESIDENT wanted to know what disposition could be made of the report and it was suggested that it be circulated among the members without adoption and without any recommendation from this Annual Meeting. The report could be examined and be reported back with a view to final adoption at the next meeting. This, however, was thought would result in too long a delay.

A lengthy discussion followed, relative to the disposition of the report, which was finally settled by a motion by Mr. Coste, seconded by Mr. Morris, that the Report on Cement be printed and distributed to the members and referred to the incoming Council for action. It was then moved by Mr. LeGrand and seconded by Mr. Hunter that the present Committee on Cement be appointed a standing committee.

PRESIDENT G. A. MOUNTAIN TAKES THE CHAIR.

Afternoon Session, January 30

Voting on By-laws.

The PRESIDENT announced the result of the vote re sections. The vote stood fifty in favor of abolishing the sections and sixty against, which he stated was an extremely small vote for the Society on such an important subject. The result of course, was that the sections stand as they did before. After some minor matters had been settled, the President read the result of the vote on the amendments to the by-laws.

By-law No. 8, for 166; against 47. Declared Carried.
By-law No. 13a, 141 for, 68 against. Declared Carried.
By-laws 27 to 45 inclusive, 135 for, 71 against. Defeated.

A clerical by-law referring to the change of numbers was carried but inoperative on account of the failure of the previous set to carry.

To omit by-laws 28 and 36 was also carried.
By-law 37A, for 73, against 114.
By-law 27, for 68, against 123.
By-law 28, for 68, against 123.
By-law 33, for 73, against 119.

The President stated that By-law 37A was apparently repeating the first, but was marked on the report as a vote referring to what was called here the first part of the second vote.

Sunday Business.

The PRESIDENT stated that he did not understand it, but the result was 73 for and 117 against, so that none of the by-laws on the white paper had carried. There was some discussion over the apparent mix-up caused by the vote on the several by-laws and the question of obtaining legal advice on the matter. The difficulty was finally cleaned up by a motion by Mr. Hunter, seconded by Mr. LeGrand, that the incoming Council be authorized to deal with the difficulties resulting from

the ommission of by-laws and the inconsistencies from the votes of the Society on the amendments to the by-laws.

Mr. MORRIS'S motion relative to appointing a Central Board of examiners representative of all branches of engineering which was made during the morning session when the report on the Usefulness of the Society was being discussed, was put and declared lost.

The clause in this same report which was carried over from the morning session, relative to Provincial Legislation that might be detrimental to the profession, or that might be repealed, upon motion of Mr. Mountain, seconded by Mr. McNab, was laid over and it was decided that no action should be taken at present. The next clause:—"Should the title 'Civil Engineer' be controlled by legislation" was included in Mr. Mountain's resolution. Clause No. 9 was also laid over.

Mr. LEOFRED read a resolution passed at the Annual Meeting of the Quebec Branch of the Canadian Society of Civil Engineers asking that a rebate of $2.00 be made to all members of the Quebec Branch who reside between Three Rivers and the eastern boundary of the Province of Quebec. Upon motion of Mr. Jamieson, seconded by Mr. McNab, the request of the Quebec Branch was referred to the incoming Council.

Article 10, page 36, as well as No. 7 were also referred to the new Council.

Mr. LEOFRED read another resolution passed by the Quebec Branch recommending that the Canadian Society of Civil Engineers should take steps to study the question of establishing a tariff which would be recognized by the Courts, similar to the land surveyors, architects, lawyers, notaries, etc. Upon motion of Mr. Coste, seconded by Mr. McPherson, the above resolution was referred to the incoming Council.

It was moved by Mr. Coutlee, seconded by Mr. Armstrong: "That as branches of the Society are rapidly forming in various parts of Canada, all reports of Committees appointed at the Annual Meeting be printed and forwarded to the branches one month before a special meeting of the Council and that the Chairman of each branch or other approved delegate be invited to attend that meeting and present a concise statement voicing the opinions of the members of his branch on all such reports and that the reports be considered at said meeting of Council, and further the Council is recommended to make reports, recommendations and draft motions to be presented at the Annual Meeting of the Society to facilitate the discussions thereat." (Carried.)

Moved by Mr. Kerry, seconded by Mr. Coste: "That the Secretary be instructed to send the members of the nominating committee a list of the men who have held office in the branches of the Society, because it is the opinion of this meeting that service in a branch is a recommendation for election to the general office of the Society." (Carried.)

Moved by Mr. Kerry, seconded by Mr. McNab: "That the Council be directed to transmit all applications for admission to membership, for transfer of membership, coming from within the district of a recognized branch to the Executive Council of that branch for recommendation before taking final action upon the application." (Carried.)

A vote of thanks was then proposed to the various individuals and organizations who were responsible for the entertainment of the Society.

Officers for 1909.

The following were elected for the nominating Committee for 1909:—Province of Ontario, Messrs. C. H. Mitchell, C. W. Dill and T. C. Irving, Jr.; Manitoba, L. A. Vallee and C. S. Leech; Section North West of Ontario, T. E. Schweitzer and H. N. Rattan; Maritime Provinces, C. E. W. Dodwell; Section outside of Canada and Newfoundland, Henry Holgate.

The following were elected as Officers and Members of Council for 1909:—G. A. Mountain, President; Vice-Presidents, W. F. Tighe, H. N. Rattan, C. J. Desbarats.

For Members of Council, J. E. Schweitzer, A. E. Doucet, D. Macpherson, R. A. Ross, N. J. Kerr, R. S. Lea, J. G. LeGrand, F. W. W. Doane, Mr. Coutlee, L. A. Vallee, F. P. Gutelius.

For General Section, P. Sherwood, A. St. Laurent.

For Electric Section, C. H. Mitchell, L. A. Herat.

For Mechanical Section, H. A. Bayfield and W. Kennedy, Jr.

Mining Section, F. L. Wanklyn, Chas. Fergie and R. W. Leonard.

At the request of the PRESIDENT, the newly elected President, Mr. Mountain, took the Chair. A vote of thanks was tendered to the retiring President and Officers for their services during the past year.

Mr. BURCHELL had some very flattering remarks to make about Mr. Mountain and his connection with the Railway Commission. Ex-President Galbraith spoke very highly of the services rendered by their Secretary, Mr. McLeod.

Mr. McLEOD replied and thanked the meeting for their kindness in proposing and accepting this vote of thanks. Mr. LEOFRED suggested that the next Annual Meeting be held in Ottawa. Mr. COSTE believed that, in view of the fact that hotel accomodations were so heavily taxed in Ottawa during January that the place of meeting should rest between Montreal and Quebec City.

After a motion thanking the scrutineers for their work the Twenty-First Annual Meeting of the Canadian Society of Civil Engineers adjourned.

A CHILDREN'S THEATRE, the first of its kind in the world, is to be erected in New York. Plans for the structure have been completed, and it is said that in design and construction it will introduce a number of novel features. The reported backers of the project are Mrs. Carter Harrison, of Chicago; Frances Hodgson Burnett and Mrs. Russell Sage, of New York.

WELL-KNOWN ARCHITECT PASSES AWAY.---Mr Maurice Perrault of the A.I.C. Vice-Presidency Succumbs to Lingering Illness.

THE LATE MR. MAURICE PERRAULT, A.I.C., P.Q.A.A.

A bereavement which has cast a gloom over the architectural and engineering fraternity of Quebec, and which will be learned with deep regret by many members of the profession throughout the Dominion, occurred February 4 at Longueil, a suburb of Montreal, in the person of Architect Maurice Perrault, one of the vice-presidents of the Architectural Institute of Canada. The immediate cause of Mr. Perrault's death was cancer of the throat, and although it was known that he was in poor health for some time, his sudden demise came as a reat shock to his many friends and acquaintances.

Although being devoted chiefly to the pursuits of his profession Mr. Perrault had been closely identified with the political life of his city and province, and since 1900 represented Chambly county in the Quebec House of Assembly. He was chairman of Private Bills Committee, and during the last session was frequently mentioned as a cabinet possibility.

Mr. Perrault was born in Montreal on June 12, 1857, and was the son of Mr. H. M. Perrault, his mother being before her marriage Miss Octavie Masson, daughter of Mr. Damase Masson. After studying at the Seminary, he engaged in the practice of architecture, specializing in churches, convents and other large stuctures, many of which pay a fitting tribute to his ability as a designer.

From 1888 to 1892 he was the official architect for the district of Montreal under the Hon. P. Garneau, then Minister of Public Works. Aside from the duties of this position, he became architect to the city of Montreal, which position he held from 1889 to 1905, and during the first six years of which period he was also acting expropriation commissioner.

In addition to being a charter member and a Fellow of the Architectural Institute of Canada, with which he had been associated since its inception, Mr. Perrault was one of the organizers of the Province of Quebec Association of Architects, a member of the Canadian Society of Civil Engineers, and a member of the American Public Health Association. Mr. Perrault was a person of pleasing individuality, a splendid platform speaker and a debater of recognized ability. In the Legislature he was always accorded the greatest respect and attention by his colleagues, and was regarded as an authority on the financial affairs of the province.

FROM 1898 TO 1907, INCLUSIVE, the production of cement in the United States increased almost five-fold. A statistical compilation of the mineral products for that period, as recently sent out by the U. S. Geological Survey, give the total output for 1898 as 12,111,208 barrels, valued at $9,859,501, as against the striking figures of 1907, when the output reached 52,230,342 barrels, valued at $55,903,851.

COMPULSORY ARCHITECTURAL EDUCATION OPPOSED.

---Mr. Eden Smith in a letter to "Construction" Sets Up a Strenuous Argument Against Architectural Registration.---Society Demands Good Buildings Not Architects.---Suggested Legal Qualification an Impertinence to the Art.

MR. EDEN SMITH, TORONTO.

IN your editorial on the Architects' License Law in the January, 1909, number of CONSTRUCTION, you say Architects' License Law makes the architect responsible to the public as well as to his client. Many architects favor such a law, some few are inclined to oppose it, and their opposition is prompted by one of three reasons. You give three reasons which are all beside the mark, as any one who will read Mr. J. C. Horwood's letter, which appears in the same number of your journal, may see if he wants to. And you neglect to give as one of the reasons for opposing license law, the contention of its opponents that proper building regulations will make more effectively not only the architect, but all who build, responsible to the public.

Among what you call the few who oppose license law you will find, if you will read the English Builder of January 16, 1909, Professor Beresford Pite, F.R.I.B.A., an architect who has had *some* recognition in England for the last twenty-five years, and you will see that this, according to you, "highly aesthetic" member of the profession is also imbued with a "Bohemian conception" of the profession when he says the attempt to set up legal qualification in the art of design, of universal application to architecture, will be an impertinence to art, unworthy of any cultivated race; doomed to distressing failure architecturally, and that its impracticable absurdity is not evident to the promoters of architects' registration, he fears, is due to an imperfect sympathy with that essential liberty of spirit which is the vital air of all artistic movement.

For that scientific building involving "mathematical calculation," which, as you say, in this "commercial age" society demands proper building laws, compel a perpetual examination of the designs which registration would not supply, and these laws would therefore better furnish society with what it demands of the architect, than would registration.

I hardly need point out the absurdity of accusing those who ask for facilities for architectural education of bolstering up a student who could design and not construct. We have no false conception of what society demands of an architect. Society demands good building, and if an architect desires to build baldly, society's building regulations should prevent him. I think the false conception rises, in imagining those architects who want protection, are society.

WHAT SOCIETY DEMANDS.

Society does not demand architects, it demands that good building be obtained and bad building prevented, and for years and years it has been pointed out that license law does not provide what society demands and that proper building regulations do.

It is unnecessary for you to point out that architects now practicing would not be required to pass an examination. Some of us have been in civilization long enough to know that a license law on coming into operation must put the most ignorant person now calling himself an architect, on exactly the same legal standing as the most learned, and a license would be no oftener revoked than licenses are now in the legal and medical professions; are these professions so fortunate as to include in their ranks no careless or incompetent practitioners.

If registration is enforced I do hope we shall not be required to believe that "architektonia," as the source of the word architect, is derived from chief carpenter. This is the popular idea, and I think it is about as accurate as most popular ideas. Because architecture, the art of the architect, a word derived from archon, a ruler or chief, and teknon, a worker, teknon including all kinds of workers, was so understood by the Greeks to be building, in the sense of constructing or contriving, that they used it metaphorically in place of stratagem, plot or artifice. When they used teknon, they may have meant mason or sculptor, quite as well as carpenter, especially as they had words derived from xylon, wood and ergon, work, such as "xylourgos," a carpenter, to use when they meant carpenter.

ARCHITECTURAL PHILOLOGY.

Are we to believe that the Greeks who spoke of architecture as the master art would have chosen a carpenter to direct Phidias, when the woodwork of their houses was so rude, and when we have to believe that Callimachus, the designer of the Corinthian order, was a sculptor. It is more easy to believe, as our first interest in Greek rose in the translation of the Gospels, and that as St. Mark used "teknon" to describe one traditionally known as a carpenter, that teknon has had since to live up to that reputation. In the Old Testament I cannot find the word carpenter, unconnected with mason or builder, except in Zechariah 1, 20, which is so obviously the wrong word, that in the revised version "smith" is used in place of it, while the Hebrew word also means workman, craftsman, or artificer. In the earlier days of clay and pottery, or of the monolith builders, the chief contriver was hardly likely to be a carpenter.

It is likely that an artizan perhaps, not a freeman, could acquire mastership, then leadership in his trade, and find time to get such qualifications as Vitruvius said an architect should possess, a knowledge of drawing, geometry, optics, arithmetic, be a good historian, philosopher, well skilled in music and not ignorant of either physics, law or astrology. How long would it take a foreman carpenter in these days of condensed methods, libraries and technical schools to do this? Neither is it likely that an architect would be found in those associations of freemasons, becoming evident in the thirteenth century after the greatest Gothic work was done, or in those trade guilds, more interested in the craftsman's privileges than in the development of their art, which in England after the thirteenth century formed much more slowly than on the continent, because the Englishman was always jealous of anything savoring of interference with freedom of trade, even as late as in Adam Smith's time. It is not likely that in such organizations an architect

would be found who could have designed the subtle differences which enable us to distinguish the work of the Cistercians from that of the Clunisians, differences which enable us to see how the twelfth century architects expressed in their building, more of their philosophy (that is their idea of the spirit of Christianity) than did the architects of philosophic Greece of their philosophy.

Any one who has studied, measured and drawn such work as we see in the Cistercian churches of Fountains, Furness, Rievaulx and Buildwass, and compared it with the semi-French church of Westminster, bearing in mind the disputes between St. Bernard and the Abbots of Cluny, is hardly likely to give a rule of thumb craftsman the credit for perpetuating in stone such intellectual refinements as six or seven hundred years after still excite enthusiasm in a church builder.

11TH AND 12TH CENTURY ARCHITECTS.

We know, too, that in the eleventh and twelfth centuries, at least in western Europe, the poet, philosopher, artist, or man of science could have had no existence save in the cloister, and we know that in the cloister was preserved the poetry, philosophy, art and science of Greece and Rome. We know that these eleventh and twelfth century architects did not, as you say, build so substantially that their buildings could not fail, but that they made the most daring experiments in building engineering the world has ever seen, and established principles of construction that were never heard of before or improved upon since. It is because the philosophy and life rules of these men which led them to work anonymously, deeming personal fame unworthy and the glory of the church everything, is so unaccountable to us in these commercial, self-seeking days, that I suppose we would give the credit of their work to vulgar artizans rather than imagine such queer men existed. Perhaps after the thirteenth century till the Renaissance, in the decline of Gothic architecture, when the influence of Cluny and its lay schools had diffused throughout western Europe, the chief workman became the building designer, but he was called the master mason or master builder and not architect; and we know that before the worker became a master of his art he served an apprenticeship of not less than seven years, during which time probably his talents and ability became evident to society; and so on through his years of service as journeyman, before he became a master or chief workman. Such training as that cannot be compared with what would be necessary to qualify under a license law, accomplishment so meagre that I expect every real estate agent would expect some of his assistants to possess it, so that he might have a legally qualified architect in his own office.

CAUSE OF DISSENTION.

We anti-license architects are sorry to see in your editorial a continuation of the role of an architectural "bumble," an assumption of authority on insufficient foundation, treating those who disagree with registration as untaught children, who are playing instead of working and to whom you can extend your clemency very little longer. It is this method of promoting the interest of the profession, so objectionable to men who were once younger members, that has divided the architects into two camps, for you can hardly expect them to think that men like Mr. J. C. B. Horwood, to whom your editorial * obviously replies, are one-sided men with a "highly aesthetic Bohemian" idea of the profession.

Instead of being untaught boys, these opponents of registration may be true Canadian men, anxious that their country may not add another inoperative law to their already half useless code, anxious that she may not adopt what even China is relinquishing. Instead of acting on purely personal grounds, they may think that in the world there are states worth more consideration than Illinois, and towns that can excite even higher aspiration than Chicago.

They may have learned that society no longer considers that qualification may be ascertained by competitive examination, and that Germany, the leader of technical education, has in some cases abandoned it, and in other cases done what is practically the same thing, permitted the use of text books during examination.

Realizing, as even China does, that progress is too swift for standards to be maintained, and without standards one cannot examine for qualification.

You say in the second part of your editorial that the objections to a measure providing for registration "are few and far fetched."

One does not need, as a rule, many fatal objections to outrule a scheme, any more than it needs many fatal wounds to kill a man, and when a practical man like Mr. J. C. B. Horwood clearly shows that license law does not accomplish its ostensible object, as well as does the measure its opponents support, that objection is near enough.

Of course, society is justified in demanding that "those who design her buildings should know the basic principles of their profession." The basic principle of architecture is construction.

REGISTRATION AN INEFFICIENT METHOD.

Registrationists cannot show so efficient a method of protecting society as that of establishing a law compelling the examination of a design for construction, licensing the plan and inspecting the erection. Would any man be practical who contended that to examine a man once in his life on some hypothetical scheme and never imagined he could forget it, would be a better protection for society. The reiteration of the statement that the opponents of registration are not practical men does not make the statement true. The frequently implied suggestion that those who are contending for better architectural education, disregard construction, could only rise in the mind of one who had never been to an architectural school.

The practical man knows that only some one with no higher knowledge of architecture than that which would be demanded as a standard for registration, would ever think it possible to divorce construction and design, and that architectural education shall not suffer from the perpetration of such an idea, is one of our reasons for opposing registration.

I suppose it will be allowed by practical men that the license will make an architect responsible to the public, not the examination; one can suspend a license, a man once examined is examined for all time. The purpose would be fulfilled quite as well as far as the public are concerned, if the architect obtained a license without examination, like a pedlar, and he would be spared the ignominy of having to pose before society as the professor of an art stamped by registration with a standard within reach of a fourth year school boy, a parrot like knowledge of a little elementary formulae.

Society shows so little interest in architectural license law that one might be justified in thinking the measure was for the protection of the profession rather than for the protection of the public.

THE INTEGRITY OF THE ARCHITECT.

The suggestion that society needs to be protected from the fraudulent business methods of an architect more than from another business man is rather a contemptible one to come from the profession. My experience of thirty years leads me to believe architects are more honest than the ordinary business man, apart from their reputation depending upon it, their work with its fixed remuneration, its ideals more interesting than money-making and the habit of exacting honesty from others, prompt honesty.

What society "demands" and what she needs are rather at variance with each other. She needs the wisest to govern, yet she demands that the preponderant vote be given to the illiterate so that the wisest may not be elected to govern, though when she needs pure milk, she has sense

*The Editorial referred to was written and in type before the receipt of Mr. Horwood's letter.—ED. NOTE.

enough to examine the milk not the milkman. She needs that those engaged in the production of a commodity show her how to obtain the best of that commodity rather than that the producers of a commodity be shown how to get the best of society.

The "demands" she makes of an architect apply even more forcibly to a journalist; he should be responsible to the people as well as to those who employ him or the party he represents. She needs that those who teach her by means of newspapers have some knowledge of the "basic principles" not only of the subject they write about, but of all the wisdom of the last three thousand years and of its effect on the government and development of society physically, mentally and spiritually, so that they may not teach what would retard or distort its growth.

Society does not "demand" architects any more than she demands tee squares. She needs good building and that those with a knowledge of good building show her how her present enactments fail and how the proposed innovation would succeed in obtaining it. This would be shown if facts were put before her, proving that all buildings in the State of Illinois under license law were better than those in Toronto under building regulations.

It is fortunate for society that as well as practical architects she has practical politicians who will wonder why the only medicine for one of society's ills should be food for those who point out the ills, because the characteristic expression of those who have *cured* most of society's ills have been "never mind me."

If examination will discover good men, then competitive examination should discover the best.

This is notoriously untrue in the British army and Civil Service. Most of us can quote such examples as the well-known one of two young men who went as companions to Woolwich, one passing all his examinations brilliantly and finishing his career some time ago with the rank of a colonel, while the other who could barely get through the school is Commander-in-Chief of the Imperial Forces in India, obtained an earldom, and has not yet finished his career, examination having failed to distinguish which was the practical man.

Society has many ills that we know of, but they are not so numerous as the remedies proposed for them by every organization in society from those of the unemployed to those of the overworked.

If license law is a panacea it might be universally employed. For as society demands that all its members conform to a recognized system of ethics, she might examine each one on coming of age as to the quality and quantity of his virtues. License him and give him such distinguishing marks that all could see his proficiency. The marks might take the form of medals with a suitable device on the face. When the person defaulted, the medals would be reversed as a sign that he was suspended. Such a course would remove the need of police.

The examinations need not be limited to the ordinary virtues. The leisured and wealthy classes might take honorary degrees in religion, as there might not be room for these badges in front, they might be worn behind somewhere, where a man need not lean on them and be uncomfortable. Then to prevent some from reversing their badges for fun, or if they had been suspended, society would have to go about in couples looking after each other's virtues as men and women now do.

Yours truly,

EDEN SMITH.

BUILDING STATISTICS FOR JANUARY.---Phenomenal Increase Recorded in Many Places.---Outlook Most Promising.

IF BUILDING OPERATIONS for the month of January can be taken as an indication of the amount of work which is to be carried on during the present year, Canada is entering upon a period of activity which in the past history of the Dominion will be without a parallel.

The returns for the month from various parts of the country, as submitted to CONSTRUCTION, show gains of such abnormal proportions as to seem almost incredible for any season of the year, much less a month like January, when it is generally expected for everything in the construction line to be practically at a standstill.

Of the fifteen cities reporting, twelve submit comparative figures. Of these nine registered increases ranging all the way from 7 per cent. up to 3,900 per cent., while three, Fort William, Toronto and Halifax are the only places to show a loss.

The greatest decrease is that of Fort William, where the comparative falling off has been 96.93 per cent. This decline, however, comes after a year of consecutive monthly gains, and can be regarded only as a temporary settling down. In view of the vast amount of work in prospect, Fort William will in all probability not only overcome this disparity, but on the year's operations pile up a greater total amount than was tabulated in 1908.

The other two places to record decreases are Halifax and Toronto, both of which failed to equal the amounts of January, 1907, by 20.43 per cent. and 19.90 per cent. respectively. Halifax also experiences this break after successive monthly gains and a year which topped its predecessor by more than 25 per cent., while Toronto's falling off for the month following the second greatest building year in her history.

The largest increase for the month is that of Three Rivers, which is 3,900 per cent., while the next best showing is made by London with a gain of 1,525 per cent. Both of these places present an exactly reverse condition to that experienced in January, 1908, when the building trade was decidedly dormant.

In the far West everything is apparently moving along in a most satisfactory manner.

Winnipeg, although in the throes of her worst season, shows a phenomenal gain for the month of 203.92 per cent., while Calgary has added to her increase of December by an advance of 61.32 per cent.

Vancouver, Victoria and Edmonton are also ahead on the month, and register increases of 1.53 per cent., 42.46 per cent., and 7 per cent. respectively.

Montreal, in recording a gain of 52.72 per cent., is evidently starting off with a determination to more than offset her loss on the past year, and from the amount of work which is reported to be in prospect, there is every indication that she will succeed.

Two belated yearly reports to hand are those of Sherbrooke and St. Hyacinthe, both of Quebec province. The former shows that building operations to the extent of $300,000 was carried on last year, as against $250,000 in 1907; while the latter register a total of $176,000 for 1908, as compared with $74,500 the year previous.

Reports as to future prospects in various sections of the country are as follows: St. Hyacinthe, P.Q., "very bright"; Edmonton, "look bright"; Vancouver, "all indications point to a banner year"; Calgary, "most promising"; London, Ont., "excellent"; Winnipeg, "bright"; Berlin, Ont., "good, great many buildings in contemplation"; Brandon, Man., "fairly good."

	Total cost of Permits for 1909.	Total cost of Permits for 1908.	Increase per cent.	Decrease per cent.
Berlin	$ 2,000	.....	.....	....
Brantford, Ont.	3.715	.....	.....	....
Calgary, Alta.	21,650	$ 12,800	$ 61.32	....
Fort William, Ont.	17,050	510,600	.....	96.66
Halifax, N. S.	17,545	22,050	.....	20.43
Kingston, Ont.	3,000	.....	.....	....
London, Ont	24,385	1,500	1,525 66	....
Peterboro, Ont.	2,300	200	1,050.00	....
Montreal, Que.	120,120	78,650	52 72	....
Three Rivers, P.Q	20,000	500	3.900.00	....
Winnipeg, Man.	50,300	16,550	203 92	....
Edmonton, Alta.	20,240	18,915	7.00	....
Vancouver, B. C.	361,130	355,685	1.53	...
Victoria, B. C.	78,080	54,725	42.67	....
Toronto, Ont.	380,025	474,453	.....	19 90

CONCRETE HOUSES ON LARGE COUNTRY ESTATE.---An Ideal Group of Buildings Designed in English Gothic of the Tudor Period.---All of Monolithic Construction.---Club House for Grooms and Employees a Novel Feature.

THE many ways in which concrete can be utilized in connection with country life, is remarkably illustrated by the groups of buildings which have recently been erected on the estate of Frederick Pabst, Jr., in Wisconsin. Mr. Pabst has about 1,000 acres in Waukesha county which he purchased for the purpose of having not only a country seat but for conducting farm operations as well as the raising of blooded horses for riding and driving. To have the suitable buildings, it was necessary to erect several different groups including not only the house itself and the owner's private stables, but homes for the farm manager and his assistant, storehouses for grain and other products, in addition to stock barns as well as a large covered riding paddock. A novel feature of the plans is a club house intended for the grooms and other employees connected with the horse raising industry.

VIEW OF OWNER'S RESIDENCE ON THE PABST ESTATE, LOOKING NORTH-EAST TOWARDS THE MAIN ENTRANCE. FERNECKES & CRAMER, ARCHITECTS.

The architects for Mr. Pabst, Messrs. Ferneckes & Cramer, found that upon the estate were large deposits of sand, also stone suitable for concrete composition. Upon learning of this fact, Mr. Pabst decided to construct all of the buildings—about a score in number—of home made material with the exception of the cement, and consequently has one of the most unique, yet picturesque group of farm buildings in this country, although they were erected at a remarkably low cost owing to the cheapness of the material.

As will be noted by the photographs, the buildings are not only appropriate, but picturesque in appearance, while they have been decorated and furnished in keeping with the purposes for which they are intended. The home of the owner is charmingly placed, forty feet above the level of the lake, on whose shores it is situated. From the massive concrete porch, overlooking the shore, can be seen ever-changing vistas as the sun and shade play on the waters below. The architecture is English Gothic of the Tudor period, and the material is well adapted to the type. It is built in the form of an L, sixty by one hundred feet, and contains three storeys and basement. Facing the lake to the northeast, there is sun on every side. Within, the concrete walls are "furred" with tile to obviate any possible chance of dampness. The back yard on the kitchen side is hidden from view with a high yet graceful cement wall, and on the lake side is a wide brick-paved terrace.

Entrance to the grounds is by a private drive from the main highway, winding along the shore and crossing a meadow-bordered lagoon over a reinforced concrete arch bridge of fifty-foot span. A picturesque path winds down the hill through the trees to this road, and to the

solid concrete boat house with cement slips, large enough for good sized launches and small steamers. The bath house adjoins, and nearby is an engine room which furnishes power for the water supply. Numerous springs give an inexhaustible supply of pure water.

ASSISTANT MANAGER'S HOUSE ON THE PABST ESTATE. FERNECKES & CRAMER, ARCHITECTS.

Besides the private stable, forty feet wide and one hundred and twenty-five feet long, which is perfectly equipped, two storeys and basement, harness and washrooms, there is an artistically designed concrete garage and an automobile repair shop. These buildings harmonize with the style of the residence, and near them is a quaint gardener's cottage and private greenhouse, all of reinforced concrete. As will be noted by the illustrations, the use of the concrete gives the home a dignified and imposing appearance, and from a distance the walls look as if they had been erected out of massive stone blocks.

The house of the farm manager, although of smaller dimensions, is equally as attractive, being located on an eminence partially surrounded by forest trees. At one end is a massive concrete portico, while windows of various sizes, including a picturesque one-storey bay window furnish ample light for the front. A feature of the house is the huge concrete chimney which permits generous open fireplaces.

The extent of the farming interests is such that a manager and an assistant are employed. The photograph of the manager's house shows that it is as ornate and pretentious as that of many a country home in other portions of the United States, yet it has been erected at a fraction of the expense which has been required to build many others of the same size and design. As concrete lends itself to so many forms of architecture, the exterior of this house is not only appropriate but very attractive. Again, provision has been made for enjoyment out of doors by the spacious verandah which completes the side wall. This is connected with the interior by large glass doors, which, as well as the windows, can be thrown open in the summer so that the porch forms practically a part of the interior. The archway from the front entrance moulded of concrete is simple, yet artistic, and an opportunity is given to produce a natural stone effect in the concrete approach to the entrance.

As will be noted the houses of the farm manager and his assistant are three storeys high. They contain not only parlors, dining room, pantry, kitchen and laundry on the first floor, but a surprisingly large number of sleeping rooms, while they are equipped with appliances for providing hot and cold water, ranges, baths, the latest ideas in hygienic plumbing, and, in fact, are as complete in this respect as the home of the owner.

The club house for the grooms and other employees is probably the only one of its kind in this country, not only in the material used, but in the character of the building. It is situated on what is called Farm Number One, where are raised the blooded stock. While it is used for the farm offices, space is also devoted to a commodious rest and lounging room, one portion of which is finished off in a library with books and newspapers.

MANAGER'S HOUSE ON THE PABST ESTATE. NOTE THE COMPARISON OF THE UNTREATED SURFACE WITH THAT OF THE FINISHED HOUSE IN ILLUSTRATION ABOVE. FERNECKES & CRAMER, ARCHITECTS.

On the same floor is also what is called the living room, used likewise for a dining room in addition to the kitchen, for this is not only a social club, but a sort of

hotel for the employees. In the upper storeys are fourteen bedrooms, each large enough to accommodate two or three if necessary, so that the house has a capacity for fifty people. While the exterior is plain and without ornament, the way in which the concrete has been moulded gives it a very pleasing effect. Like the larger buildings it has a roof of shingles in which a composition of cement and asbestos is used.

A portion of the riding paddock can be seen at the right of the club house. This is probably the largest covered paddock in the world, for it is over two hundred feet in length and seventy-five feet in width. Here again the use of concrete has been a great advantage, as it has not been necessary to utilize posts or pillars of any kind in upholding the roof, and the interior is entirely unobstructed. The concrete is of special advantage as the floors of the stalls are composed of it, and it can be kept

CLUB HOUSE FOR GROOMS ON THE PABST ESTATE. IT CONTAINS OFFICES, LIBRARY, DINING ROOM AND BEDROOMS FOR EACH GROOM.

clean and odorless without difficulty. The same is true of the farm horse barn, which is also two hundred feet in length, and has accommodations for nearly one hundred horses.

To give an idea of the extent of this group of buildings and the work required, it may be stated in all over 10,000 barrels of Portland cement were required. The process employed in finishing the exterior was what is known as the rough cast, which prevented any cracking or peeling of the plaster, and gave an excellent finish. While the groups of buildings can truly be called picturesque and appropriate, perhaps the most important feature of their construction is the fact that they are practically fire-proof owing to the material used, not only in their walls, but the roofs. While the entire outlay for them is a secret known only to the owner, building experts who have visited the estate say that considering their size and proportions, they have been erected at an expense which would be far less than if the cheapest brick or natural stone were employed owing to the abundance of the home made material which enters into them.—CEMENT AGE.

THE ILLINOIS LICENSE LAW.---How It Deals with Malpractice and Unscrupulous Methods in the Practice of Architecture.

CANADIAN ARCHITECTS who doubt the efficacy of a law requiring a license to practice, or who cannot conceive of how it will be of benefit to the profession, will probably find much of interest, in the manner in which the Illinois License Law is operating against practitioners in that State who are guilty of malpractice or unscrupulous methods in the conduct of their profession.

According to the records of the State Board of Examiners, a number of licenses were revoked during the past year. One of the most recent instances of the application of the law in this respect was in the case of Gustav Voigt, an architect with office at 3220 South Canal street, whose certificate to practice was revoked "for cause." The charge brought against Mr. Voigt by the board was that of placing his official seal on the plans of a basement and three-story building erected on the southeast corner of Leavitt and Crystal streets, Chicago, said to have cost in the neighborhood of $30,000, made by E. J. Patelski of 383 East Ontario street, a draftsman without license, and used for the purpose of obtaining a permit from the building department for the erection of the building. The action of the board was unanimous, and only taken after a trial in accordance with section 10 of the Architects' License Law, in which the state and the defendant were represented by counsel and witnesses were examined on both sides.

CEMENT AND CONCRETE INTERESTS TO MEET.---Final Arrangements Complete for Convention and Exhibition of C.C.C.A.---First Event of Its Kind in Canada.---Indication Points to a Large Attendance from All Parts of the Dominion.---Exhibit to be a Big Feature.

WITH ALL ARRANGEMENTS completed, an excellent programme prepared and final details well in hand, everything is practically ready for the first annual convention and exhibition of the Canadian Cement and Concrete Association, to be held in Toronto, during the week of March 1 to 6.

From the present indications the attendance will far surpass what was at first anticipated. Communications are reaching Toronto daily regarding exhibitors' space and hotel accommodation, and there is every evidence that all sections of the Dominion will be represented by large delegations of visitors and members.

That the executive of the Association has spared no effort or expense in order to make this event an unqualified success in every particular, is amply attested to in the elaborate and comprehensive character of the convention programme Among those who will address the meetings are a number of the most eminent engineers and authorities in Canada and the United States on cement and concrete construction, and one or more papers and discussions are to be devoted to each and every branch of the industry. Some of these lectures are to be illustrated with lantern slides showing the practical application of cement and concrete in construction work.

The convention will be opened in the Banquet Hall of the King Edward Hotel on afternoon of March 2, and the business session will continue through the two following days.

The exhibition will be officially opened on the evening of March 1, and will continue through the entire week. All the space at St. Lawrence arena, where it is to be held, has been practically sold, only a limited number of booths now remaining to be taken up. An idea as to the magnitude of this feature of the event can be imagined from the fact that the exhibition hall approximately takes in an area of 40,000 square feet, all of which will be fully occupied with cement and concrete machinery appliances of every conceivable kind. This floor space is in excess of that of any previous cement exhibition ever held.

Among the large list of firms who will have displays are some of the best known companies in Canada and the United States, and a large part of the machinery is now under way. Cement products of every character will be shown, and most of the machinery, such as mixers, concrete block machines, etc., will be seen in active operation.

St. Lawrence arena will be decorated in an appropriate manner, and an orchestra will be provided to dispense music throughout the day and evening.

Arrangements have been made with the Eastern Canadian Passenger Association for reduced rates. Delegates upon purchasing single fare ticket to Toronto at their home town will, upon request to the local agent, receive a receipt for this fare upon a standard form, which, when validated by the Secretary of the Canadian Cement and Concrete Association, will entitle the holder thereof to a return ticket free of charge.

Official invitations have been extended to the following organizations to attend the business session of the convention and to take part in the discussions of the several papers and addresses to be given, and to delegate members to represent their respective organizations on the convention programme: Ontario Association of Architects, Toronto Architectural Club, the Architectural Institute of Canada, the Engineers' Club of Toronto, the Toronto branch of the Canadian Society of Civil Engineers, and the Guild of Civic Art.

Those attending the Good Road Association convention, and the meeting of the Mutual Underwriters' Association, to be held in Toronto during the same week, will be entitled to the reduced railway rates and all privileges of the cement and concrete convention and exhibition.

The following programme which has been prepared is subject to changes and additions:

PROGRAMME.

Monday, March 1, 1909, 7.30 p.m.

Formal opening of the Exhibition in St. Lawrence Arena by Hon. Dr. Reaume, Minister of Public Works, Province of Ontario. This evening is reserved for the special reception of the citizens of Toronto by the officers and members of the Association.

Tuesday, March 2, 1909, 10.30 a.m.

Meeting of Executive Board of the Association at the King Edward Hotel.

2.30 p.m.

Address—Dr. John Galbraith, Dean, Faculty of Applied Science and Engineering, University of Toronto.
Annual address by the President—Mr. P. Gillespie, Lecturer in Theory of Construction, Faculty of Applied Science and Engineering, University of Toronto.
Address—Richard L. Humphrey, Structural Materials Testing Laboratories, St. Louis.
Why Sidewalks Fail—William M. Kinney, Asst. Inspecting Engineer, Universal Portland Cement Co., Chicago, Ill.

8.30 p. m.

Tests and Inspection of Cement—J. E. Moore, Inspecting Engineer, Robt. W. Hunt & Co., Chicago, Ill.
Concrete Bridges—Frank Barber, Engineer, County of York.
Concrete Blocks—J. Augustine Smith, Ideal Concrete Machinery Co., South Bend, Ind.
Portland Cement Mortars—A. G. Larsson, chemist, Grey & Bruce Portland Cement Co., Owen Sound, Ont.

Wednesday, March 3, 1909, 11.15 a.m.

Annual general meeting of members for the reception of the report of the Executive Board, and the election of officers.

2.30 p.m.

Designing and Testing of Reinforced Concrete Beams—E. Brown, Associate Professor of Applied Mechanics, McGill University, Montreal, Que.
Twenty Years' Experience in Cement Walk Building—C. W. Cadwell, Mgr. Cadwell Silex Stone Co., Windsor, Ont.
Modern Methods of Waterproof Concrete—Lucius E. Allen, Ontario Limestone & Clay Co., Belleville, Ont.
Reinforced Concrete Design from the Standpoint of Practical Engineering— A. W. Burge, Trussed Concrete Steel Co., Toronto.

8 p.m.

Field-made Concrete—Walter J. Francis, Consulting Engineer, Montreal.
The Use of Cement in Municipal Work—A. W. Campbell, Deputy Minister of Public Works, Province of Ontario.
Reinforced Concrete in Building Construction—Emile G. Perrott, architect, Philadelphia, Pa.
Ornamental Concrete Stone—Fred A. Norris, Consulting Engineer, Boston, Mass.

Thursday, March 4, 1909, 2.30 p.m.

Factory-made Concrete Building Products—Chas. D. Watson, Consulting Engineer, Cleveland, Ohio.
Electrical Equipment for Cement Plants—D. M. McCargar, late Electrical Engineer, Belleville Portland Cement Co., Belleville, Ont.
Artistic Concrete Bridges—C. R. Young, Lecturer in Applied Mechanics, University of Toronto.
Address—Merrill Watson, General Sales Manager, Consolidated Expanded Metal Companies, New York.

8 p.m.

Factory-made Concrete—M. Morssen, Consulting Engineer, Montreal, Que.
Municipal Engineering—Mr. Blanchard, Sewers' Engineer, City Hall, Toronto.
Selection of Concrete Materials—Sanford E. Thompson, Consulting Engineer, Newton Highlands, Mass.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These itefs appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—Henry Disston & Sons, Limited, Philadelphia, have purchased a four acre tract on Fraser avenue, just opposite Diamond Park, on which they will erect a branch factory. Architect G. W. Gouinlock, Temple Building, is preparing plans for the building.

Toronto.—The Toronto Show Case Company will erect a large factory, to employ two hundred men, on Carlaw avenue.

West Toronto.—Heintzman & Co., Ltd., piano manufacturers, have purchased a block of land immediately south of their present factory, in West Toronto, on which they will erect a large addition.

London, Ont.—The Globe Casket Company's factory has been practically destroyed by fire, entailing a loss of $200,000, of which $110,000 is on the building. The insurance amounts to $93,000.

London, Ont.—The Canadian Packing Company, whose plant at Pottersburg was recently destroyed, have secured a site in London, on which they propose to establish a public abbatoir.

London, Ont.—It is understood that Messrs. Geo. White & Sons are negotiating for the purchase of the property adjoining their premises, on Cabell avenue, with a view of extending their plant.

Hamilton, Ont.—The Meriden Brittania Company will erect a three-storey addition to their works at this place.

Hamilton, Ont.—Messrs. Chadwick Bros. will erect another storey to their plant at this place.

Hamilton, Ont.—The Dewswell Manufacturing company will erect a large addition to their works.

Hamilton, Ont.—The Stanley Mills Company will erect a number of new buildings on their property in John street, in the near future.

Collingwood, Ont.—The Collingwood Shipbuilding Company will greatly enlarge its plant. The improvements will include two new dry docks, one four hundred feet in length and the other seven hundred and five feet in length, with the necessary equipment.

Sudbury, Ont.—The Ogilvie Milling Co., of Montreal, is contemplating establishing a branch mill at this place.

Brantford, Ont.—The Hempel Paper Works, a four-storey structure, has been destroyed by fire. Loss estimated at $10,000, covered by insurance. The works were owned by Mr. W. J. Hempel and will in all probability be rebuilt.

Woodstock, Ont.—The Oxford Knitting Company, Limited, will, in the near future, erect a new building on Ingersoll avenue, just east of the C. P. R. station. The building will be 200 feet long and 56 feet wide, two storeys in height, with basement, of brick construction. In addition to this a dye house 70 feet by 30 feet will be erected.

Belleville, Ont.—Tickell & Sons' furniture factory has been damaged by fire to the extent of $2,000. Loss covered by insurance.

Galt, Ont.—The Canadian Potato Machinery Company, Limited, a branch of the Champion Potato Machinery Works, of Hammond, Ind., has purchased a four-acre site on the Stone road, on which they will erect a factory. The initial building will be 100 ft. by 80 ft.. Mr. Walter H. Schreiber, late of Hammond, will be resident manager.

Blenheim, Ont.—The Pere Marquette Railway's coal chute, at this place, together with the machinery, coal, etc., have been totally destroyed by fire. Loss estimated at $10,000, fully insured.

Sault Ste. Marie, Ont.—According to the terms of an agreement, practically arrived at, between the city of Sault Ste. Marie and John O' Boyle, representing a company of capitalists, arrangements are made for the construction of a dry dock and shipbuilding yards in the Soo, work to commence in the spring. The company asks the city for exemption of taxes and a cash bonus annually for twenty years, and in return promises to construct a shipbuilding plant and dry dock 620 feet long, the initial expense to be $500,000.

Kingston, Ont.—The Gould broom manufacturing plant and considerable property in the car barns of the Kingston and Cataraqui Street Railway Company, adjoining, have been destroyed by fire. Total loss estimated at about $30,000. The broom plant was owned by Mr. Geo. Crawford, whose loss will be about $10,000.

Montreal.—The scrap iron building of the Grand Trunk Rolling Mills, at Point St. Charles, has been destroyed by fire. Loss estimated at $10,000.

Montreal,——Architect H. C. Stone, 84 St. Francois Xavier street, has prepared plans for the erection of a carriage factory in Delorimier municipality, for the E. N. Heney Co., Ltd.

Montreal.—The preserving and canning establishment of Mr. J. W. Windsor, 740 Visitation street, has been damaged by fire to the extent of $20,000, fully covered by insurance.

Montreal, Que.—Architects MacVicar & Heriot, 104 Union avenue, have prepared plans for a factory building to be erected for Messrs. J. Eveleigh & Co.

Montreal.—N. Pichet's biscuit factory, at the corner of Ontario and Jeanne d'Ars streets, has been damaged by fire, to the extent of approximately $12,000.

Montreal.—E. Gauthier, 39 Bagg street, has taken out a permit for the erection of a factory at 46 Albert Lane. The building will cost $8,000.

Montreal, Que.—Articles of Incorporation have been granted to The Labrador Pulp and Lumber Company, capitalized at $1,500,000, and with headquarters at Montreal. The incorporators are: Ernest Hutcheson, Joseph Alexander, Trotwood Richards and Thomas Stephens, all of Montreal, Que.

Lachine, Que.—The plant of the Canadian Asbestos Co., corner of Broadway and Twentieth avenue, Lachine, has been destroyed by fire. Estimated loss, $40,000, fully covered by insurance.

Dartmouth, N. S.—The Halifax Fish Company's factory has been destroyed by fire, entailing a loss of $15,000. Insurance, $11,000.

Winnipeg, Man.—The Manitoba Iron Works has under consideration the extension of its plant on Logan avenue, by the addition of a large structure, 450 by 130 feet, at an initial cost of over $150,000. T. R. Deacon, manager of the company.

Nelson, B. C.—The McGillvray Creek Coal and Coke Company, owners of the extensive coal fields adjoining those of the International Coal and Coke Company, Coleman, Alta., just east of the British Columbia boundary, are said to be making arrangements for the establishment of a large coal and coke plant at Michel, B. C. The president of the company is H. L. Symons, of Glencoe, Minn., while others interested are: Byron E. Sharpe, formerly of the firm of Sharpe & Irvine, stock brokers of Nelson, B. C.; Frank Povah, formerly accountant at the Hall mines smelter, Nelson, B. C. Estimated cost of plant is given as $200,000.

Rossland, B. C.—The Rossland Engineering Works, owned by M. W. Cunliffe, have been badly damaged by fire. The loss is estimated at $10,000, fully insured.

Vancouver, B. C.—The Empress Manufacturing Company will rebuild their plant, which was destroyed by fire. The new building will be three stories and basement in height, of mill construction, and will cost $20,000. Smith & Sherborne have the general contract.

Vancouver, B. C.—It is reported that Mr. C. A. McGillvray, of Bellingham, will erect a large sawmill here at the corner of Strathcona and Boundary avenues.

Vancouver, B. C.—The Vancouver Pipe and Foundry Company, Vancouver, B. C., will erect a large foundry in the southern part of Hastings townsite. The proposed building will be 150 by 75 feet.

New Westminster, B. C.—The plant of the Fraser River Tannery Company has been sold to the Swift Packing Company of Chicago. The plant will be greatly enlarged and operated to its full capacity in the near future.

New Westminster, B. C.—The Brooks-Scanlon Lumber Co., of Minneapolis, Minn., will erect three large mills, each capable of handling at least 100,000 feet annually, on the banks of the Fraser River, near this place.

Gas Plants, Elevators and Warehouses

Toronto.—Messrs. J. D. Young & Son, 274 College street, have been awarded the general contract for a four-storey warehouse to be erected on Clinton street, near College street, for the Imperial Storage & Cartage Co., Ltd., 429 Spadina avenue. The building will be of mill construction, with brick walls and will cost $20,000.

Toronto.—Gratton Bros. have the contract for a three-storey brick warehouse to be built at 145 Wellington street, for J. Stevens & Son Co. Wickson & Gregg, 59 Yonge street, are the architects.

Toronto.—The following contracts have been awarded for a $40,000 warehouse to be erected at 40 Queen street east, for the Yokes Hardware Company, Yonge and Adelaide streets: Masonry, H. N. Dancy & Son, 184 Howland avenue; carpentry, E. G. Powell; tinsmithing, A. B. Ormsby & Co., Queen and George streets; steel work, Reid & Brown, 63 Esplanade east; plumbing and heating, Fred. Armstrong Co., 277 Queen street west; cut stone, John Yokes, 275 Avenue road; elevators, Parkin Elevator Co., Hespeler, Ont. The building will be of mill construction, with brick foundation, felt and gravel roof, hardwood floors, open plumbing, steam heating, etc.

Montreal.—Architect Joseph Perreault, 17 Place d'Armes Hill, has awarded to Lynch & Sharp, 16 St. Sacrament street, the contract for the brick work for the new warehouse of the Campbell Manufacturing Company, Ville St. Louis.

Montreal.—Architect Robt. Findlay, 10 Phillips Place, has awarded to C. E. Deakin, 11 St. Sacrament street, the general contract for the erection of a new warehouse and office building, on Craig street west, for W. J. McGuire & Co.

Montreal, Que.—Architect Joseph Perreault, 17 Place d'Armes Hill, has awarded the following contracts for the erection of the Campbell Manufacturing Company's new warehouse in Ville St. Louis: Dressed stone, Chas. Charbonneau, St. Louis; masonry and brick, Lynch and Sharp, St. Louis; georgia pine timber, Shearer, Brown & Wills, Ltd.

Vancouver, B. C.—The Vancouver Milling Company has taken out a permit for the erection of a frame grain elevator on Smyth street, to cost $25,000.

Vancouver, B. C.—Seattle and Kansas capitalists have purchased, through A. D. Goldstein, of this place, a property with 200 feet water frontage on the north shore of False Creek, east of the Westminster avenue bridge, on which they will erect a large grain elevator.

Calgary, Alta.—The International Harvester Company will in the near future erect a four-storey solid brick warehouse, 75 by 120 feet, on Tenth avenue.

Saskatoon, Sask.—The International Harvester Company has had plans prepared for a large warehouse to be erected at this place. The building will be 100 by 110 feet, three storeys and basement in height and will be of brick construction, faced with pressed brick.

Revelstoke, B.C.—Messrs. P. Burns & Co.'s cold storage warehouse has been destroyed by fire. Loss not stated.

Toronto.—The members of the Hydro-Electric Commission have awarded contracts for the equipment for the transmission line, to the Westinghouse Company of Hamilton, and the General Electric Company of Peterboro.

Montreal, Que.—Architects Mitchell & Creighton, Inglis Building, have awarded to H. H. Willetts, 1154 Ontario St., East, the contract for the electrical work in the new Lyman warehouse on St. Paul St.

North Vancouver, B.C.—The British Columbia Electric Railway Company will rebuild the transmission lines, carrying them up Lynn Creek. New transformers will be installed in the substation, and also a new transformer giving double power to the street lighting system. Mr. A. G. Perry is local manager of the Company.

Bridges, Wharves and Subways

Toronto.—The City proposes to expend the sum of $16,880 on the Island maintenance this year; $42,950 for permanent works; and $24,700 for concrete bridges. The estimates will be taken up by the Island Committee.

Niagara, Ont.—The Fort Erie and Buffalo Bridge Company will apply to the Dominion Parliament for articles of incorporation for the purpose of constructing, maintaining and operating a general traffic highway bridge over the Niagara River, beginning at a point on the Niagara River, within the corporate limits of the Village of Fort Erie, and extending to a point at or near Ferry St., Buffalo, N.Y.

Montreal.—The Canadian Pacific Railway will in all probability erect a number of steel bridges along the main line of the Pacific division, and on some of the branches of the interior.

Montreal, Que.—A. D. Swan, C.E., who was chief engineer of the new Bristol, England, docks, has been appointed resident engineer of the new Montreal harbor works, which it is expected will cost about $20,000,000. The plans will be submitted to the Minister of Marine before the end of the present session, but in all probability the work of construction will not be commenced until the spring of 1910.

St. John, N.B.—Mr. F. W. Holt has been engaged to prepare plans and specifications for a bridge across the harbor. It is expected that the plans will be completed so that the matter may be presented to the local legislature at the coming session.

Fredericton, N. B.—It is estimated that $100,000 will be spent in repairing bridges throughout the province, which were damaged by the recent freshet. Chief Commissioner of Public Works Morrissy may be addressed.

Fredericton, N. B.—Chief Commissioner Morrissy has awarded the following contracts: Brown's Flats high water wharf, to G. W. & B. R. Palmer, of Kars; McFarline bridge, parish of Sussex, to A. E. Syme, of Albert County.

Vancouver, B. C.—A deputation representing Vancouver city, North Vancouver, and a number of suburban districts, will wait upon the Government at Victoria, with a petition for the building of a bridge across the Second Narrows of Burrard Inlet, at the Government's expense. Plans have been prepared by Architect Cameron, and will be presented to the Government, for both a high level and a low level bridge. The cost of a high level bridge would not exceed $750,000.

Edmonton, Alta.—The City Commissioners will in the near future tape up with the Dominion Government the question of enlarging the Saskatchewan bridge.

Clover Bar, Alta.—A petition, signed by 190 residents on both sides of the North Saskatchewan river, at Clover Bar, asking for better traffic accommodation across the Saskatchewan, has been filed with the Edmonton Board of Trade. The petition will be forwarded to the City Council of Edmonton, and thence to the Provincial Government.

Waterworks, Sewers and Canals

Hamilton, Ont.—At a meeting of the Fire and Water Committee, it was estimated that $53,840 will be required for the Waterworks Department for the following improvements: Beach pump house, $25,975; high level pump house, $3,735; Barton reservoir, $1,320; James street reservoir, $300; filtering basin, $800; sand pump, $500; high level reservoir, $800; inspecting, etc., $14,300; office, $5,700; telephones, $410. It is estimated that $67,000 will be required for waterworks construction to include extension of mains, $35,000; new services, $20,000; meters, $3,000; conduit valves, $3,000; filtering basins, $2,000; crib work at filtering basin, $2,000.

Meaford, Ont.—The ratepayers have passed a by-law authorizing the installation of a waterworks filtering basin.

Simcoe, Ont.—The ratepayers have passed a by-law authorizing the installation of a waterworks system.

Burlington, Ont.—The ratepayers have passed a by-law authorizing the installation of a waterworks system.

Beamsville, Ont.—Messrs. J. Ritchie & Company have been awarded the contract for the new Lindsay locks and dam.

Hull, P. Q.—The Hull Council will extend the waterworks system, including the installation of new hydraulic pumps, and new main.

Halifax, N. S.—Orders have been given to the City Engineer to proceed at once with the laying of sewer and water pipes on Brussels street.

Winnipeg, Man.—H. N. Ruttan, City Engineer, has recommended that the old softening plant at well No. 2 be rearranged to provide a capacity of 5,000,000 gallons; that a new plant with $5,000,000 capacity be built at well No. 5; and that a third plant of 2,000,000 gallons capacity be located at well No. 6. The estimated cost of providing the three plants would be $150,000.

Winnipeg, Man.—The Board of Works has under consideration the construction of an immense trunk sewer to carry off all the sewage west of the Red and north of the Assiniboine, to a point north of the city limits. The proposed work, it is estimated, will cost several millions.

Edmonton, Alta.—The Roberts Filtration Company, of Philadelphia, Pa., has been awarded the contract for the installation of a filtration plant, at cost of $16,500.

Railway Construction

Ottawa.—The estimates for the coming year, as placed on the table of the House of Commons, include the following items for the Intercolonial Railway, viz.: Increased accommodation at Truro, $52,000; cut-off line at Moncton, $50,000; increased accommodation at Halifax, $180,000; locomotive and car shops at Moncton, $400,000; to increase accommodation and facilities along the line, $100,000; improvements at Campbellton, $50,000. For the Prince Edward Island Railway there is an appropriation of $194,000 to increase accommodation at Charlottetown.

London, Ont.—The Grand Trunk Railway is having plans prepared for the elevation of the tracks through the city, and also for the erection of a new station.

Sarnia, Ont.—The Northern Navigation Company, which will in future be known as the Grand Trunk Route, will erect a terminal station at this place. C. H. Nicholson is general traffic manager of the company.

Temagami, Ont.—The T. & N. O. Railway station at this place has been destroyed by fire. The building was just completed about a year ago, at a cost of $15,000. It will be rebuilt at once.

Toronto.—The Toronto Railway Company will erect new brick and concrete car barns on its property on the west side of Lansdowne avenue. Work on the building, which will be 100 by 350 feet, will be commenced this spring.

Montreal.—Plans are being completed, and arrangements are under way by the Canadian Pacific Railway, for the carrying out of the long projected improvements to their Windsor street headquarters, which will mean an expenditure of over a million dollars. It is understood that work will be commenced in the spring.

Montreal.—Mr. William Whyte, second vice-president of the Canadian Pacific Railway states that the company will expend the sum of $6,000,000 in construction work in the Western provinces, the plans including the building of some 300 miles of additional line. The most important piece of work will be the building of a new line north through Alberta from Lethbridge, parallel to Crow's Nest line.

Bonaventure, Que.—The Bonaventure Depot has been damaged by fire to the extent of $6,000.

Vancouver, B. C.—The Great Northern will expend the sum of three million dollars in the erection of terminals at this place.

Edmonton, Alta.—A five mile extension will be built to the street railway system during the present season.

Winnipeg, Man.—Tenders will be received at the office of the Commissioners of the Transcontinental Railway, Ottawa, up to noon, Mar. 10th, for the construction and erection complete, in accordance with the plans and specifications of the Commissioners, of shops east of Winnipeg. Plans, details and specifications may be seen at the office of Mr. Hugh D. Lumsden, Chief Engineer, Ottawa, Ont., and Mr. S. R. Poulin, District Engineer, Winnipeg, Man.

Winnipeg, Man.—The Grand Trunk Pacific Railway will, next month, commence the erection of a twelve-storey block at the corner of Portage avenue and Main street. On the ground floor will be the ticket, telegraph and freight offices, while the upper stories will be used for offices of the company and for rental.

Portage La Prairie, Man.—The C. P. R. roundhouse at this place has been destroyed by fire. Loss on building estimated at $5,000.

Public Buildings

Toronto.—In his estimates for the year the Park Commissioner asks for the sum of $310,540 for park maintenance, and permanent improvements. Among the most important improvements recommended are: Permanent shelter buildings at High Park, $7,500; new shelter at Riverdale Park, $8,000; at Riverdale zoo, new lion house, $4,500; bird and monkey house, $8,400; shelter building, etc., at St. Andrew's Square, $2,500; grading and completing section of sea wall and boulevard, near foot of Dufferin street, $10,000, etc. etc.

Toronto.—The Property Commissioner has asked for the following interim appropriations: Public buildings, $7,000; general markets, $4,500; City Hall, $13,000; cattle market, $5,000; city wharf buildings, $200, etc.

Toronto.—The Board of Control will recommend to the City Council that tenders be called for in the near future for the erection of the new Transportation building to be built at the Exhibition Grounds. It will cost $86,000.

Elora, Ont.—The ratepayers have voted in favor of the erection of a new public library.

Strathroy, Ont.—A new armory will be erected here at a cost of $5,000.

Leamington, Ont.—Messrs. Leslie and McNeil, St. Marys, Ont., have been awarded the general contract for the erection of the new post office at Leamington, Ont.

Milverton, Ont.—Mr. Andrew Carnegie has agreed to donate to the village of Milverton the sum of $7,000 for the er-

section of a public library building, with music hall, providing the village will supply a suitable site.

Lindsay, Ont.—The County Council has approved of the plans of architect G. M. Miller, Toronto General Trusts Building, Toronto, for the proposed enlargement and interior improvement of the Registry Office. The improvements will cost approximately $7,000.

Mount Forest, Ont.—The ratepayers have voted in favor of erecting a new public library.

Dundas, Ont.—The Dominion Government will erect a new post office at this place. The building will cost between $35,000 nnd $45,000.

Montreal.—It is reported that the contract for the erection of the 65th Battalion's new armory, on Pine avenue, has been awarded to Messrs. Labelle & Lessard, 1018 St. Urbain street.

Montreal, Que.—Architect W. E. Doran, 180 St. James street, has awarded to C. E. Teakin, 11 St. Sacrament street, the contract for the erection of the United States Immigration Offices.

Quebec, P. Q.—Plans have been prepared for a new branch post office to be erected in Quebec east, at estimated cost of $93,000.

Woodstock, N. B.—The Building Committee of the municipality of Carleton will receive tenders up to February 20th for the erection of a brick court house in the town of Woodstock, during the summer of 1909. Henry A. Phillips, Chairman Building Committee, Woodstock, N. B.

Winnipeg, Man.—The Winnipeg Horse Show Association has had plans prepared for a large amphitheatre to be erected in the near future.

Vancouver, B. C.—The management of the Vancouver Horse Show has taken out a permit for the erection of a new building, on Georgia street, to cost $45,000.

Fernie, B. C.—At a meeting of the City Council it was decided to at once call for tenders for the erection of the Municipal Building, at this place.

New Westminster, B. C.—Tenders will be called for in the near future for the erection of a Land Registry Office, at this place.

Calgary, Alta.—An additional $50,000 will be required to complete the City Hall. The extra amount will be used for the raising of a tower, installing an elevator, and equipping a laboratory.

Strathcona, Alta.—The Market Committee of the City Council, composed of Aldermen Tipton, Elliott, and Duncan, are taking up the question of the proposed new market building.

Saskatoon, Sask.—Messrs. Smith Bros. & Wilson, Regina, have been awarded the contract for the erection of the land titles building at this place. The contract price is $26,700. Work on the building will be started in the spring.

Battleford, Sask.—The Dominion Government will in all probability erect a post office and Dominion Lands Office at this place.

Business Buildings

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for two two and a half storey stores and dwellings to be erected on Bloor street, near Bathurst street, at a cost of $5,000. The building will be of brick construction, with brick foundation, felt and gravel roof, pine floors and interior finish, open plumbing, hot water heating, combination lighting.

Toronto.—Mr. W. S. Walker, 627 Palmerston avenue, will erect a three-storey store and dwelling on Bloor street, near Palmerston avenue, at a cost of $4,000. It will be of brick construction, with stone foundation, felt and gravel roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, metal ceilings, plate glass, art glass, leaded glass, electric bells, mantels. Jos. Walker is the architect.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has prepared plans for a three-storey store and dwelling to be erected on Sorauren avenue, near Wright avenue, at a cost of $3,500. It will be of brick construction, with stone foundation, felt and gravel roof, pine floors and interior finish, open plumbing, combination lighting, hot air heating, electric bells and mantels. Mr. Wright, 220 Sorauren avenue, will receive tenders.

Toronto.—Major A. G. Peuchen has purchased the property at No. 177 King street west, on which will be erected a large office building for the Standard Chemical Company, Manning Chambers.

Ottawa, Ont.—Plans are being prepared for a large office building to be erected by Messrs. Ahearn and Soper, on their property, which extends from Sparks to Queen streets. It is proposed to erect a fireproof structure, with a frontage of 66 feet and depth of 200 feet, six stories in height. In all probability work on the building will be commenced next summer.

Hamilton, Ont.—Architect Chas. Mills has completed plans for a large store building to be erected on John street south. The building will be commenced in the spring, and will be occupied by the Mills Hardware Company.

Ottawa, Ont.—Mr. Thomas Smith has taken out a permit for a brick veneer building to be erected on McLeod street, at a cost of $12,000.

London, Ont.—Contracts have been awarded as follows for alterations to the London Loan and Saving Co.'s offices: Masonry, Scott Murick; carpentry, Tambling & Jones; painting, Lewis Bros.; vault of enamelled brick, tile floor, hardwood office fixtures, Barton Netteg, Windsor. Architect, Wm G. Murray. Cost of improvements, $8,000.

Cobalt, Ont.—Messrs. Couture & Aubrey have been awarded the contract for a three-storey store and office building to be erected for The Nipissing Stores Company. The structure will be of frame construction, with cedar foundation, Carey roofing, steam heating, electric lighting. W. R. Graham is the architect.

Montreal.—Mr. Jacob Jacobs has purchased the property at the corner of St. Catherine and St. Alexander streets, on which he will erect a large building to be used either for commercial purposes, as a hotel building.

Montreal.—Architect Jos. Sawyer, 407 Guy street, has prepared plans for a two storey hall to be erected in St. Henry, for Mr. A. Delorme, Laporte avenue. The building will be of stone construction, with stone foundation, gravel roof, hot water heating, and electric lighting.

Montreal.—Architect Eric Ham, 30 St. John street, has prepared plans for the erection of a six-storey stone front to the premises of the John D. Ivey Co., Ltd., 240 Notre Dame street west.

Montreal.—It is reported that Mr. David Ogilvy will prepare the plans and supervise the construction of the departmental store to be erected by Messrs. Jas. A. Ogilvy & Sons, on the corner of St. Catherine street west and Mountain street. Approximately $400,000 will be expended.

Montreal, Que.—Jas. E. Wilder has purchased two blocks of property on the corner of Bleury and Ontario streets, which will, in all probability, be used as the site for the new store for W. H. Screggie, Ltd.

Montreal.—Architect J. E. Huet, 260 St. James street, has prepared plans for the erection of new offices for Mr. Rudolphe Forget, at corner of Notre Dame and St. Xavier streets.

Winnipeg, Man.—Mr. T. D. Farmer, a Hamilton capitalist, has purchased the property next to the new Bank of Montreal, on Main street, on which he will erect a new block.

Winnipeg, Man.—Plans have been prepared by Architect J. G. Russell, for a twelve-storey, fireproof office building, to be erected on Portage avenue, between the Hotel and the new Nanton block, for Mr. J. D. McArthur. The work of construction will be commenced within the next two months.

Winnipeg, Man.—Mr. C. H. Enderton, real estate dealer, will erect a business block at the corner of Portage avenue and Hargrave street. Plans for the building are being prepared.

Winnipeg, Man.—The Great Life Assurance Company has acquired the property on the northwest corner of Lombard and Rorie streets, on which they will erect a building to cost $150,000.

Vancouver, B. C.—Messrs. Douglas & Thorley have had plans prepared for the erection of a three-storey structure on Granville street. The building will be 50 by 120 feet, and will cost about $20,000. Parr & Fee are the architects.

Vancouver, B. C.—Architects Parr & Fee have prepared plans for a three-storey building to be erected at the corner of Hornby and Dunsmuir streets, for Messrs. Gordon & Campbell. The building will be 50 by 120 feet and will cost $25,000.

Vancouver, B. C.—Architect Parr & Fee have prepared plans for a large building, to be known as the Codson block, to be erected on Beatty street. It will be three storeys in height, 50 by 120 feet, and will cost $50,000.

Vancouver, B. C.—Mr. A. Filion purposes erecting two additional storeys and an extension to the rear of his brick store building on Carrall street. The improvement will cost $15,000.

Vancouver, B. C.—Messrs C. S. Douglas & Co. have taken out a permit for the erection of a business building on Cordova street. The structure will be of mill construction, and will cost $22,000.

Vancouver, B. C.—Mr. Samuel Burris has taken out a permit for the erection of a brick business building at 904 Davie street, to cost $15,000.

Vancouver, B. C.—Architects Parr & Fee have prepared plans for a three-storey and basement building to be known as the Fuller block, to be erected at a cost of $15,000.

Vancouver, B. C.—The National Finance Company has taken out a permit for the erection of a business block at the corner of Westminster avenue and Barnard street, at a cost of $30,000.

Victoria, B. C.—The British-American Trust Company, Ltd., have purchased the Redfern block, Government street, on which site they will erect a large modern office building.

Calgary, Alta.—Messrs. Tees and Persee have had plans prepared for a four-storey solid brick building, to be erected in the rear of the Brock warehouse, on Second street.

Strathcona, Alta.—Plans are being prepared for a three-storey brick store and office block to be erected on Main street, near Whyte avenue, for Mr. Henry Harvey. The building will have two large stores on the ground floor and offices and living rooms on the second and third. It will cost between $15,000 and $20,000.

Prince Albert, Sask.—Plans are being prepared for three business blocks to be erected in the vicinity of the City Hall, for Mr. D. Agnew, Mr. Andrew Holmes and Mr. G. W. Baker.

Prince Albert, Sask.—Mr. T. Baker has purchased property on Central avenue on which he will erect a large business block.

Banks

London, Ont.—The Dominion Bank has purchased the property at the N. E. corner of Dundas and Richmond streets, on which they propose to erect a new building.

Hamilton, Ont.—The Imperial Bank has purchased the Glassco property, on which they will erect a large office building. Plans for the building have been submitted to the head office in Toronto.

Montreal.—The Quebec Bank, New York Life Building, has taken out a permit for the erection of a bank building at the corner of Atwater avenue and Notre Dame street. The building will be of pressed brick, with stone trimmings, stone cornice, tar and gravel roof, concrete foundation, hot water heating. Architects, Cox & Amos, 112 Mansfield street. Contractors, Peter Lyall & Son, Board of Trade Building. It will cost $10,500.

Winnipeg, Man.—The contract for the erection of the head office of the Rolay Bank of Canada, at this place, will be awarded shortly and the work of construction commenced as soon as weather permits.

New Westminster, B. C.—The Bank of Commerce, on Columbia street, has been damaged by fire. Loss not stated.

Prince Albert, Sask.—The Imperial Bank has had plans prepared for the erection of a new block opposite the City Hall.

Clubs and Societies

Toronto.—The I. O. O. F. Hall Association has purchased the property at 229 College street, on which they will erect a new lodge building, to cost at least $60,000. The plan is to erect a hall hold-

ing several lodge rooms, and office apartments. John T. Hornibrook, President of the Association; Geo. A. Kingston, secretary-treasurer.

Toronto.—The Young Men's Christian Association have commenced a campaign to raise funds for the erection of a new building to replace the structure at the corner of Yonge and McGill streets. Mr. E. R. Wood is the chairman of the committee having the arrangements in hand.

Ottawa, Ont.—The Rideau Club has asked the Legislature for permission to issue $250,000 debentures, to redeem old debentures and make additions to their clubhouse.

Hamilton, Ont.—At a meeting of the Y. W. C. A. directors it was practically settled that a new building be erected on the present site, at cost of $35,000. The plans make provision for sixty rooms and a gymnasium.

Belleville, Ont.—Mr. A. H. Kerr, of Ottawa, purposes to erect a large yacht club house in the harbor just west of Victoria park, at this place.

Montreal.—It is reported that a new club house will be erected on the N. A. A. A. grounds at a cost of $50,000. A new grand stand will in all probability, also be built.

Bonaventure, P. Q.—Architects Ouellet & Levesque, 115 St. John street, Quebec, P. Q., have prepared plans for a frame club house to be erected here for Cercle Pie. The building will be two and a half storeys in height and will cost $12,000.

Saskatoon, Sask.—The Saskatoon Club will erect a $10,000 building sometime during this year.

Moose Jaw.—The Y. M. C. A. will erect a new association building this spring. R. E. Manley is the local secretary.

Asylums and Hospitals

Toronto.—Mr. Ambrose Kent, President of the Toronto Home for Incurables, has filed with the Provincial Government plans for the proposed extensions to the building, including a new wing, facing on Dunn avenue, to be three storeys in height; and a nurses' home, to be built on the west end of the building, to face Close avenue. The cost of the two additions is $70,000, towards which the city has granted $50,000.

Toronto.—The Building Committee of the Western Hospital have instructed Architect E. J. Lennox, 164 Bay street, to prepare plans and call for tenders for the first large section of the new hospital to be erected on Bathurst street. This section will be three stories in height and will cost about $150,000.

Toronto.—The Board of Health has approved Dr. Sheard's proposal that the Isolation Hospital be enlarged at an estimated cost of $60,000.

London, Ont.—The sum of $6,300 has been subscribed towards the fund for the erection of a sanitorium at this place.

London, Ont.—Chairman Niven, of the Board of Health, will ask the City Council to set aside $2,500 for the erection of an addition to the smallpox hospital.

Montreal.—Architects Mitchell & Crighton, Inglis Building, have prepared plans for alterations to the Protestant Infants' Home, recently purchased by Frank H. Norman. The building will be used as a dance hall.

Quebec, Que.—It is understood that Architects Stopes & Fuerstman, Saranac Lake, N. Y., are preparing plans for the erection of two sanitariums, one at St. Agaths, to be called "The Montreal," and the other at Quebec, to be called "The King Edward."

St. John, N. B.—About $100,000 will be expended in repairs, new buildings, etc., at the Provincial Hospital, which was recently badly damaged by fire. A separate building of brick and stone will be erected for the heating and lighting plant, and laundry. The wing of the main building, which was destroyed will be rebuilt. It is also expected that new boilers will be installed in the engine room. Plans for the proposed work will be prepared at once.

St. John, N. B.—The Provincial Government has promised financial aid towards the construction of a tuberculosis hospital at this place.

Winnipeg, Man.—The Hospital Commission has made a report recommending that the General Hospital be enlarged.

Ninette, Man.—At a meeting of the Board of Trustees it was decided to locate at Ninette the proposed Manitoba sanitarium for tuberculosis.

Residences and Flats

Toronto.—Architects Simpson & Young, 17 Toronto street, have prepared plans for a three-storey apartment house to be erected on King street west, at a cost of $30,000. The building will be of brick construction, with felt and gravel roof, pine floors, Georgia pine interior finish, open plumbing, electric lighting, steam heating, staved columns, plate glass, leaded glass and mantels.

Toronto.—Architects Simpson & Young, 17 Toronto street have prepared plans for a two and a half storey residence to be erected on Broadview avenue. It will be of brick construction, with slate roof, oak floors, hardwood and pine interior finish, open plumbing, hot water heating, electric lighting and mantels. Estimated cost $12,000.

Toronto.—The following contracts have been awarded for the erection of a two and a half storey brick dwelling at the corner of Heath street and Dunvegan avenue, for Mr. Jas. Ince, 43 Front street east: Masonry, J. C. Claxton & Son, 311 Stair Building; carpentry work, F. Heal; roofing, Webb & Dunlop, 15 Kensington avenue; plastering, J. W. Nonson; painting and glazing, Faircloth & Co., Ltd., 64 Richmond street east; plumbing, Toronto Furnace Co., 72 King street east; heating, Joseph Harrison, 608 Yonge street; wiring, R. A. F. Gray. Chadwick & Beckett, 20 Toronto street, are the architects.

Toronto.—Architect J. W. Siddall, 75 Yonge street, is preparing plans for a two and a half storey residence to be erected on Roxborough street, at a cost of $20,000. The building will be of brick construction, with slate roof, oak floors, and interior finish, open plumbing, hot water heating, combination lighting, ornamental columns, plastic relief work, plate glass, leaded glass, electric bells, refrigerator, and five mantels.

Toronto.—Architect J. W. Siddall has prepared plans for a $5,000 two-storey brick dwelling to be erected on Park Place, near Indian road, for H. H. Halls. The building will have brick foundation, shingle roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, staved columns, electric bells and four mantels. The owner will supply materials for masonry work, and subiet all other trades.

Toronto.—Architect J. Hunt Stanford has prepared plans and specifications for two pairs of semi-detached, and one detached dwellings, to be erected on Margueretta street, at a cost of $7,000. The buildings will be two and a half storeys in height, of brick construction, with stone foundation, shingle roof, pine floors and interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a $6,500 residence to be erected on Forest Hill Road, near Heath street, for Mr. C. Pace, Shaw street. It will be of brick construction, with stone foundation, slate roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, electric bells and four mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a $7,000 residence to be erected on Palmerston Boulevard, for Mr. C. Baker. It will be of brick construction, with stone foundation, slate roof, hardwood floors, hardwood and pine interior finish, open plumbing, hot water heating, combination lighting, electric bells and four mantels. The owner will receive tenders.

Toronto.—Architect J. Hunt Stanford has prepared plans for a pair of two and a half storey dwellings to be erected on St. Clair avenue, near Poplar Plains road, for Mr. R. McLeod, Walmer road hill, at a cost of ..6,500. The building will be of brick construction, with brick foundation, slate roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, electric bells and four mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for two pairs of two and a half storey dwellings to be erected on Howard Park avenue, near Sunnyside avenue, for Mr. J. Gibson, 413 Deleware avenue, at a cost of $8,000. It will be of brick construction, with slate roof, pine floors, interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Toronto.—Architect J. A. Harvey, Manning Chambers, has prepared plans for a two-storey residence to be erected on Major street, near Lowther avenue, for Mr. S. G. Near, 27 Bellair street, at a cost of $4,500. It will be of brick construction, with slate roof, hardwood and pine floors, Georgia pine interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Toronto.—Architect J. A. Harvey has prepared plans and specifications for a two and a half storey residence to be erected on Lucas street, near Roncesvalles avenue, for J. S. Lougheed, Lucas street, at a cost of $2,800. It will be of brick construction, with brick foundation, shingle roof, pine floors and pine and hardwood interior finish, open plumbing, hot air heating, combination lighting and two mantels.

Toronto.—Architect J. A. Harvey has prepared plans for a two-storey apartment house to be erected at the corner of Havelock street and Sylvan avenue, for Mr. J. T. Hutson, 43 Victoria street. It will be of brick construction, with stone foundation, felt and gravel roof, open plumbing, hot air heating, combination lighting, pine floors, hardwood and pine interior finish, electric bells and mantels. Estimated cost $14,000.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for four attached two and a half storey stores and dwellings to be erected at 1550-6 Queen street west, for Mr. R. T. Smith, 1648 Queen street west. The building will be of brick construction, stone foundation, felt and gravel roof, hardwood and pine interior finish, open plumbing, hot air heating, combination lighting and electric bells. Estimated cost $8,000.

Toronto.—F. J. Hale, 74 Parkway avenue, will erect a two and a half storey dwelling on Thorold avenue, near Alhambra avenue, at a cost of $3,000. It will be of brick construction, with pine floors, hardwood and pine interior finish, open plumbing, hot water heating, combination lighting, electric bells and two mantels. Architect, J. H. Galloway, 77 Victoria street.

Toronto.—Architect W. G. Hunt, 255 Westmoreland avenue, has prepared plans for a two and a half storey residence to be erected on Deleware avenue, near Vanhorne street, for W. C. Clatworthy, 580 Deleware avenue, at a cost of $2,800. It will be of brick construction, with stone foundation, shingle roof, open plumbing, combination lighting, hot air heating, pine floors and interior finish and tile mantel.

Toronto.—Architect H. H. Wilmot has prepared plans for the erection of a two and a half storey dwelling on Woodlawn avenue, near Yonge street, for Mr. John Wilmot, 806 Yonge street, at a cost of $5,000. It will be of brick construction, with stone foundation, slate roof, hardwood and pine floors and interior finish, open plumbing, combination lighting, hot water heating, electric bells and mantels.

Toronto.—Architect J. Hancock has prepared plans for a pair of two-storey, semi-detached dwellings to be erected at 490-2 Givens street, for W. A. Nixon, 615 Crawford street. It will be of brick construction, with stone foundation, slate roof, hardwood and pine floors and interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantels. Estimated cost $4,000.

Toronto.—Architect T. Hancock, 836 Dovercourt road, has prepared plans for a pair of two-storey dwellings to be erected on Westmoreland avenue, near Hallam avenue, for H. H. Le Drew, 339 Concord avenue, at a cost of $4,000. It will be of brick construction, with brick foundation, hardwood and pine floors, pine interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Toronto.—The Designing and Draughting Co., 23 Jordan street, has prepared plans for a $4,500 brick dwelling to be erected on Indian Road, near Howard Park Road, for Mr. T. W. Murray, 41 Calendar street. The building will have hardwood and pine floors and interior finish, open plumbing, hot water heating,

combination lighting, electric bells and two mantels.

Toronto.—The Designing and Draughting Co. have prepared plans for a frame residence to be erected in Munro Park district for Mr. A. Brovan, 103 Charles street. It will have pine floors, pine and hardwood interior finish, open plumbing, hot air heating, combination lighting and brick mantel.

Toronto.—Joseph Hutchison, 317 Spadina avenue, has been awarded the general contract for a pair of two and a half storey dwellings to be erected on Huron street, between D'Arcy and Baldwin streets, for Mr. Geo. Lowe, 106 Huron street. The building will be of brick construction, with slate roof, hardwood and pine floors and interior finish, hot water heating, open plumbing, combination lighting, electric bells and mantels. Estimated cost of building, $5,000. Architect, H. G. Paull, 395 College street.

Toronto.—Architect E. G. Wilson, 77 Victoria street, has drawn plans for a two storey brick residence to be erected on Sorauren avenue, near Roncesvalles avenue, for Mr. Dinsmore at a cost of $3,000. It will have brick foundation, slate roof, pine floors and interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantel.

Toronto.—Architect E. G. Wilson has prepared plans for a brick residence to be erected on the south side of Langley avenue, near Broadview, for J. A. Gallagher, corner Langley and Broadview. It will have slate roof, hardwood floors, pine and hardwood interior finish, open plumbing, hot air heating,, combination lighting and electric bells, mantels.

Toronto.—Architect J. H. Cowan, 66 Adelaide street east, has prepared plans for a two and a half storey residence to be erected on Palmerston boulevard, near Harbord street, at a cost of $5,000. It will be of brick construction, with slate roof, open plumbing, hot water heating, combination lighting, oak floors and interior finish, electric bells and mantels.

London, Ont.—Mr. John Heyman has purchased the property at the corner of Wellington and Queen's avenue, on which he will erect a large apartment house.

London, Ont.—Messrs. Moore & Henry will erect a terrace of four residences, two storeys and basement in height, at the corner of Colborne and Queen's avenue, for Mr. Arthur McClary.

Ottawa, Ont.—Architect W. G. Hunt, 255 Westmoreland avenue, Toronto, has completed plans for a two-storey apartment house to be erected here for Mr. J. McMurchy, James street, at a cost of $8,000. It will be of brick construction, with pine floors and interior finish, open plumbing, hot air heating, combination lighting, dumb waiters, sidewalk lifts, telephone system and four mantels.

Weston, Ont.—Architect P. H. Finney 43 Victoria street, Toronto, has prepared plans for a two and a half storey dwelling to be erected here for Mr. Irwin, of Nobleton, Ont. It will be of brick construction, with concrete foundation, pine floors and interior finish, plumbing with septic tank, hot air heating, electric lighting, electric bells and one mantel.

Davisville, Ont.—Architect E. C. Wilson, 77 Victoria street, Toronto, has prepared plans for a two and a half storey residence to be erected here for Mr. Davis, at a cost of $4,000. The building will be of brick construction, with slate roof, hardwood floors, pine and hardwood interior finish, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Huntsville, Ont.—Mr. J. H. Johnson will erect a two storey residence at a cost of $3,500. It will be of frame construction, with pine floors and interior finish, open plumbing, hot air heating, electric lighting and mantels. J. H. Galloway, 77 Victoria street, Toronto, is the architect.

Bridgeburg, Ont.—Architect Leonard Foulds, 43 Victoria street, Toronto, has prepared plans for a two-storey residence to be erected here for Mr. John Jones, at a cost of $2,500. It will be of frame construction, with brick foundation, shingle roof, hardwood floors, pine interior finish, open plumbing, hot air heating, electric lighting and mantel.

Meaford, Ont.—Architects Ellis & Connery, Manning Chambers, Toronto, have prepared plans for a $3,000 residence to be erected here, for Mr. Geo. Carnahan. The building will be of brick construction, with oak floors, pine interior finish, open plumbing, hot air heating, electric lighting, electric bells and mantels.

Montreal, P. Q.—Architects Wright & Son, 204 St. James street, have completed plans for a three-storey apartment house to be erected on Crescent street, at a cost of $35,000. It will be of brick construction, with stone foundation, cement roof, plaster partitions, hot water heating, electric lighting, hardwood interior finish and two dumb waiters.

Montreal.—Messrs. Lynch & Sharp, 16 St. Sacrament street, have been awarded the contract for the erection of three houses, at the corner of Montrose and Clark avenue, Westmount, for Mr. A. D. Rosaire.

Montreal.—Architect J. E. Huot, 260 St. James street, Montreal, has prepared plans for the erection of a residence on St. Catherine Road, Outremont, for L. J. Beaubien.

Montreal.—A three-storey apartment building will be erected on Mountain street, for Mr. J. D. Duncan, 218 Mountain street. It will be of brick construction, with stone foundation, stud partitions, cement and gravel roof, pine and birch floors, pine interior finish, hot water heating, electric lighting, skylights and electric bells. MacVicar & Heriot, 104 Union avenue, are the architects.

Montreal.—Architects Brown and Son, 207 St. James street, have prepared plans for a $25,000 apartment house to be built on Major street. It will be of brick construction, with stone trimmings, concrete foundation, expanded metal lath partitions, gravel roof, birch floors, open plumbing, hot water heating, electric lighting, fire escapes, dumb waiters, skylights, metal lath an electric bells.

Montreal.—Architect Jos. Sawyer, 407 Guy street, has prepared plans for a three-storey building to contain stores and dwellings, to be erected at the corner of St. Catherine and Dufresne streets, for Mr. F. Harel. It will have stone walls, pine interior finish, electric lighting, open plumbing, hot water heating, metal ceilings, cornice, skylights, plate glass, prismatic glass, electric bells and refrigerator. Cost of building, $55,000.

Montreal.—Architect J. Perrault, 17 Place d'Armes Hill, has prepared plans for eight two-storey dwellings to be erected on Park avenue, near Bernard for Mr. J. M. Derion, 950 Park avenue. The buildings will be of brick construction, with stone foundation, plaster partitions, gravel roof, gas and electric lighting, hot water heating and electric bells. Estimated cost of buildings, $18,000.

Montreal.—Architects Finley & Spence, Guardian Building, are preparing plans for an apartment house, to be known as the "Seaforth," to be erected on Cote des Neiges Road. G. W. Badgley, 124 St. Peter street, Montreal, is promoting the company which will erect the building.

Montreal.—Architects Saxe and Archibald, 59 Beaver Hall Hill, have completed plans for the erection of a residence in Westmount for Mr. Scott.

Montreal.—Architects Saxe and Archibald, 59 Beaver Hall Hill, have prepared plans for a residence to be erected in Westmount for Mr. Fraser.

Montreal.—Architect J. E. Knot, 260 St. James street, has prepared plans for two two-storey residences, to be erected in Outremont, St. Catherine Road, for Messrs. C. P. Beaubien and E. G. Beaubien, of Montreal. They will be of brick and stone construction, with red birch, chestnut and pine interior finish, hot water heating, combination lighting, plumbing and dumb waiter.

St. Zotique, Que.—Architect J. E. Huot, 260 St. James street, Montreal, has completed plans for a country residence to be erected at St. Zotique, Soulanges County, for Mr. N. Corbeau.

Moncton, N.B.—Mr. William Stone will shortly erect three houses on the upper end of Cornhill street.

Moncton, N.B.—Mr. Collingwood Clark will erect a two-storey residence on Austin street, and Mr. W. G. Jones will build at least twelve new buildings on the Mount View Estate.

Brandon, Man.— A company of capitalists has decided to erect a large apartment building at this place in the near future. A. H. Bartlett is the local representative of the promoters.

Vancouver, B.C.—Architects Parr & Fee have prepared plans for a three-storey and basement structure to be known as the Banfield Building, to be built at the corner of Bute and Melville streets. It will be utilized for stores on the ground floor and tenement apartments above. Estimated cost, $40,000.

Saskatoon, Sask.—Mr. R. N. Baldwin will erect a three-storey tenement block on Second avenue, near the Empire hotel.

Fire Stations and Jails

Toronto.—In his estimates for the year 1909, the Civic Property Commissioner asks for the sum of $464,500 for the following improvements: Fire hall at East Toronto, fire hall at College Heights, fire hall in vicinity of Bathurst and Dupont streets, fire hall in vicinity of Perth avenue and Bloor street, four police and patrol stations, approximate cost, $33,000 each; public building, $21,978; registry office, $1,160; general markets, weigh scales, etc., $16,279; cattle market, $35,195; city hall maintenance, $51,178.

Ottawa, Ont.—The Fire and Light committee recommends rebuilding No. 6 fire station, which was destroyed by fire, rebuilding No. 4 station, and the erection of an entirely new station, to be known as No. 10, in Ottawa South.

Hamilton, Ont.—A new police station will be erected in Hamilton at a cost of $6,000.

Opera Houses and Rinks

Montreal.—Architects Mitchell & Crighton, Inglis Building, have prepared sketch plans for the erection of a vaudeville theatre on Bleury street for the Blumenthal Estate.

Gananoque, Ont.—The Turner block, corner King and Stone streets, owned by W. Y. Boyd, and the Grand Opera House block adjoining, owned by W. G. Rogers, Gananoque, have been destroyed by fire. Loss estimated at $110,000. The Grand Opera House was a concrete block building valued at $30,000.

St. John, N.B.—Plans have been prepared by Architect F. Neil Brodie for remodelling the theatre building of F. G. Spencer.

Chatham, N.B.—The Chatham Curlers propose to erect a new curling rink, towards which the sum of $1,100 has been subscribed. A committee composed of Messrs. F. M. Tweedie, R. A. Snowball, and A. McKinnon, has been appointed to solicit additional subscriptions.

Hotels

Edmonton, Alta.—Plans have been prepared by E. C. Hopkins and Edmund Wright, associate architects, for a large addition to be built to the Castle Hotel. The present building will also be remodelled and made to correspond with the new additions. The building will be of solid brick with stone trimmings, and will have a frontage of 100 ft. on Second street and 150 ft. on Athabasca avenue. Passenger and freight elevators will be installed, and telephone connection with each bedroom will be provided. The corridors on each floor and the main staircase will be made fireproof. The improvement will cost $100,000. Mr. J. A. Hendry is manager of the hotel.

Vancouver, B.C.—Plans have been prepared by Architects Parr & Fee for a seven-storey hotel building to be erected at the corner of Howe and Hastings streets for Messrs. Bauer & Harrison. It will be 78 by 120 feet, of steel and concrete construction, and will cost approximately $150,000.

Star City, Sask.—The Star City Hotel at this place has been destroyed by fire. Loss estimated at $5,000, partly insured.

Ottawa, Ont.—Mr. Wainwright, of the Grand Trunk Railway, announces that the company will build a hotel on Major Hill Park, commencing work on the first of May.

Kingston, Ont.—Extensive improvements will be made to the Hotel Frontenac. Plans have been prepared for the erection of an arcade between Ontario and King streets, connecting the Frontenac with the British American. Bath rooms will be connected with each suite of rooms; the hotel will be fitted with an elevator, billiard room, library, bowling alley, etc.

Park Laval, Que.—The Hotel Berthelet has been damaged by fire to the extent of $15,000.

Peterboro, Ont.—Mrs. W. H. Graham's summer resort "Viamede" at Stony Lake, Ont., which was recently destroyed by

fire, will be rebuilt at once. It is expected to have the buildings ready for the tourist season this coming sumemr.

Sydney.—E. LeRoy Wills announces the formation of a syndicate of prominent Montreal and Sydney capitalists, with capital of $150,000 for the purpose of enlarging and reorganizing the Sydney Hotel. The new addition will extend along Charlotte street, and will provide for at least twenty sample rooms and additional parlors and bedrooms. Salt water baths will be installed.

Moncton, N.B.—The Brunswick House has been damaged by fire to the extent of $4,000.

St. John, N.B.—It is stated that Messrs. Raymond & Doherty, St. John, have purchased the property on Germain street belonging to the estate of the late James Reynolds, with a view to enlarging the Royal Hotel.

Churches

Toronto.—The congregation of St. Aidan's Anglican Church, Balmy Beach, will commence the erection of a new church building in April.

Toronto.—The Parkdale Congregational Church, at the corner of Brock avenue and Maple Grove, has been practically destroyed by fire.

West Toronto, Ont.—The congregation of the Royce avenue Presbyterian Church will in all probability erect a new edifice on a site west of Dundas street.

Ottawa, Ont.—At the Official Board Meeting of the Bell street Methodist Church a resolution was passed that more accommodation was necessary. The congregation is undecided as to whether it will build a new church and hall or just a Sunday School hall. Rev. J. E. Lavety is the pastor.

Ottawa, Ont.—At the annual meeting of the McKay Presbyterian church it was announced that plans had been prepared for a new edifice which is to be erected this coming summer.

Woodstock, Ont.—At the annual congregational meeting of Chalmers Church the following committee was appointed to take up the matter of the erection of a new church building: Messrs. Jas. W. Innes, Wm. Matheson of the Governor's Road West, John Weir, Hugh McDonald, Wm. Amos, Pierce Irving, R. W. McPherson, Jas. Forbes, Geo. A. Mason and Allan Virtue. Rev. Dr. Dickie, pastor.

Port Colborne, Ont.—The interior of the Presbyterian church has been badly damaged by fire.

London, Ont.—The congregation of St. Andrew's Church is contemplating making extensive improvements to the church and manse. Rev. Dr. Ross is the pastor.

Renfrew, Ont.—The Baptist Church has been badly damaged by fire. Loss not stated.

Ingersoll, Ont.—At a meeting of the Quarterly Board of King street church the plans for the proposed remodelling of the church were accepted.

Lindsay, Ont.—The sum of $3,000 will be expended on interior decoration to St. Mary's Church. Bishop O'Connor or Archdeacon Casey may be addressed.

Deer Park, Ont.—Plans for a new building to replace Christ Church, Deer Park, one mile from Toronto, have been submitted to the Anglican Young People's Association of that church. The building it is estimated will cost $20,000.

Windsor Mills, Que.—The congregation of St. George's Church have had plans prepared by Architect C. E. White, Sherbrooke, Que., for the erection of a new church. The building will be of frame construction, exterior walls to be covered with cement over metallic lath, interior to be finished in plain oak, stained leaded glass, etc. Work of construction will be commenced as soon as weather permits.

Newport, Que.—The Roman Catholic Church at this place has been totally destroyed by fire. Loss not stated. Rev. Father Laurent is the pastor.

Port Essington, B.C.—St. John's Church, which was recently destroyed by fire, will be rebuilt. The building was valued at $3,000, with insurance of $1,000. Rev. Walter Ruchwork is the pastor.

Calgary, Alta.—At the annual meeting of Knox Presbyterian Church it was decided to purchase two lots on the corner of Fifteenth avenue and First street west for the purpose of erecting a new edifice. Trustee, Hugh Neilson; Board of Managers, W. N. Connacher, chairman; J. T. Macdonald, secretary; William Stuart, William Carson, T. Allan, W. D. Thornton.

Lethbridge, Alta.—The congregation of the Baptist Church is contemplating the erection of an addition to their church this year.

Schools and Colleges

Toronto.—Architects Darling & Pearson, 2 Leader Lane, are revising the plans for the Faculty of Education and Pedagogy buildings, which will be erected this year, on a smaller scale than previously intended.

North Toronto.—A by-law has been passed providing for the issue of debentures to the amount of $13,000 for the purpose of enabling the School Board to make additions and alterations to the school house in Eglinton East Ward.

Oshawa, Ont.—The ratepayers have voted the sum of $20,000 for a new high school and also in favor of the county roads scheme.

Stratford, Ont.—At a meeting of the Collegiate Institute Board a motion was carried to authorize the city architect to submit pencil sketches and suggestions for the erection of a four room addition to the Collegiate Institute.

Ottawa, Ont.—At a public meeting of the residents of Westboro, Woodroffe and Ottawa west, it was decided to erect a school building at Westboro and a smaller building at Woodroffe, to be completed by Oct. 1st; cost not to exceed $18,000.

Ottawa, Ont.—Architects Weeks and Keefer have prepared plans for the Ashbury College building to be erected at Rockcliffe Park, at the rear of the former residence of Lord Dundonald. The building will be fireproof throughout.

Ottawa, Ont.—The Separate School Board will in all probability erect two new school buildings this year.

St. Mary's, Ont.—Plans have been prepared for a two-storey stone school building, 104 by 80 ft., to replace the present structure. The building will have slate roof, and will be heated and ventilated by means of fresh air driven over steam coils, and distributed throughout the building by means of fans.

St. Thomas, Ont.—The ratepayers of S. S. No. 13 have decided to erect a two-room brick school building at Paddon's, Yarmough Heights, near St. Thomas, Ont. The plans, as prepared by Architect Neil R. Darrach, St. Thomas, provide for a two-storey building to cost approximately $4,500.

Flesherton, Ont.—The ratepayers of the rural districts propose to erect a high school in Flesherton, Ont.

Port Arthur, Ont.—Competitive plans have been invited for a collegiate building to be erected on the present site of the high school. The building to be faced with grey sandstone and brick lined; to contain seven class rooms, also provide for typewriting, physics, chemistry, assembly hall, staff rooms, domestic science, manual training and storage, ventilation, mechanical draft and stack heaters, etc., automatically regulated steam heating. Separate gymnasium in rear of collegiate, government standard, with basement. Total cost, $60,000, allowing $15,000 for gymnasium, heating, plumbing, ventilation and equipment. Plans to be submitted by Feb. 20th.

Norway, Ont.—Brother Edward, of the De La Salle Institute, Toronto, is looking after the purchase of a site for a preparatory school for the Brotherhood, to be located at this place.

Scarboro, Ont.—At a meeting of the Scarboro Ratepayers' Association, a deputation consisting of William Kelly, W. Stewart, F. Hallt, F. Baskerville, T. S. Cumber and Wm. Burns, was appointed to wait on the Scarboro Township Council, at its next session, to present a petition for the erection of a public school building.

London, Ont.—Architect Wm. C. Murray has prepared plans for a two-room building and also for a four-room structure to be erected on Chelsea Green. The first building will be one storey in height, with felt and gravel roof, hot air heating. Estimated cost, $4,000.

London, Ont.—A proposition is before the Board of Education regarding the erection of a technical school in conjunction with the collegiate. The committee has been instructed to have estimates and rough plans prepared for the building.

Montreal.—The plans for the new technical school have been submitted to the Provincial Government, and accepted. The working plans are now being prepared, and it is expected that tenders will be called for shortly. Messrs. John S. Archibald and Maurice Perreault, associate architects.

Montreal.—A bill to provide for the raising of increased revenue for the building of schools and for the enlargement of some of the present school buildings will be presented at the coming session of the Quebec Legislature, by the Protestant Board of School Commissioners.

Montreal.—The Royal Arthur School has been partially destroyed by fire. The loss will amount to about $10,000.

Montreal.—At a meeting of the managers of the Technical Institute, Sherbrooke street, it was decided to make an addition to the building. A second room, to be fully equipped with electrical apparatus, to accommodate one hundred students, will be built.

Hull, Que.—The Fathers of the Holy Ghost, who conduct an agricultural college on the old Alonzo Wright property, near Hull, purpose enlarging their institution. They will make application at the next session of the Quebec legislature for power to maintain schools for the purpose of giving religious, industrial and agricultural instruction, to establish model farms, butter and cheese factories, etc. It is proposed to incorporate under the name of "The Agricultural and Industrial Corporation of the Missionaries of the Holy Ghost," for the purpose of possessing and acquiring immovable property not in excess of $400,000.

Halifax, N. S.—Messrs. Faulkner & McDonald have been awarded the contract for the erection of a large addition to the Convent of the Sacred Heart. The plans, prepared by Architect H. E. Gates, call for a pressed brick building of three storeys, 100 x 40 feet, with basement, foundation walls and trimmings of granite. French slated roof. The building will be commenced in April.

Sydney, N. S.—The Special Committee appointed to report to the School Board regarding proposed new county academy, recommends the construction of a new and thoroughly modern academy with as little delay as possible. It is estimated that the sum of $50,000 would be required.

Newcastle, N. B.—Tenders will be received up to 12 o'clock noon, Mar. 1st, for the erection and completion of a stone addition to Harkins' Academy, according to plans and specifications prepared by Harry H. Nott, architect, St. John, N. B., and which may be seen at the office of the architect, and on application to J. E. T. Lindon, secretary to Board of School Trustees, Newcastle, N. B.

Winnipeg, Man.—The School Board is negotiating for a site on which to erect a new Collegiate Institute. The building will contain thirty rooms, and will cost approximately $200,000.

Vancouver, B. C.—The Board of Trustees have selected a site for the new high school building, for which $45,000 has been appropriated. Plans for the building will be prepared at once. It is expected to have the building ready for ocupancy by August 15th.

Edmonton, Alta.—Architect Roland W. Lines has been instructed to prepare plans for a new sixteen room high school building, to be erected this year at a cost of approximately $75,000.

Saskatoon, Sask.—Tenders are being called for a suitable site of three or four acres, on which to erect a collegiate institute.

Raymond, Alta.—At a meeting of the ratepayers it was decided that another election would be held to vote on raising money to build a twelve-room school building. Plans had previously been prepared for an eight-room building, but it was found that this would not give sufficient accommodation. Estimated cost of twelve-room building is given as $30,000.

Calgary, Alta.—Estimates will be called shortly for the construction of twelve miles of street pavement.

Edmonton, Alta.—During the coming year the city will expend the sum of approximately $150,000 for bitulithic pavement on Kinistino avenue, from Jasper to the C. N. R. tracks, and Namaye avenue from Isabella street to Sutherland street, and on Fraser avenue. Tenders for the work will be called for in the immediate future.

MACHINERY AND TRADE

GAS PRODUCING PLANTS.

TO SUCCESSFULLY demonstrate, under ordinary conditions, gas engines as a means of producing power and lighting current can show results unobtainable by any other method of power production, and to prove conclusively that a suction gas engine equipment specially designed to meet Canadian conditions and properly installed, would furnish the manufacturer with his power at a cost considerably lower than if on a steam engine basis, and with the same or a greater degree of reliability, is what the Colonial Engineering Company, Limited, Montreal, set about doing when it was organized two years ago.

That great economy could be obtained with gas engines was generally admitted, but upon the point of reliability opinion was divided, due, no doubt, to the fact that the development of the suction gas engine had not been accomplished without failures. These failures, however, were not without value, as they served to indicate to the experienced builder where the trouble lay, and by a process of elimination the evolving of a perfectly reliable suction gas engine equipment was only a question of time.

That a perfectly reliable suction gas engine equipment has been evolved, and that it is meeting operating conditions in Canada with perfect success, is evidenced by the installations which this company has made.

The company owns and controls the Canadian rights for the manufacture of the celebrated Hornsby-Stockport Improved Patent Suction Gas Plant, an English product, which, it is said, has met with such widespread recognition that to-day there are 30,000 of them in active operation in all parts of the world.

Among the special advantages which are claimed for this plant are its moderate first cost, great economy in working, extreme simplicity, small space occupied, little attendance required, little or no cost in repairs, requires no gas holder, boiler or chimney, an entire absence of smoke, soot, smell and danger, and is ready for use in fifteen minutes. The entire apparatus consists of a generator lined with fire-brick in which the gas is made, a vaporizer for producing the steam from the heat of the gas, a scrubber for cooling and cleaning the gas and a reservoir from which the gas engine draws its supply, the various parts being arranged to suit the space at disposal. The gas is generated without a greater pressure than the atmosphere, which eliminates all chance of leakage and smell, while no gas holder is required by reason of the fact that just enough gas is manufactured as will be immediately consumed by the engine, and ceases the instant the engine is stopped. Very little attendance is required, it only being necessary to replenish the fuel about every four hours, and remove the ashes at the end of the day.

The Colonial Engineering Company have installed a large number of these producer gas plants in various cities of the Dominion, which it is reported are giving the highest degree of satisfaction.

In Chatham, Ontario, a city of 12,000 population, the company erected and equipped a large municipal street lighting plant, which, according to figures given, now consumes but $1 worth of fuel a day, as compared with $6.50 a day, which was previously the case. This comparison of daily fuel cost is with the engines operating with natural gas, although they are designed to operate with either natural gas or suction gas. By using suction gas (anthracite pea coal) the daily full cost would be $1.50.

The Chatham plant has been inspected by a large number of extensive power users, many of whom, in seeing its advantages, have adopted the system in their own plants.

Among those receiving entire satisfaction by the use of the Hornsby-Stockport Improved Patent Suction Gas Plant may be mentioned the Empire Manufacturing Company of London, Ont., who have reduced their coal bill from $8.30 a day to $1.60 for one hundred horsepower; the Ames-Holden, Limited, of Montreal the largest shoe manufacturers in the Dominion, who have reduced their annual coal bill from an average of $2,750 to $700, while the Queen City Printing Ink Co., of Toronto, who formerly paid $60 per year per horsepower, now find that it costs them but $19 per year per horsepower by using this system.

A few others who may be mentioned are the Essex Roller Mills Co., Essex, Ont.; Dominion Brewery, Toronto; Frame & Hay Fence Co., Stratford, Ont.; Vegreville Electric Light and Power Co., Vegreville, Alberta, and the Megantic Electric Light and Power Co., Lake Megantic, Que.

The Colonial Engineering Company have during the past year created a wide interest in manufacturing circles of the Dominion, and their claims of producing horsepower for less cost than can be produced by steam engines or water power, has seemingly been amply demonstrated.

LOCATES IN MONTREAL.

MR. THOMAS REID, identified as sales manager of the John Betram & Sons Company, Limited, for a number of years past, has moved his headquarters to Montreal, where he will be associated with the Canadian Fairbanks Company, Limited, who are the general sales agents of the Betram Company. Owing to the importance of the Montreal machine tool market, this move is evidently a highly advantageous one to both the Betram Company and the Canadian Fairbanks Company.

AN 80,000 BARREL ORDER.

WHAT IS POSSIBLY by far the largest single order for Portland cement ever placed in Canada, was recently received by the Canadian Portland Cement Company, Temple Building, Toronto, from Messrs. John Gunn & Sons, contractors, of Winnipeg. It calls for 80,000 barrels of Star Brand cement, to be used in the construction of the municipal power plant of the city of Winnipeg at Point du Bois, for which Messrs. Gunn & Sons, have the general contract. Aside from the enormous quantity it represents, this vast order is of more than passing interest in that it indicates in an unmistakable manner the tremendous growth of the West, and the great extent that cement is being employed in its upbuilding.

The Star Brand of cement has been used in a large number of important jobs throughout the Dominion, and always with the most satisfactory results. It was one of the two brands specified in the construction of the reinforced concrete chemical plant of the Woods Product Company, Limited, at Donald, Ont., which was published in the January issue of CONSTRUCTION. A remarkable instance of its excellent quality is to be found in the concrete pier of the ill-fated Quebec bridge, which successfully withstood the awful crash of iron and steel, which

brought to a tragic end the greatest attempt of bridge engineering ever undertaken.

The company will have a booth at the exhibition to be held in connection with the convention of the Canadian Cement and Concrete Association at Toronto, from March 1 to 6, where its representatives will be pleased to meet its customers and to expound the virtues of the Star Brand to the trade in general.

A CONCRETE BLOCK CHURCH.

THE HIGHLY satisfactory results that can be obtained with concrete block construction when intelligently executed, is strikingly exemplified in the Salem Methodist church which was recently erected at Derwent, Ont. Not only does this building demonstrate what can be attained in rural church architecture, but it also brings out forcibly the possibilities of concrete blocks along other lines in the hands of an architect who understands his material.

The church, which was erected during the past summer, is a 40-ft. square structure with a 12-ft. tower to one side of the main entrance, and a vestry at rear 11 x 22 ft. in size. All the material used in its walls and the outside trimmings were made on the grounds, and it was built complete at a cost of $6,500.

SALEM METHODIST CHURCH, DERWENT, ONT., BUILT OF CEMENT BLOCKS. THE STRUCTURE WAS DESIGNED BY H. POCOCK, ARCHITECT AND PRESIDENT OF THE LONDON CONCRETE MACHINERY COMPANY, LONDON, ONT.

The auditorium of the building is excellently arranged, the seats radiating from the pastorium, which is in one corner, on a grade of one foot in fifty feet. Immediately to the right of the pastorium is the organ loft and choir gallery, while directly between them at the back is a door leading into the vestry. In designing the interior due consideration has been given to the acoustic properties. The ceiling, which is finished in light oak and panelled, curves from the walls and extends in horizontally four feet on all sides, from which point it rises domically three feet higher. In the basement are class rooms capable of seating 150, small library, ante-rooms and kitchen, having thoroughly under-drained concrete floors.

The concrete blocks used in this structure were made on a face-down adjustable block machine manufactured by the London Concrete Machinery Company of London, Ont., and the sills, steps, window caps and coping on a London adjustable, sill, step and window cap mould machine. They were made of one part cement to five parts of fine gravel, and were faced with a 1:2 mixture of cement and sand respectively. In making the blocks the size of the core opening was governed by the weight the walls had to carry. It is claimed that often builders of structures of this kind use blocks with very large core openings, as the machine on which they are made will only make one size of core opening in one size of block, and that in heavy structures the concrete blocks should not only have increased width but the core opening should also be varied according to the weight of the structure.

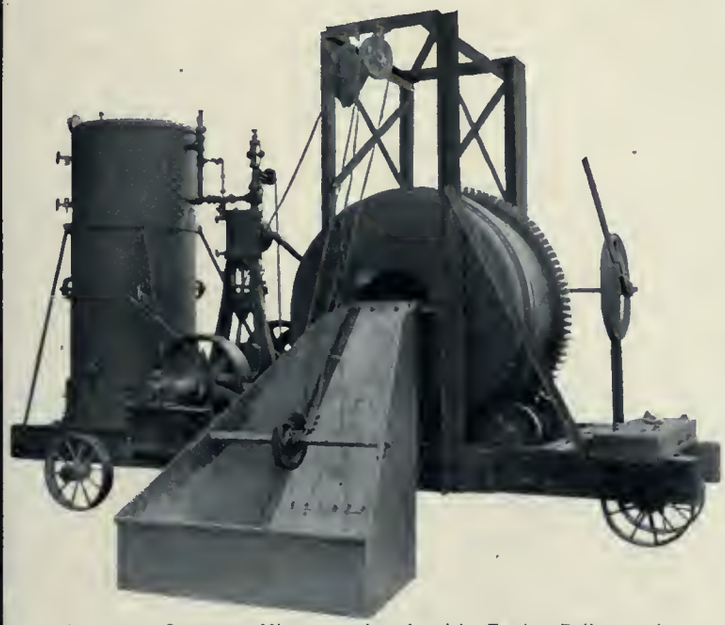
In this special case, as is shown in the accompanying drawing, the basement walls are built of 10-inch concrete blocks having a 2-inch core opening, and backed by a 4-inch solid concrete block wall, a 2-inch air space intervening the two.

Fig. 2 shows a section of the walls of the basement and a portion of the upper story. It will be noted that the concrete footings of the structure are two feet wide and one foot in depth. Fig. 4 shows the method of bonding the first course, the second course being bonded so as to overlap the first. Fig. 3 shows the method of bonding the second course in the wall, the dotted line which runs vertically through the walls indicating the air chamber in the block.

This method of construction, it is claimed, insures an absolutely dry wall and one that is thoroughly tied. Several churches and other structures in western Ontario, which have been built under the joint direction of capable architects and the London Concrete Machinery Company, attest abundantly to this fact. The Hyatt ave. Methodist church, of London, is one that is particularly referred to. It is now undergoing the rigors of a second winter. During the greater portion of the first winter, on account of the grading not being properly done, a pool of water lay directly on each side of the building, but at no time did any moisture appear on the inside of the walls.

In the basement of the Salem Methodist church and the other structures mentioned, the only interior finish of the walls is that of the blocks themselves, which are vertically tooled faced, the points being neatly beaded up. The appearance is particularly good, and, it is said, in

CONCRETE MIXERS



Ransome Concrete Mixer, equipped with Engine-Boiler and Pivot Charging Hopper.

Ransome Concrete Mixers

have solved the problem of mixing concrete. Mixing it properly—with the greatest economy and with the greatest possible speed. Study a Ransome and see how it works. We will send you the necessary data for such study.

Mixers supplied, equipped for steam, electric, gasoline or belt driven.

We carry all sizes in stock for immediate shipment.

Prices upon request:

"Ransome"

CONCRETE CARTS

For Economical Handling of Concrete.

6 cubic feet capacity.

TWISTED STEEL

For reinforcing concrete.

All Sizes--All Quantities--Prompt Shipment

MEET US AT THE TORONTO CONVENTION, MARCH 1st to 6th, FOR DEMONSTRATION.

F·H·Hopkins & Co

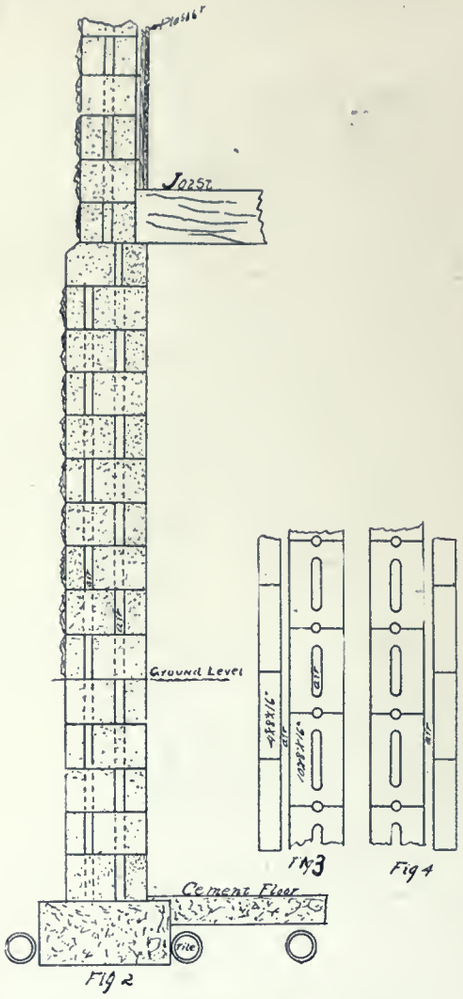
Canadian Representatives

MONTREAL

this respect that a large amount in each case was saved in painting and wainscotting.

The London Concrete Machinery Company has just issued a large, handsome catalogue, which contains a large amount of data regarding the handling of concrete for different classes of work, as well as figures and estimates which will be of general value to the contractors.

Illustrated within its covers are four different types of concrete mixers, concrete block machines, silo block ma-



DETAIL OF WALL CONSTRUCTION AND SECTION VIEW OF BLOCKS, SALEM METHODIST CHURCH, DERWENT, ONT.

chines, silo curbs, cement brick machines, ornamental porch column and baluster moulds, pier block moulds, lawn vase moulds, head stone moulds, grave post moulds, tile and sewer pipe moulds, rock crusher, sill step and window cap mould, fence post mould, hitching post mould, side-walk tools, cement working tools, wheel barrows and many other cement working appliances. This catalogue will be mailed to any address upon request.

CONTRACTORS' MACHINERY.

THE EXIGENCIES of the building trade are many and varied, and the quick delivery of contractors' and builders' machinery is often a very important matter. Where to obtain the equipment needed and how to get it on the job in the quickest possible time is a vexatious problem with which builders are frequently confronted. At a time like this, to be able to reach a central shipping point and to personally select the apparatus best suited to the requirement of the job in hand, is a decided advantage. It enables the prospective buyer to quickly and thoroughly compare the various outfits, and to readily decide as to what machine or equipment will most effectively and economically serve the purpose for which it is to be used.

"Time is money" is a trite saying which especially applies to the construction work, and a delay of a couple of weeks in the delivery of required machinery may run a job into bad weather which usually means a heavy financial loss to both contractor and owner.

In order to meet conditions of this kind it is not only necessary for the supply house to have a perfect organization and a complete stock of machinery, but it also means that it must have at its disposal the very best facilities to insure the immediate delivery of goods.

One of the firms in this respect, whose warerooms contain a most complete array of machinery and equipment and whose facilities for the prompt execution of all orders are unsurpassed, is the A. R. Williams Machinery Company, Limited, of Toronto. This company's extensive stock of steam engines, boilers, hoists, derrick swingers, cement mixers, etc., seemingly include every conceivable type of machine in each particular line. Steam engines are shown in both vertical and horizontal styles, plain slide valve motion and also the automatic cut off such as the Brown, Corliss and Wheelock, slow, medium and high speed types. The sizes range from 3 h.p. up to 300 h.p., suitable for all purposes. Marine steam engines are also shown in a large range of sizes.

In boilers there are all types from the small vertical ones of 3 h.p. up to the largest horizontal ones of 80 h.p. each. The ordinary return tube boiler is in evidence in large numbers and also the locomotive fire box type.

A large well equipped boiler shop is operated by the firm in order that any boilers reaching them in a defective condition can be readily put into proper order so as to conform to the inspection laws. Every boiler is subjected to a severe test before being allowed to be sent out, so that any annoyance to the purchasers after receipt and installation of the same is avoided.

Another feature of the company's display are the hoists. These are to be seen in every variety from the small sizes with single drum and sheave for handling bricks, cement or mortar to the workmen on the different floors of a building in course of construction, up to the large outfits with large boiler, double drums and swinger attached. They are to be had with or without boilers as desired and with either plain valve motion or link motion for reversing as the work demands. Quite a number of hoists to be operated by horses are also carried in stock.

The magnitude of the company's warehouses can be better appreciated when it is known that they occupy two buildings—one the original structure at 95 Front St. and the other the new acquired premises on Lake St. Both of these buildings are five storey structures, and the floor has an area of 15,000 square feet. This makes a total floor space of 150,000 square feet, all of which is fully taken up with general machinery, and it is claimed in this connection that the amount of floor space is not exceeded by any one firm of machinery dealers in America.

In view of the Cement Convention and Exhibition to be held in Toronto the first week in March, the R. J. Williams Company extends an especial invitation to the contractors and visitors who will be in attendance to visit its warerooms, and to inspect the large and interesting stock of machinery designed for their especial use.

FENESTRA STEEL SASH.

A NEW FEATURE in window construction which is now being introduced to architects, engineers and contractors, and which gives every promise of attaining a wide popularity, is the Fenestra Steel Sash manufactured by the Expanded Metal and Fireproofing Company, Limited, Toronto.

The universal success with which this sash has met in

International Portland Cement Co., Limited

Ottawa

FACTORY OF THE INTERNATIONAL PORTLAND CEMENT CO., LIMITED, HULL, QUEBEC, SHOWING EXTENSIONS MADE TO THE PLANT DURING THE YEAR 1908. DAILY CAPACITY, 3,000 BARRELS.

INTERNATIONAL PORTLAND CEMENT is unapproached by any other brand of Cement on the market for Uniformity, Strength, Purity and Perfection. **PRACTICAL TESTS** prove it.

Canada

Great Britain and continental countries, where is has become a recognized standard, is readily understood when its many excellent points are taken into consideration. It not only combines a handsome light appearance with great rigidity and strength, but as to cost it compares most favorably with the wooden sash, while its fire resisting qualities are unsurpassed

Another advantage of the Fenestra Sash is that it is adapted to any character of building, from the residence or church to the largest industrial and office buildings.

Three excellent examples of its use in manufacturing buildings are to be seen in the plant of the Sunbeam Incandescent Lamp Co, the factory of R. Bigley, and in the plant of the Expanded Metal and Fireproofing Company itself. All of these are large modern plants which were erected in Toronto during the past year.

The construction of the Fenestra Sash is in itself very interesting. All intersections of members are securely made A small slot is made in the vertical bar, just sufficiently large to allow the flange of the horizontal bar to pass through. The mould portion is then pressed out so as to fold closely the mould portion of the horizontal member, which is cut only in one place, a small niche being made to allow of it being firmly locked in position. Owing to the amount of metal removed in making the joint, being comparatively infinitesimal, this allows the use of the highest possible section, making a great saving in weight of material and cost of sash.

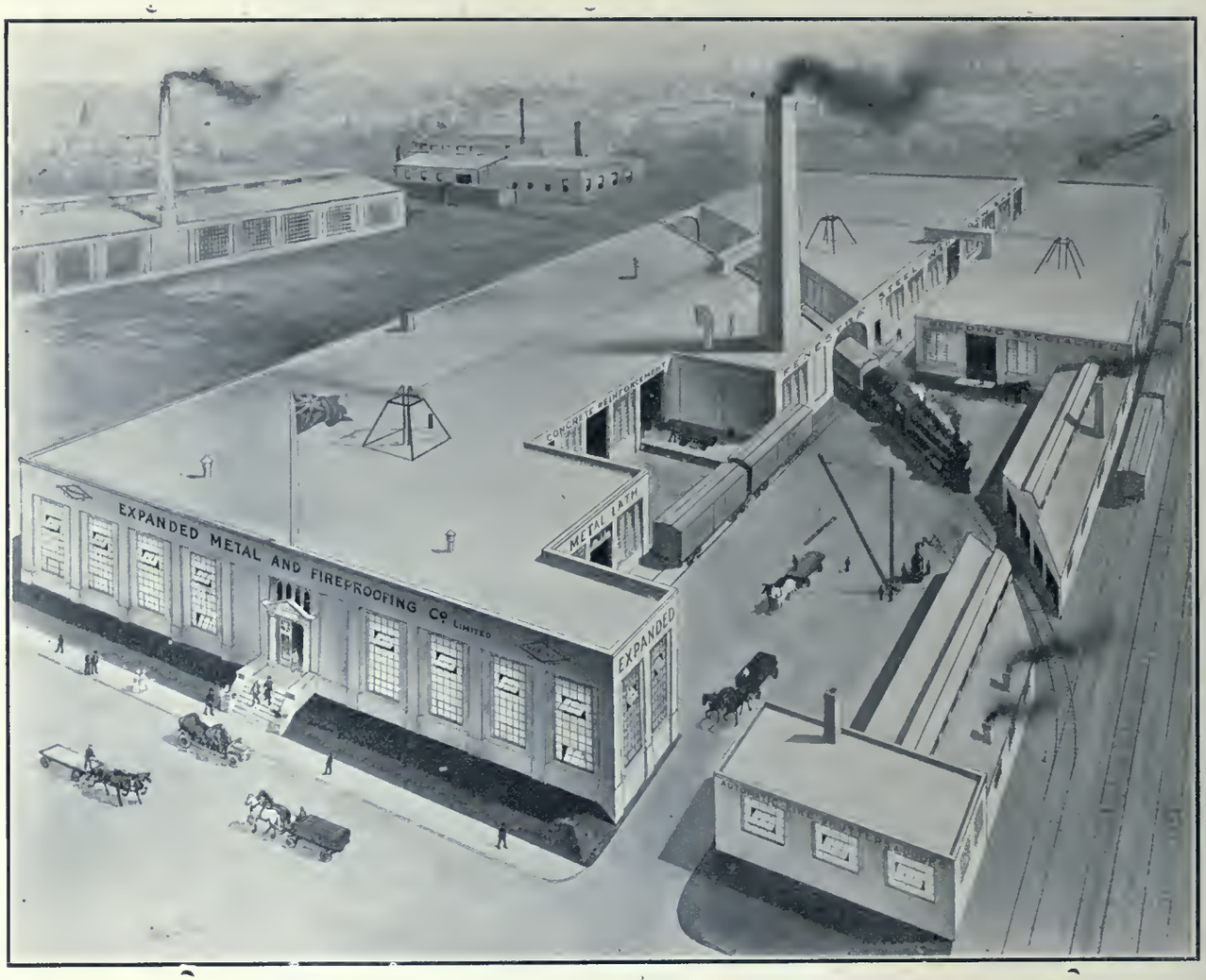
A noteworthy feature of this sash is that it can be designed with an area of ventilation in the following styles centre hung, pivoted at sides or at top or bottom; and side hung, top hung or bottom hung, to swing inwards and outwards.

Another line the company is manufacturing in this connection is economic and standard steel casements, which have numerous good points to commend them to the trade.

The Expanded Metal and Fireproofing Company's new factory on Fraser ave., Toronto, is one of the most perfectly appointed manufacturing institutions in the Dominion Both in design and construction it demonstrates the possibilities in factory construction with the use of the materials the company manufactures.

It is a concrete building in its entirety, the walls and columns which support the roof being built according to the reinforced method, while expanded metal is used extensively on the interiore. The window arrangement leaves little to be desired, as it permits of a maximum degree of light in the interior.

A feature of the plant and one which is being adopted in quite a number of modern factories, is the mezzamono floors in both the steel sash department and the expanded metal lath and reinforcing departments. These are enclosed with glass and occupied as offices by the foremen who can command a complete survey of the shops over which they have charge.



THE NEW FACTORY OF THE EXPANDED METAL AND FIREPROOFING COMPANY ON FRASER AVE., TORONTO.

The plant is heated by a forced draft system, a suction fan drawing the air through steam coils and forcing it through galvanized iron duct to the different parts of the factory, where it is discharged.

All shafing in the two departments is driven by induction motors, which are also used to drive the motor of the heating fan.

The lavatory is of the most sanitary type, and every consideration has been given to the welfare of the employees.

The company has ample yard and side track facilities to enable them to make prompt shipment to any part of the country.

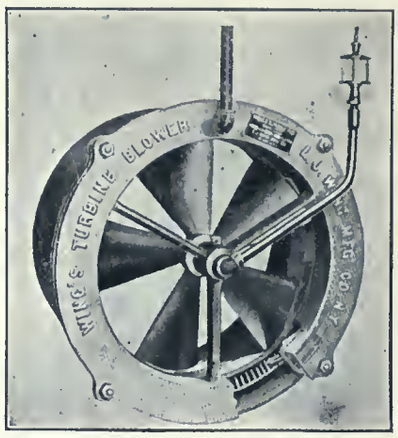
The company will have an exhibit at the coming Cement and Concrete Show in Toronto, at which the merits of its method of reinforcement and expanded metal will be explained to the delegates and visitors The Fen-

estra steel window sash will form part of the display, and the admirable manner in which it combines with all forms of concrete construction will readily be appreciated by all those who are in attendance.

TURBINE BLOWERS.

SOMETHING with which architects and builders are always concerned is the problem of ventilation, and any apparatus which will facilitate its solution is always a matter of utmost interest.

An apparatus which has many salient features in both its general character and method of operation is shown



WING'S TURBINE BLOWER, MANUFACTURED BY THE LAURIE ENGINE AND MACHINE COMPANY, MONTREAL.

in the accompanying illustration. It is the Wing's Turbine Blower, manufactured by the Laurie Engine and Machine Company, Limited, of Montreal, and is something which merits a thorough investigation when a system of ventilation is being consjdered

The blower consists of the well known "Wing Disc Fan," to which is connected an impulse turbine engine of simple construction. One of its many features are the fan blades which are fastened to the inside of a ring carrying the turbine buckets or vanes on the outside, so that the fan and vanes are literally one piece, and as the steam acts direct on them, the centre shaft or spindle is a fixture around which the blades revolve. No power is transmitted by the shaft, and the only friction loss is that due to the weight of the blades, which, as they are built of a special alloy, are quite light. Ample provision is made for lubricating, and after being installed this is the only thing that requires the occasional attention of the engineer.

The fan is easily installed, each boiler having its own individual installation, and the small amount of steam required to drive it passes in under the grates with the air thoroughly mixed. This gives the best combustion at lowest cost, and the steam so used helps to preserve the grates by reducing the clinkers and keeping open the entire grate surface.

These fans are built in four sizes, 12-in., 16-in., 20-in., and 24-in., and can be applied to boilers ranging in size XX from the smallest up to 400 horsepower. The larger sizes can also be installed in pairs, thereby doubling their range.

In addition to their use for mechanical draft, they can also be applied to such purposes as that of ventilation, drying, removing heat, steam, vapors, dust, etc., and are also particularly available for cooling towers, humidifying the air in cotton, silk, or other mills, etc. For ventilating of mines, tunnels, factories, theatres, etc., the fans can be run with compressed air acting on the buckets instead of steam, and is an ideal system of supplying cool, fresh, pure air.

Additional information regarding the many excellent points of the Wing Turbine Blower may be obtained from the Laurie Engine and Machine Company, Montreal.

MONTREAL FIRM MAKES IMPROVEMENT

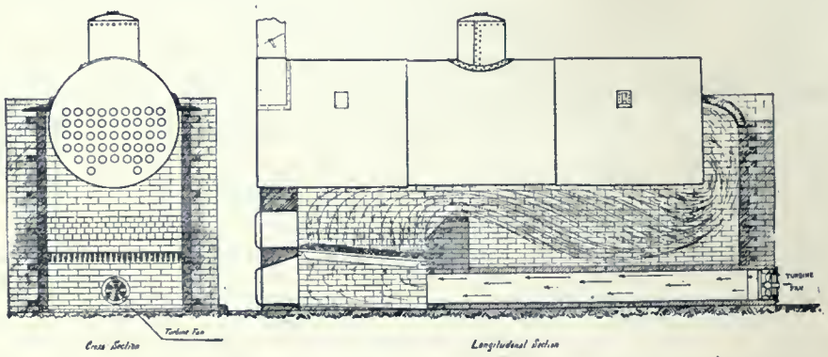
EXTENSIVE improvements are being made to the offices and showrooms of the Calkin Tile & Mosaic Company, 458 Bluery St., Montreal, which when completed will give the firm many additional advantages for the displaying of its goods and the transaction of business. The new arrangement, in general, will be ideal as it provides a large public reception room connecting with the showrooms and offices on either side.

Another improvement which the company will shortly undertake, in order to better meet the demand of its growing business, is the erection of a large warehouse, off Bluery St., which will be devoted for wholesaling purposes, and also a large shop which will be used for the manufacturing and cutting of all kinds of mosaic work. The building will be 143 x 52 ft. in ground area, and will be of brick construction with concrete floors. Messrs. Hutchinson and Wood, Montreal, are the architects, and plans will be ready about March 1st.

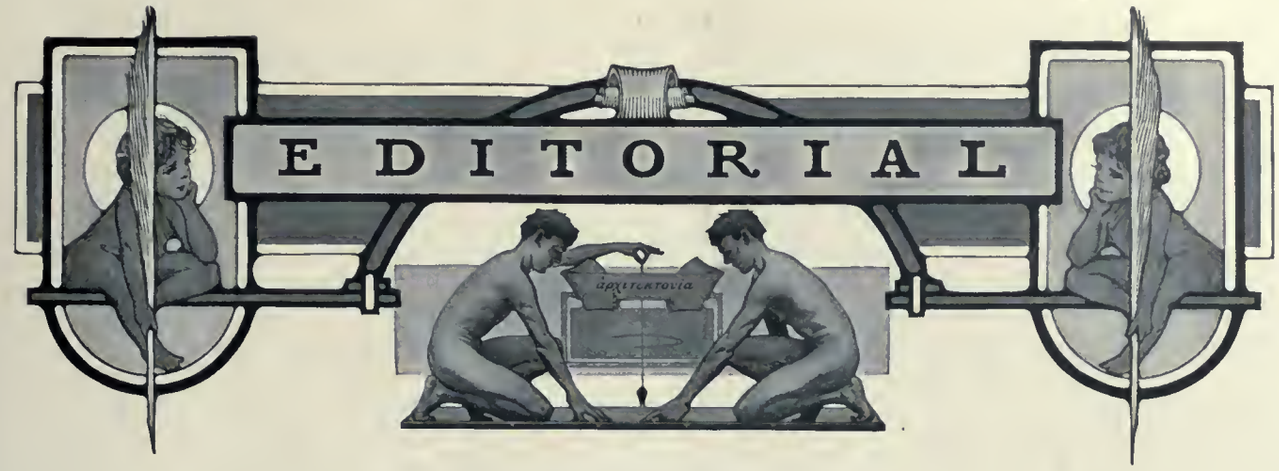
The "Dago Motor" which greatly reduces the cost of finishing mosiac floors, etc., is the property of this company, and is the only machine of its kind in Canada. The possession of this machine, it is claimed, enables the company to execute contracts in less time, at less cost and with more satisfactory results than has been customary in Canada heretofore.

The Dago Motor is the invention of the president of the company, Mr. S. H. Calkins, who claims that the old way of laying mosaics cannot possibly compete with this modern method on account of the great reduction in labor effected.

Designs, samples and estimates will be forwarded by the Calkins Tile & Mosaic Company upon request.



CROSS AND LONGTITUDINAL SECTION SHOWING THE LOCATION OF WING'S TURBINE FAN AND THE DIRECTION IN WHICH THE AIR TRAVELS.



Smuggling

IN TIME OF WAR a man who betrays the interests of his country; who places into the hands of the enemy papers, plans, secrets, information; who, being in possession of knowledge or position, undertakes to defeat the laws designed for the protection of the country to which he ostensibly owes his allegiance, if caught is courtmartialed and shot as a traitor.

The ignominy and shame associated with such a crime does not end with the extreme penalty. The name of the traitor lives for generations and is forever associated with all that is despicable, contemptible, sordid and base. He accepted of the protection of the institutions of his country while he attempted to lay bare its vitals to the fire of the enemy.

A man who, through unscrupulous methods, betrays his employer to his competitor and thereby renders ineffective the business advantages possessed by the institution which is giving him his livelihood, is dishonest, deceitful, treacherous and unsafe. A man who deliberately transgresses a rule or law of the institution with which he is employed, designed to protect the business of that institution against the unfair advantage of its competitors, is unworthy of his trust and not to be depended upon by any employer.

If such a traitor in the course of the betrayal of the institution, with which he is associated, commits an act punishable under the statutes he is sent to jail. But his punishment does not end here. Society has yet to deal with him. He is despised and distrusted and for his duplicity is marked for the remainder of his days.

Just as our government has found it expedient to enact laws for the protection of the secrets of the country; for the protection of the community against murder, theft and arson; just as the business world has deemed it efficacious to establish unwritten laws for the protection of business interests against unfair advantage of competitors, so has our government deemed it expedient to enact laws providing for import customs duties for the protection of Canadian industries and the development of Canadian enterprise, against the dumping of foreign products, made under political, social and commercial conditions, over which we, in Canada, have no control.

Individuals or corporations that conspire to defeat the objects of such laws not only lay themselves liable to punishment as provided in the statutes, but are guilty of operating against the commercial welfare of the country and for private gain render a protection, which they themselves enjoy, useless and inoperative.

In most cases where the product has a specific and tangible value, the customs authorities are successful in thwarting the efforts of professional and amateur smugglers and through a very elaborate and expensive method of customs inspection the traffic of smuggling is brought to a minimum, but in the matter of imported *Architects' or Engineers' plans,* where there is an opportunity for *misrepre-*

sented values, co-operative duplicity, tangled complications, and *secretive smuggling,* either through the lack of efficient and intelligent inspection, the cunning secretiveness and disloyalty of our citizens, or a combination of both, the fact remains that our customs laws, in this particular, have by no means been adequately or evenly effectively enforced.

The man who makes a profession of smuggling openly declares war with the customs authorities. He is interested in no country; the success of his business (if it may be called such) does not depend upon the protection provided by such laws, other than it renders profitable the breaking of them. He plies his precarious trade with the expectation of being punished, when caught. He is a self declared law breaker.

But the Canadian manufacturer, the corporation, or the individual who, through misrepresentations, false valuations and secretive methods, smuggles into Canada, building or engineering plans, not only undertakes to transgress the laws of the country and defraud the government of its rightful revenue, but attempts to render ineffective those measures which have been enacted for the protection of Canadian institutions against the incursion of foreign interests; the protection granted by the people, which every institution and corporation in Canada has profited by; the protection necessary to the very existence of industrial prosperity in Canada. For private gain he has surreptitiously and dishonestly laid bare the very industrial vitals of the country to the batteries of our commercial enemies.

The manufacturer, the incorporation, the municipality, the individual that attempts to smuggle plans into Canada, is not only a law breaker, but is a traitor to Canadian institutions, just as the soldier is a traitor, who, by transgressing military law, deliberately renders ineffective the protective plans of his regiment and opens it to the direct fire of the enemy.

The architect or the engineer who, by fathering foreign building plans, conspires with the owner or the foreign architect to import plans without the payment of the rightful duties, is a traitor to his profession and to the building interests in general in Canada, just as much as the man who conspires with his employer's competitor to render ineffective, business methods adopted for the protection of the institution which gives him his livelihood.

The contractor who aids or abets the importation of foreign plans "sells his birthright for a mess of pottage."

Building and Engineering Plans

THE PRACTICE OF SMUGGLING building and engineering plans into Canada has become a common one. Buildings have been erected in almost every large city in Canada after foreign plans, upon which the rightful duties have never been paid.

The Ontario Association of Architects have repeatedly discussed the evil, and, at their last convention in Toronto, Past President Gordon dealt at some length with the question. The Ottawa Chapter of the O. A. A. has been especially active in their efforts to have this pernicious practice stopped. They have been successful in a limited degree in bringing some few owners to task in Ottawa. The attention of the Canadian Government has been repeatedly called to the rapidly growing contempt with which owners regard this portion of the Tariff laws. But of no avail. *The government is either unable or unwilling to put a stop to this contemptible, unpatriotic custom.*

The evils, growing out of the smuggling into Canada of foreign plans, are obvious. In the first place it is only right and proper that the professional man should be protected as well as the manufacturer, the corporation, or the individual who employs him. Our doctors, our lawyers, our dentists, are protected by close corporations, which practically require that a man must be a resident of the country before he can practice here.

The only protection given the architect or engineer is a duty of 25 per cent. of the architects' or engineers' commission, levied upon foreign plans and blue prints.

Why should not this part of our customs laws be as rigidly enforced as the portions that protect the manufacturer? From the standpoint of the general public, it is as important that the professions of architecture and engineering should be protected as it is that the manufacturer should be protected. If we desire to develop architects competent to do our work in Canada, we must protect the profession against unfair and ruinous foreign competition.

Experience has taught us that foreign architects employ foreign contractors, and specify foreign made materials and appliances. Canadian architects make it a practice to employ Canadian contractors and specify Canadian made materials and appliances wherever possible. It, therefore, would appear that it is very much to the country's interest to encourage the employment of Canadian architects. The United States bars our architects from practice in that country, and it may be added that there is no portion of the United States Tariff laws that is more rigidly enforced than that, dealing with imported plans.

A Toronto architect prepared plans for a house for his brother in Buffalo not long ago, but the United States' Customs authorities made such exhorbitant demands that the Toronto architect was obliged to withdraw and a Buffalo architect was employed.

Recently, a United States firm of engineering contractors, who had operated in Canada from a Toronto office, and had erected several buildings for prominent Canadian manufacturers, after plans prepared at their head office in the United States, closed their Canadian office and made an attempt to take the blue prints of these several jobs back to their head office, but they were held up at the Suspension bridge, where it was necessary to provide satisfactory evidence that the plans were prepared at their United States office, before the customs authorities would pass them.

Think of it; plans prepared in the United States for Canadian structures, brought into Canada without duty, the structures erected after them here, and held up on their return by the authorities of the country from whence they came! Owners and even contractors make no secret of the fact that they have very little difficulty in smuggling plans into Canada. They have even become so bold as to put up an argument why they should not pay duty, after they have been caught.

Even the City of Toronto, when "caught with the goods," was very much annoyed to think that the government had the audacity to demand duty on the plans for the new $800,000 filtration plant, and the absurdity of the many statements made by the city fathers showed that they were actually sincere in their protestations.

It is not to be wondered at that our Yankee friends have such a poor opinion of our ability to do things in Canada, when they read such interesting, intelligent and highly amusing matter as was provided by the city officials of Canada's second largest city, over the filtration plant controversy.

If the United States can prevent this smuggling of plans so successfully, so can Canada. Every piece of work has its architect or its engineer. If that architect or engineer is not a resident of Canada, where does he come from, and where were his plans prepared, and what is his commission? Some Canadian architect or engineer is in possession of such knowledge on every job, and it is only by conveying such information to the proper authorities that this evil will be stopped. *"CONSTRUCTION"* is of the opinion that any such information with regard to any individual piece of work in Canada, should be placed in the hands of the proper authorities. The source of such information will be treated confidentially. Remember that the owner is liable for duty on imported plans, even after the structure has been completed.

In the interests of Canadian enterprise, Canadian institutions, Canadian architects and engineers and Canadian contractors, we propose to find some method or means whereby this despicable practice of the smuggling and under-valuation of building plans is stopped.

INCONSISTENT AND EGOTISTICAL CONTENTION OF UNITED STATES ARCHITECTURAL JOURNAL.—BELIEVES CANADA SHOULD WELCOME WORK OF FOREIGN ARCHITECT. - - - -

COMMENTING upon Past President H. B. Gordon's address before the Ontario Association of Architects, at the recent annual convention of that Association, the WESTERN ARCHITECT, Minneapolis, says:

"A strong protest was made against the attitude of the government toward the foreign architect whose plans and competition was not taxed, to the detriment of the Canadian Architect, who is. We believe in this connection, that if foreigners were admitted it would elevate the standard of Canadian design, as the foreigner can often introduce a class of structure that the local architect would not have been allowed to, and thus set a pace which the business man has to follow, to the future advantage of the local architect, while by some means the "PLAN FACTORY ARTIST" should be prohibited."

It is amusing to Canadians to read the kindly advice so willingly given us, as to how we should do things, by our patronizing friends in the neighboring Republic. They are altogether too ready to prescribe a remedy for our evils, which they, themselves, refuse to experiment with. James Hill tells us how we can develop our West by letting in his railroad, tearing down our already too low tariff walls, and permitting him to carry into Canada American manufactured products and carry back over his American railroad system, our raw products to American ports, from whence they may be shipped to our own British market. Think how absurd it would sound if we should make such a proposition to the Western States. Our Yankee friends would declare us insane.

Our esteemed contemporary would have us encourage foreign architects to come into Canada, for the purpose of establishing standards in building construction, from which our own architects would eventually profit. Suppose we turn the tables and suggest that the United States should take down its barrier, against the importation of foreign plans, and allow Canadian and European architects to come into the United States and establish standards in architecture, for the reason that a foreign architect could accomplish with his client, that which would be impossible for the local architect. Suppose that this were proposed, upon the strength of the argument that the United States architect would be eventually benefited by the new standards established by the foreign architect. We ask would our esteemed contemporary undertake to advance such a policy for the United States, and expect it to meet with any degree of favor.

The United States often reminds us of a spoiled child that has had all the play things its heart desired and is not satisfied with keeping all it has, but wants everything it sees another youngster with, and even believes it within its inherent right to have it. "All that's mine is mine, and all that's yours is mine, too."

Through the laxity of our Customs Department, in collecting duty on foreign plans, we have had in Canada some experience with foreign architects, who did that with their clients which local architects could not. But the result was not as outlined by our American contemporary. We have had no new standard of excellence created through the incursion of foreigners. In fact, we have a few structures, designed by American architects, which come far from being creditable to either the architect or the owner.

Foreign architects have, however, been highly successful in inducing Canadian owners to consent to have American building materials and appliances specified in their structures; materials and appliances that could have been supplied by Canadian-made products at an even lower cost. But the United States architect does not know Canadian contractors, Canadian materials or appliances, and, as the wise man on the job, the foreign architect prevails upon the owner, to build of the materials which he (the architect) knows and has been accustomed to specify.

There is a duty on foreign plans coming into Canada, for the same reason that there is a like duty in the United States. Duty is levied upon foreign plans for the development and protection of the profession, to encourage competent designers to come to Canada, study conditions in this country and establish a purely Canadian practice; to develop architects in this country who know our contractors, our materials, and our Canadian-made appliances, and to protect the profession in Canada against the incursion of architects out of a job, when times are dull in a country of eighty million people. What Canadian architects object to, is that the Customs law is enforced in the United States, where it is not in Canada.

The WESTERN ARCHITECT suggests a registration act as a means of barring the "plan factory architect," while admitting the competent designer.

An efficient registration or licensing act would do more than that. It would provide that all plans should bear the seal of their author as a guarantee that they were either planned by him or in his office by his employees, under his direct supervision. This seal would bear the business address of the architect at the time his license was issued or last renewed. It would further provide that any architect found guilty of unlawfully using his seal on plans not prepared by himself or his direct employees, under his supervision at his stated place of business, would have his license to practice, revoked. This would force the foreign architect to secure a license upon which would be stated his place of business, before he could proceed to erect a building in the province, in which such a law was in force. By this means, the Customs Department could be apprised of the fact that a certain building was to be erected after plans of a foreign architect, which would greatly assist officials in collecting the rightful duties on such plans.

On the other hand, such a law would prevent resident architects in Canada from fathering foreign plans and thereby avoiding the payment of duty. If the resident architect used his seal on plans not prepared by himself, or his direct employees in his own office, he would stand to lose his license to practice.

We have to thank the WESTERN ARCHITECT for so unwittingly suggesting such an effective remedy of an evil so rightfully deprecated by Canadian architects.

A CONDEMNED SCHOOL—A CONSCIENTIOUS COMMUNITY—SHORT-SIGHTED TAXPAYERS—AND THE POSSIBLE CONSEQUENCES.—A REPRESENTATIVE CONDITION. - - - - - - - -

WITHIN THE MEMORY of some of the grandfathers in a quiet, thrifty town in Western Ontario, a red brick school house was built. At the time this modest little town was duly proud of this, its seat of learning. In those early days, when Canada's men, brave and true, were cutting the paths through our rich forests, for the generation to come, the erection of a four-room brick school house was by no means a small undertaking. But realizing the importance of "book learning" this little band of pioneers accepted the responsibilities thrust upon them, and deprived themselves that they might do their duty in providing adequate educational facilities for their children.

It was a proud moment for the youngsters in that early day, when those of the higher classes were moved out of the little frame school with its long desks and benches into the "new brick school" with the modern, double, varnished desks with the covered inkwells. Time rolled on and year after year thirty or forty young men and women passed the highest examination conducted in the "big red brick school," some to later return to teach the lower forms, some to go back on the farm, some to

take up some occupation in the town, some to seek higher education, some to go to the United States, some to go West and some to get married.

Year after year it was the supreme ambition of the beginner in the little frame school to "pass" into the "big brick." When into the big brick, the next hope was to get down stairs into the third book, then upstairs into the fourth book and the entrance class, and then down stairs again into the principal's room. Year after year did this good old building thus house the children of this little town, while they were being given the first lessons in life's vexatious problems.

The town grew and the young to be accommodated multiplied and the "big brick" was no longer able to accommodate all the classes, so it was deemed expedient to move a class to a large room fitted up for the purpose, in the Town Hall on the other side of the river. In the meantime the masonry in the old school proved to be defective and great large cracks developed in the brick walls, and it became necessary to reinforce it with steel rods. This was some twenty years ago, and the lack of accommodation in addition to the very evident, unsafe condition of the "big brick" actually started a whisper intimating that it might he advisable to think about a new school.

Later the building was condemned as being inadequate and unsafe. Then there was more talk about a new school, but other local matters of apparent greater import, engaged the minds of the citizens. Still later the matter came up more forcibly and it looked almost as though the old "big brick" were doomed. But not yet. A dispute arose as to which side of the river the new school should be located, and the citizens from each side of the town became so fervent in their respective claims for the new building, that they forgot about the condition of the "big brick."

Again, a school board was elected that had strong ideas about the necessity for better school accommodations and undertook to have a United States architect from Port Huron, Mich., prepare preliminary sketches and plans. These plans were morally approved by the school board, and the citizens were asked to vote upon the issuing of $20,000 bonds for the new school. It seemed, now that the old red brick was doomed beyond all question. But not yet.

The citizens voted against the expenditure. The architect sued the town for $700 fees, claiming that he had been authorized to prepare plans by the Public School Board. The town claimed that the board was not authorized to order such plans. Judge McMahon rendered a decision in favor of the town. The case was appealed by Mr. Erb to the Divisional Court at Toronto, which gave a decision reversing the ruling of Judge McMahon, and thus giving Mr. Erb, the United States architect, $125.00.

But where is the new school? The light-hearted, playful youngsters who day after day attend this, the building, which the community by its vote has declared to be the only one they will provide, little realize, when they step over the threshold of the school, that ere they come out the old building may have effected its own destruction. Parents cannot fully realize the hazardous condition of this old worn-out structure when they kiss their beloved offspring good-bye, as they hustle off in the morning "in time for school." A small fire that would reduce the least bit, the factor of safety, would bring down the roof, the floors and the walls, before the building could be partially emptied. The breaking of a supporting rod, the subjecting, by any trivial condition, of any part of the structure to an abnormal stress would bring the already condemned building down upon the heads of the pupils, with awful, horrifying and appalling consequences.

Inspector of Public Schools W. H. G. Colles, in a recent communication to the school board of this town, made the following statement, which should at least arouse the citizens to the realization of their plain duty.

"In no one sense or particular are your school accommodations such as are required by law, by the needs of the pupils, or by any sense of the duty resting upon us.

"Better accommodations are absolutely required and it is imperative upon the trustees to provide them. I need not particularize as to the inferiority and unfitness of your accommodations. You have not anything under this head that could be made up-to-date even by expending considerable money in repairs and alterations, and the time has now come when it is your duty as trustees, and as good citizens, to build a new school house, and I must now discharge the duty that rests upon me to tell your Board that the present conditions cannot any longer be tolerated."

It appears extraordinary that a community of the present day should be so parsimonious as to risk the lives of their children in a dilapidated fire trap, rather than consent to be taxed for an adequate structure, so obviously needed. The early pioneers of this town did well to provide the structure they did. It answered the purpose well at the time of its erection, but it now must be replaced. Will the community accept its responsibilities of to-day, or will it continue to lean upon the dilapidated structure provided and paid for by their forefathers?

Again, why should a United States architect be employed? Have we not Canadians who can plan and erect a structure equal to the requirements of this town? Surely so. Would the young men reared in this community, who have gone to the United States, where they speak with boastful pride of Canada and Canadian institutions, be pleased to learn that the school to be erected in their old Canadian home was to be built in accordance with the plans and specifications of an architect from the United States? Canadians should have sufficient public spirit and national pride to see that such important institutions as our school buildings, should be designed, planned and built by Canadians. Western Ontario has several architects fully capable of designing a $20,000 school house. Any insistent demand for a foreign architect could only come from some financially interested source.

This case we speak of is only one of the many, in smaller towns throughout the province of Ontario. Many of these towns become filled with retired farmers whose children have all grown up and who have no direct interest in the public school. Many of these old pioneers attended school in a log house and it is hard for them to understand why increased educational facilities are required to-day, and they religiously vote against every and any expenditure that will add to their taxes. Thousands of dollars will be spent in places of worship, but not a dollar for schools. It is a peculiar religion, it seems to us, that would prompt a man to spend money in a place, to worship once a week, when he refuses to contribute his share toward an adequate building in which the coming generation may safely and comfortably learn their first lessons.

The town we speak of is "Dresden," and the editor attended school in the "big brick."

We sincerely hope that ere the citizens of Dresden are awakened to the fullness of their responsibilities, the old maple and walnut trees that surround the "big brick" will not be called upon to perform the awful duty of hiding a great pile of debris in which were crushed out the lives of the little victims of unheeded danger.

MR. J. C. B. HORWOOD HAS MORE TO SAY ON PROPOSED "LICENSING ACT."— MORE PROBLEMATICAL DEDUCTIONS.

WE PUBLISH herewith a letter from Mr. J. C. B. Horwood, in which he replies to Mr. A. H. Gregg's letter, published in January CONSTRUCTION. This question, of the licensing of architects, is, without question, a live one with the profession, in the province of Ontario, and the two factions, for and against such a law, have evidently lined up for a battle royal.

Mr. Horwood has something to say also relative to the conclusion of an editorial in the same issue. Mr. Horwood's letter is as follows:

Editor, "CONSTRUCTION."

Dear Sir: Mr. Gregg, in his letter in your January number, thinks it "curious" that I should oppose a license law for architects after having made the statement in a former letter that under a license law "The licensing of architects rightly remains with the government." But Mr. Gregg has evidently not noticed that at that time I was discussing as to where the power to license architects should be placed—as to whether handed over to the members of a society of architects or placed in the hands of a government official appointed by and directly responsible to the government. If he will look up a still earlier published letter of mine he will see I thought it as unwise to place the licensing of architects in the hands of a society of architects, as it would be to place power to enforce laws relating to morals in the hands of a law and order society, or to place power to enforce prohibitory liquor laws in the hands of a prohibition society.

All of these three kinds of society have their proper function and realm of activity but their proper function and realm of activity is not the enforcing of government law that "rightly remains with the government."

I oppose a license law for architects not because, if enacted, one of its features would be satisfactory; but because the existence of the law would be detrimental to the cause of architectural education.

The curious thing about Mr. Gregg's letter is that though he professes to be an advocate of architectural education and says "All will agree that the architect should be a thoroughly trained man"....."All will surely agree that there is need of the educational facilities of schools of architecture with proper staff and equipment," he nevertheless takes the ground that without a close corporation or a license law for architects the government would not be warranted in providing proper educational facilities. He fails to see that the need of the facilities by the community is in itself sufficient warrant for providing them. If Mr. Gregg is strongly in favor of proper architectural education, he should keep emphasizing the need of the necessary facilities. To say they are not warranted is a function which rightly belongs to the government.

As to your editorials in the same issue: It seems necessary to point out to your writer that he has failed, as yet, to see the view point of "some few architects" who actively oppose registration or license law for architects.

They oppose not for the reason that "it is unwise to teach a boy arithmetic because it will interfere with his history." But they do oppose, for the reason that a law ought to be opposed, which would give a boy a certificate that he was an historian merely because he passed an examination in arithmetic.

They oppose not for the reason that "It is ill advised for an intending law student to take an arts course for fear it will interfere with his law studies." But they do oppose for the reason that a law ought to be opposed which would give a student a certificate that he was a lawyer merely because he passed an examination in the arts course.

In like manner they oppose, not for the reason that "it is injudicious for an arts student to study French because it may interfere with his English." But they do oppose, for the reason that a law ought to be opposed which would give a student a certificate that he was a French scholar merely because he passed in English.

As to the statement that a license law would not be detrimental to the cause of architectural education: Let us suppose that the study and practice of medicine in the province were in a similar condition as the study and practice of architecture is to-day, and the University had a proper course for medical students for the degree of M.D., and then the government should propose to enact a law which said in effect that every one passing an examination in "First aid" would be officially recognized as an M.D. I can well imagine the very men, who are advocating a similar law for architects, would clearly see it would be detrimental to the course of medical study and would most strenuously oppose a law which provided for only a one sided and completely inadequate study of a subject in which the public are most vitally interested.

Yours very truly,
J. C. B. HORWOOD.

We heartily agree with Mr. Horwood in his position with regard to close corporations, but would say that the same argument in favor of a licensing law as compared with a Provincial Act, granting a charter making a close corporation of the Ontario Association of Architects, would forbid Mr. Horwood's drawing a comparison between the degree of protection given the public, through the existence of the Ontario Law Association, and that which an Architects' Licensing Act would provide. In one instance, we have all laws governing the actions of the lawyer, placed in the hands of an association of lawyers for enforcement and in the other we would have the laws, governing the conduct and action of architects, enforced by a board responsible to the Government.

With regard to Mr. Horwood's contention that architects oppose a licensing law for the reason "that a law ought to be opposed, which would give a boy a certificate that he was a historian merely because he passed an examination in arithmetic, etc.," we would say that it is not the object of such a law to grant a certificate in any individual branch of architecture, but in public interest, to raise the standard of architecture, by demanding that the man who calls himself an architect, shall have sufficient knowledge of the basic principles of the profession to enable him to safely and sanely design and superintend the construction of buildings and, in the interest of the profession, by thus protecting the title *"Architect."*

It is not contended that a certificate as to a man's ability to design, should be granted him simply because he may have excelled in his knowledge of construction, any more than a certificate should be granted a man for his knowledge of construction, simply because he excelled as a designer, but that every man should be forced to qualify, before an impartial board of examiners, in all subjects that are essential in the practice of architecture, before he is entitled to use the title *"Architect."*

It is to the individual advantage of the architect, to improve his knowledge of design, for the size and character of his practice, will greatly depend upon his ability as a designer. But the community has a right to demand that the architect should have the knowledge and ability to safely and economically convert his design into the actual building.

It is true that Government qualification would not examine a student as to his knowledge of design and rendering, as thoroughly as it would his knowledge of building construction, strength of materials, laws of sanitation, and merit of investment, but if he were in possession of the latter knowledge, he would find it necessary, or at least beneficial, to develop his knowledge of design, if he desired to procure a large lucraitve practice. His knowledge of the science of building construction would render him at all times a sane designer.

The owner can judge and criticise an architect's design, if he desired to procure a large, lucrative practice. knowledge of building construction.

It is very well to say that after several failures and bad jobs, the incompetent will be found out, and experience will demonstrate who is the best architect to employ, but few men ever build more than once in a lifetime, and the community has a right to protect the public as well as the owner against these failures, necessary to demonstrate to the public whether a man is an architect or not.

A GENERAL SPECIAL MEETING OF the members of the Architectural Institute of Canada will be held in the rooms of the Ontario Association of Architects, 94 King street west, Toronto, on April 6th, at 10.30 a.m. The business of the meeting will consist of the election of a vice-president, the opening of a letter ballot for the admission of Associates and the transfer of Associates to the Fellow class, and the transaction of other matters which may arise. At 9 a.m., previous to the general meeting, the council of the Institute will confer with representatives of the various Canadian architectural bodies regarding the proposed federation of all architectural societies of the Dominion. The lectures will be delivered by Messrs. H. B. Gordon and J. P. Hynes, both fellows of the Institute, and the members of the Council will be the guests of the Toronto Chapter of the Ontario Association at their fortnightly luncheon.

THE KITCHEN-TO-THE-FRONT HOUSE.---An Arrangement in Domestic Architecture Which Marks a Departure from the Conventional Plan.---All Rooms Admirably Grouped.---Recessed Ingle Nooks a Feature.

TO PLACE THE KITCHEN to the front of the house, and the drawing-room at the rear, is an arrangement in residential planning which, to the average person, might suggest an order of things wholly revolutionary.

This is because the average person has been accustomed to find in most homes a somewhat conventional from-the-front-to-back layout of rooms, to which the kitchen-to-the-front variety is the direct reverse.

While not an unknown quantity, this reversed type of residence is nevertheless quite uncommon, and, as a rule, the fact of its existence is more or less obscured by exterior lines, which suggest nothing radically different from the usual order of things within.

A very attractive domicile of the character is to be seen in the accompanying illustrations. It is the home of Mr. John Martin on Lowther avenue, near Walmer road, Toronto, and was originally designed by Architects Eden Smith & Son as a residence for Mr. A. E. Plummer. It is a pleasing conception of domestic architecture done in brick and stone, with arched entrance, niched balcony and low broad eaves, to the right of which the wall rises in gabled effect.

A usually characteristic feature of a building of this sort is the side or rear verandah. In this particular case, it is at the rear affording more privacy and comfort than it would if in its much wonted place at the front of the house.

FRONT VIEW, RESIDENCE OF MR. JOHN MARTIN, TORONTO. THE KITCHEN IS LOCATED AT THE FRONT IN THE VINE COVERED PORTION TO THE LEFT OF THE DOORWAY ON ENTERING. MESSRS. EDEN SMITH & SON, ARCHITECTS.

Over the verandah, between the bays of the second storey, is a balcony, sheltered from above by an overhanging dormered roof. This portion of the house overlooks a well kept terrace and lawn, and is equally as pleasing in appearance as is the front.

On the interior a most excellent arrangement has been worked out. From the porch one passes through the vestibule and enters a large hall around which are grouped various rooms on the ground floor.

The plan, while compact and permitting of direct communication between the various rooms, yet virtually separates the living rooms from the service department

The kitchen, notwithstanding its location next to the entrance at the front, is well removed from the other portion of the house. It can be reached either through the rear of the main hall or from an entrance at the side, which leads into the service passage, and also affords access to the basement. The service passage is equipped with a built-in china closet and shelves, and provides direct connection between the kitchen and the dining-room at the rear.

On the other side of the hall from the kitchen, at the front of the house, and equally as well sequestered, is the library, while immediately behind it, opening off the reception-room and adjoining the dining-room, is the drawing-room. The space between the library and drawing-room has been advantageously utilized to provide each of them with an inviting ingle-nook.

This feature has been carried out in a very novel manner. In each of these rooms, the fireplace is located in a recessed portion, having a low ceiling and permanent settees on either side. The design and treatment varies according to the character of the room in which they are located, and built-in mantel shelves and plate rails add to the snugness and coziness of the two, the effect in the drawing-room ,with small leaded glass corner cupboards, being particularly good.

Both the drawing-room and dining-room open directly on to the verandah, from which a doorway leads into the conservatory, which is situated at its right. Access to the conservatory can also be obtained from the drawing-room, off of which it really opens.

All of the rooms on this floor are finished with hardwood and adamant plaster, the walls in the dining-room

REAR VIEW, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING THE VERANDAH AND CONSERVATORY WITH BALCONY ABOVE, ALL OF WHICH OVERLOOKS A WELL KEPT TERRACE AND LAWN. MESSRS. EDEN SMITH & SON, ARCHITECTS.

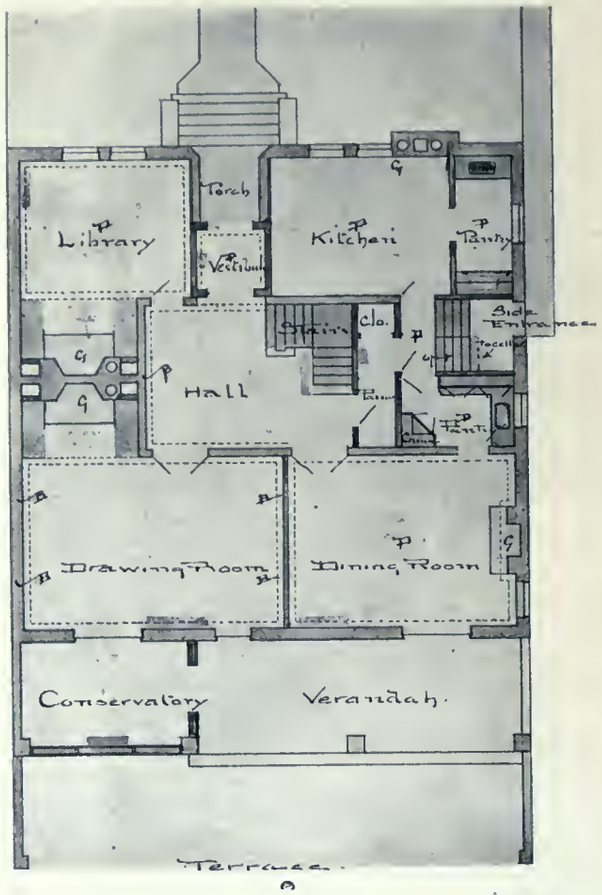
DRAWING ROOM LOOKING TOWARD MAIN HALLWAY, RESIDENCE OF MR. JOHN MARTIN, TORONTO. THE FIREPLACE WITH ITS BUILT-IN SETTEES AND SMALL OVERHEAD CORNER CUPBOARDS, IS A PARTICULARLY PLEASING FEATURE. MESSRS. EDEN SMITH & SON, ARCHITECTS.

LIBRARY, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING COZY FIREPLACE WITH MANTEL SHELF AND LOW PROJECTING HOOD. THE FURNITURE AND WALL HANGINGS ARE OUT OF HARMONY WITH THE ORIGINAL SCHEME OF DECORATION AS DESIGNED BY THE ARCHITECTS. MESSRS. EDEN SMITH & SON, ARCHITECTS.

DINING ROOM, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING THE LOW PANNELLED WAINSCOTTING AND TILE FIREPLACE. MESSRS. EDEN SMITH & SON, ARCHITECTS.

and library having a low pannelled wainscotting.

The plan is unique in many respects, and an idea as to the character of the various rooms can be seen from the accompanying illustrations. The greatest criticism which can be offered is in the case of the library, where the wallpaper and furniture are entirely out of keeping with the architectural lines of the room, and the original decorative scheme as designed by the architects. The somewhat quaint lines of the furniture, to which evidently there is a strong personal attachment on the part of the owner, have their value and their atmosphere, but not



FIRST FLOOR PLAN LOOKING FROM THE REAR, RESIDENCE OF MR. JOHN MARTIN, TORONTO. NOTE THE LOCATION OF KITCHEN AT THE FRONT AND THE ARRANGEMENT OF HALLWAY, TOGETHER WITH FIREPLACES IN LIBRARY AND DRAWING ROOM. MESSRS. EDEN SMITH & SON, ARCHITECTS.

here where the simply straight lines should predominate in the general scheme.

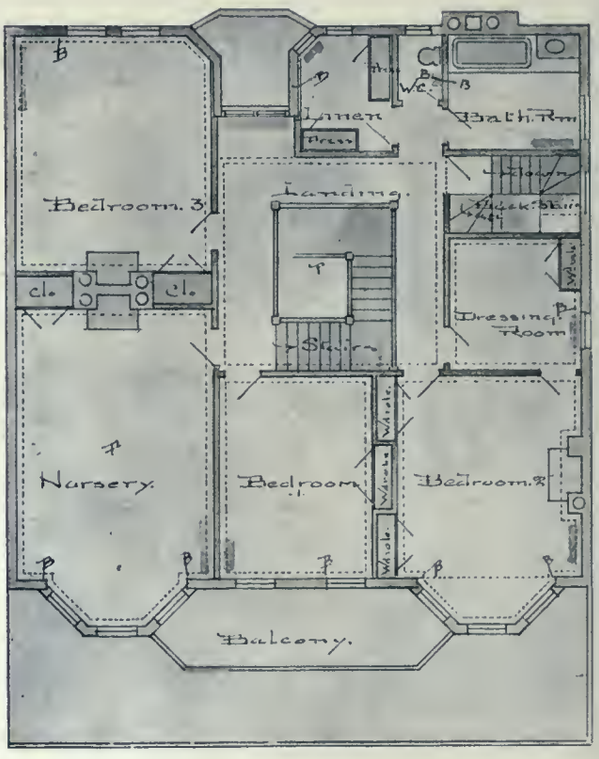
One feature, in passing, which is worthy of attention, is the main stairway connecting the first and second floor. The manner in which it has been disposed of could not be improved upon. On the first floor it stands in a most convenient spot and admirably screens off the service passage at the side, while on the second floor it is so located as to produce a most desirable grouping of the various rooms.

On this floor there are three bedrooms, a nursery, a dressing room, linen room, and bathroom. All of them have outside exposures, and the principal rooms are provided with built-in wardrobes and closets.

THE OFFICE OF SCHOOL ARCHITECT has been created by the Vancouver Board of Education. Mr. A. C. Hope is the appointee, being selected out of a list of twenty-five applicants for the position. The salary consideration is $2,500 a year, and the architect will be privileged to devote his spare time to his private interests.

17th CENTURY DECORATIVE ART.--- Some Interesting Examples Discovered in Renovation of Celebrated Old Aberdeen Building. ∴ ∴

It appears that the renovation of a celebrated old building in Aberdeen has brought to light some interesting examples of decorative art of the end of the seventeenth century. The building referred to stands in the Guestrow—one of the slum districts of the city—and was erected about 1676, although a portion of it dates back to 1580. During the Jacobite rebellion of 1745 the house was lent by its then owner—Mr. Thomson, an advocate—to the Duke of Cumberland, who occupied it as his residence during his six weeks' stay in the city, and not only made very free with all it contained, but on his departure carried off all the valuables he could possess himself of. Since that date, says an English exchange, the house has changed hands many times, and latterly had been used as a common lodging house. It was in a small paneled apartment—probably an antechamber—that the discovery referred to was made. Ordinarily one would have expected that the panels themselves would have been the portions decorated with subjects; but it is not so in this case. The panels have been painted very boldly with an effective imitation of marble, and the stiles and rails enclosing the panels have been carefully and minutely treated with painted decoration on a black ground. The decorations include groups of figures, landscapes with trees and with towers, spires, castles and ruins. The work has



SECOND FLOOR PLAN LOOKING FROM REAR, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING THE MANNER IN WHICH THE VARIOUS ROOMS ARE GROUPED. MESSRS. EDEN SMITH & SON, ARCHITECTS.

been done with great skill, and is evidently by a thorough craftsman. To all appearance, the painting is contemporaneous with the date of the erection of the house, so it is probably about 230 years old. The ceiling of a small apartment in the older part of the house is painted in the Flemish manner. One of the panels, although much faded, evidently portrays the Ascension, and another the Crown of Thorns and the Five Wounds. This apartment was probably used as a private chapel.

REINFORCED CONCRETE CONSTRUCTION.---Architectural and Constructive Development of New Permanent and Fireproof Building Methods.---Different Types of Reinforced Concrete Buildings. ---Accuracy in Plan Important.---Need for Uniform Specifications and By-Laws.

By WALTER J. FRANCIS, C.E.*

THE MARVELOUS DEVELOPMENTS of the past forty years in all branches of art and science have been the subject of numberless volumes, and the nineteenth century in its last quarter will in this respect be without a parallel in the pages of history. It is possible that in discussing these developments one might first think of the advance in the field of electricity, affecting as it does so many of the larger of the world's affairs to-day, or of the advances in surgery, but of equal importance to mankind are the applications of those new methods of permanent and fireproof construction which are perhaps the most noted advance that the ancient and noble art of architecture has made since the days of Ancient Greece and Rome.

To the introduction of calculus, mathematics and applied science owe their most important advancement. The germ theory gave to medicine its greatest impetus, and is responsible for the new system of preventive medicine. In the same manner a new and important system of architectural construction was evolved and the construction of permanent and fireproof buildings advanced with great rapidity, when in place of the comparatively large pieces of wood, brick and stone, the builders employed the atoms of cement combined with the particles of sand, the crushed stone and the small sections of steel.

The invention of steel, the earliest practical application of which to engineering and architectural construction is still fresh in the memory of many in the profession, rendered possible the erection of the modern tall buildings. Without steel the present-day reinforced concrete systems would be impractible.

INGALLS BUILDING, CINCINNATI, OHIO, DESIGNED BY ELZNER AND ANDERSON. A SIXTEEN STOREY OFFICE BUILDING OF REINFORCED CONCRETE SKELETON CONSTRUCTION, WHICH SHOWS HOW THIS MATERIAL IS BEGINNING TO COMPETE WITH STRUCTURAL STEEL IN THE SKYSCRAPER FIELD.

Reinforced concrete as a general builder's term refers to a Portland cement concrete combined with steel rods. Usually the steel is so disposed in the compound mass that it will care for tensile and shearing stresses that may be set up from any cause, the concrete itself furnishing the compressive strength. To this general rule there is an exception, however, inasmuch as in some types of columns the steel is introduced solely for compression purposes.

The combination of these two construction materials—concrete and steel—which formerly had been and are still being extensively used separately as simple materials for well defined purposes, is from both theoretical and practical considerations a very desirable one. The coefficient of expansion by heat is almost identical for the two materials, so that variations of temperature will have no effect on the composite structure. Probably the most important feature, however, in this connection is that while the concrete is comparatively low in tensile strength its durability and permanency are of the highest order. Steel, on the other hand, although possessing the highest tensile strength of all the common construction materials is one of the least enduring. A bright steel surface is visibly affected by ordinary atmospheric conditions in ten minutes, and unless protected its life is very short. The most efficient and practical protection yet known for steel is Portland cement. Our present knowledge of the subject leads to the conclusion that steel properly embedded in Portland cement concrete is absolutely protected for all time irrespective of moisture conditions. Further, the adhesion of cement to steel is very considerable and has been carefully studied and measured.

Tests have shown that the composite body is perfectly elastic within working limits. While it cannot be claimed that present knowledge of reinforced concrete is anything like complete and all the best formulæ have been deduced for the design of reinforced concrete, still the assumptions are safe on which the approved formulæ are based. In the case of the older materials the formulæ accepted do not apply beyond the elastic limit.

*Full text of illustrated paper delivered before the recent annual convention of the Ontario Association of Architects.

When the architects erected the Pantheon at Rome shortly before the Christian era they knew how to use hydraulic cement so well that the 142-ft. concrete dome of that interesting structure has withstood the elements through nearly two thousand years and it is in perfect condition to-day. Time will not permit of more than a passing reference to the fact that the art of making

EMPIRE BUILDING, SEATTLE. A. WARREN GOULD, ARCHITECT. ANOTHER EXAMPLE OF HIGH OFFICE BUILDING CONSTRUCTION OF WHICH THE ENTIRE FRAMEWORK IS OF REINFORCED CONCRETE CONSTRUCTION.

hydraulic cement appears to have been lost until Smeaton built the Eddystone lighthouse in 1756. Portland cement was first produced in 1824, and for twenty-five years England led in its manufacture. Germany then gained supremacy in cement making until a few years ago when the United States surpassed all other countries as a maker of Portland cement.

The first recorded instance of the use of reinforced concrete was in 1855 when M. Lambot of Paris exhibited a small row boat made of wire netting and cement mortar 1 1-2 in. thick, which is said to be still in use. In 1866 M. Monier was granted patents on reinforced concrete but he confined it to the construction of troughs, waterpipes, tubs and reservoirs. The Germans however are largely responsible for the successful development of the system of reinforced concrete, which they really began about 1880. In France M. Hennebique was the first engineer to design floor beams and slabs and to develop formulæ for proportioning them. The study by American engineers appears to be contemporary with that of the Germans and in 1875, W. E. Ward erected a complete building at Port Chester, N.Y. He built rods into the lower sides of his beams and joists much as they are built to-day, relying on his judgment, in the absence of formulæ, to guide him in proportions. The need of fireproof floor construction is in a measure responsible for the development of the system which was also studied carefully for use in culverts and short span bridges. After the successful completion of the first examples the progress although gradual was uninterrupted. To-day we see this system responsible for the investment of millions of dollars. In the last few years buildings have been erected for every kind of duty throughout the world. Its use is not confined to the construction of the least pretentious, architecturally, of all buildings—the factory. Many elaborate hotels have been erected of reinforced concrete, to say nothing of countless warehouses and office buildings. Even the field of the skyscraper, so long closed to all but structural steel, has been invaded, and we find a sixteen-storey office building in Cincinnati that has a skeleton of reinforced concrete from basement to roof.

The applications of the system are very wide. The engineer to-day is using reinforced concrete successfully for purposes not dreamed of ten years ago. Incidentally he is learning what is not adapted to—knowledge of great value and inseparable from the development of every important system. One writer on the subject says something like this: "Formerly concrete was good for nothing. Then it was applied to everything. Now we are learning that the system is here to take its place amongst the highest types of construction." Its application to architectural requirements will now be discussed, dwelling more particularly on those features which are not particularly referred to by the standard authors, and which concern the architect in his relations to the

KAHN BUILDING, DETROIT, BUILT BY THE TRUSSED CONCRETE STEEL COMPANY, IN ACCORDANCE TO THE SYSTEM WHICH NAME IT BEARS. IT IS AN ALL CONCRETE STRUCTURE WITH THE EXCEPTION OF THE EXTERIOR WALLS. MR. JULIUS KAHN, ARCHITECT.

owner and to the contractors. Time will not permit of a discussion of detail, design and calculation, which is fully taken up in the standard works of reference.

TYPES OF REINFORCED CONCRETE BUILDINGS.

Reinforced concrete buildings may be divided gener-

ally into two classes—entirely of reinforced concrete, and reinforced concrete interior only. Of the latter class there are divisions since we may have an entirely self-supporting skeleton or one in which the exterior walls sustain a proportion of the floor systems. Of the first general type we may take as an interesting example the Imperial Tobacco buildings of Montreal. For the second type with self sustaining skeletons the Chateau Frontenac at Quebec City and the Lyman and the Southam Building in Montreal may be used as good examples. As an instance of floor sustaining exterior walls the Ames-Holden building in Montreal may be taken. These are all Canadian buildings of the highest type for their respective uses, representing heavy manufacturing and warehousing purposes, office use, hotel use, and light manufacturing. As a matter of general interest two

AMES-HOLDEN BUILDING, MONTREAL. ROSS & MACFARLANE, ARCHITECTS. AN INTERESTING INSTANCE OF FLOOR SUSTAINING EXTERIOR WALLS IN REINFORCED CONCRETE CONSTRUCTION.

AMES-HOLDEN BUILDING, MONTREAL, SHOWING REINFORCED CONCRETE FLOOR WORK IN PROCESS OF CONSTRUCTION. IT WILL BE NOTED THAT THE FLOOR SUSTAINING EXTERIOR WALLS ARE CONSTRUCTED SIMULTANEOUSLY WITH THE CONCRETE FRAMEWORK OF THE BUILDING. ROSS & MACFARLANE, ARCHITECTS.

views are shown, one of the 16-storey Ingalls skyscraper, and one of the immense Empire Building in Seattle. Very large buildings such as may be found in all the large cities of Europe and the United States are not yet numerous in Canada. This is not the result of climatic conditions but rather the age and wealth of the other countries.

DESIGN.

As in every other branch of heavy buildings the design of the constructional part of reinforced concrete structures is best carried out by specialists who are, ordinarily, trained architects or engineers who have had actual experience with field construction and who can appreciate fully not only the possibilities but the limitations of the material. That a good mathematical knowledge and considerable constructive ability is necessary need not be emphasised. Reinforced concrete, like many other new systems of construction, has suffered in the past from overzealousness on the part of its friends. Its design should never be attempted by rule-of-thumb methods.

It frequently happens that a building has been laid out for some other type of construction and at a later date the design becomes merely a translation by having reinforced concrete substituted for the material originally intended. Such methods cannot of course produce the best or even passably satisfactory results. For the proper and economical use of reinforced concrete the layout must be studied from that point of view.

TELEPHONE BUILDING, SHANGHAI, CHINA. AN ELABORATELY DETAILED CONCRETE STRUCTURE, WHICH IS ESSENTIALLY A CARVED MONOLITH IN THAT THE EXTERIOR WAS ENTIRELY CUT BY HAND. MATHIEN & JARDIN, ARCHITECTS.

The writer does not for a moment think that reinforced concrete should be used throughout every part of a building. Other things being equal there are many instances of the material having been adopted where some other material would have been much better. Within reasonable limits the material best suited for the purpose should be used. For example, because reinforced concrete has been decided on for an interior, that is no reason why structural steel should not be employed for roof trusses for certain designs, or that terra cotta should not be used for ordinary partitions. Stairways, balustrades and similar details are usually much cheaper and quite as satisfactory in metal.

The selection of the form of reinforcing steel in the present state of the art will depend to some extent on the individual taste of the designer. Some pin their faith to plain bars, many want them twisted, while others rely entirely in their designs on deformed bars of various shapes and types. Good work has been and is being done by all. The writer uses, ordinarily, plain round rods and sees no reason to indulge in anything more expensive. They can be procured practically anywhere in the open market and can be fabricated and put in place for from $37.50 to $47.50 per ton. His next choice is twisted squares, not so much on account of the possible mechanical bond given by the spiral as the fact that the elastic limit of the steel is raised in the twisting and none but high quality will stand the process. Speaking broadly we then come to the "deformed" bars of which there are numerous varieties. The general idea sought by their advocates is to obtain a "mechanical bond" to help out the adhesion between the cement and the plain steel. Many of the best authorities and those who have been instrumental in bringing reinforced concrete to its present state of perfection hold to the opinion that mechanical bond should be adopted in all cases. With this view the writer does not agree. The simple adhesion is sufficient to develop the strength of the steel. If the adhesion does not exist then the mechanical bond will not save the structure. To make satisfactory work the concrete must be made properly wet, in which case it will adhere to the steel. Anything that prevents proper adherence is detrimental and cannot be counteracted by any amount of mechanical bond.

In detail too much stress cannot be laid on the importance of liberal fillets where abrupt changes of shape occur, as they obviate shrinkage cracks in the setting just as they do in cast iron and steel in cooling. Corbels should be introduced where the main beams join columns to to add to the general rigidity of the building. In steel skeletons this duty is performed by knee braces and wind bracing.

Those who have followed the subject closely will have observed the immense amount of discussion that has taken place during the past few years on the general design of column reinforcing. The column has received a great deal of attention through jealousy of the floor space it occupies. The writer will admit that New York and London rentals will demand the maximum available floor space, but he believes that in a general way the space occupied by columns is really not so important as many owners imagine. In any event the desire to decrease column dimensions appeared serious and important and

so it was given special attention. The earliest columns had vertical reinforcement. At a later date, M. Considere of France and Mr. Jameson of Montreal, during the same time and unknown to each other, developed the hooped column, the idea being that the concrete if restrained from side flow would stand a very much greater pressure than othewise, which proved to be true. As an exaggerated example of this action—if loose sand be put into a tube and not permitted to escape, the amount of load it will sustain will depend entirely on the bursting strength of the tube. The "hooped" or "spirally reinforced" column has proven very satisfactory in large tests. Other designers pin their faith to vertical rods placed near the circumference of the column with hoops about the verticals spaced at least as close together as the distance apart of the outer rods. Still other designers would make practically a structural steel column, the concrete encasing it being really for fireproofing only. In the writer's judgment many of the building codes require too low a unit stress, many of the owners have an undue prejudice against putting an extra inch or so on the dimensions of columns, and that there has possibly not been sufficient consideration given to the fact that cement itself is one of the strongest, cheapest and best reinforcements. This phase of the subject will be dealt with at length under the head of by-laws and specifications.

In locating the steel members great care should be exercised to obtain at least 2 inches of concrete outside of all metal in order to protect the steel from the action of fire. A further precaution is necessary to see that the steel members do not come too close together, for two reasons, first in order to provide a sufficient body of concrete to properly transmit the stresses in the composite mass,and secondly to prevent the reinforcing members from acting as a screen to separate the component parts of the concrete in the pouring and thus form voids. Generally speaking there should be at least 2 inches between rods.

The subject of the proper proportions of cement, sand and stone is one worthy of the most careful consideration. On general principles it is well not to have too many formulæ on any one job, because it is confusing to the workman and apt to lead to serious errors, and, again, the different rates of setting for different mixes is very likely to cause shrinkage cracks at the junction of the two. In a general way 1:1 1-2:4 or 1:2:4 makes a very good mix for columns and 1:2 1-2:5 for beams and slabs.

Concerning the advantage of rich mixtures, Prof. Talbot in one of his most recent pamphlets says: "The effect of the amount of cement used in the concrete is very marked and cement is shown to be an economical reinforcing material for compression members. A 1:1 1-2:3 concrete at 60 days gives an average ultimate strength of 2,300 lbs. per sq. in., while a 1 :2 :4 gave 1,740; 1:3:6, 1,030; and 1:4:8, 575; under the same conditions."

If rich mixes are decided upon they should be used with regard to uniformity not jumping from say 1:1:2 for columns to 1:2 1-2:5 for beams.

INTERIOR OF TELEPHONE BUILDING, SHANGHAI, CHINA, SHOWING ARCHED TRUSSES OF THE REINFORCED CONCRETE ROOF.

For dwellings cinder concrete is amply strong enough for floors and is much lighter than that made with sand and stone. The best authorities appear to agree that no detrimental effect is to be feared by the possible presence of sulphur in the cinders acting on the steel.

For floor work all of the standard floor reinforcements are good and in the writer's judgment this point resolves itself into one of price. In heavy floors 3-8 in. or 1-2 in. rounds are very satisfactory. The wire reinforcements are also good, the wire being of high tensile strength and convenient to handle.

Regarding rust on the steel, the best authorities agree that a slight amount of rust is not harmful and indeed some consider it beneficial. The writer in his practice prefers the steel to be practically free from rust.

A most important feature of the design is the accuracy of the plans. It must be remembered that the reinforced concrete type of building is unique, inasmuch as every element of the structure goes on the ground in its

CANADIAN GENERAL ELECTRIC COMPANY'S TRANSFORMER HOUSE, PETERBORO. A STEEL FRAME STRUCTURE, WITH CONCRETE WALLS AND FLOORS.

raw state bearing absolutely no resemblance to its finished form. The superintendent and inspector must be supplied with absolutely correct information or later on the wail will be heard that it is very difficult to make alterations in reinforced concrete.

CONSTRUCTION.

The correct plans can only be executed by a competent and skillful superintendent co-operating with a qualified building inspector. (Kindly note the word co-operation.) The claim so commonly heard by the advocates and friends of reinforced concrete that it is cheap because unskilled labour can be employed, must be properly interpreted. Unskilled labour may be used and should be used in the proper place, but that place is not the position of responsibility in reinforced concrete structures. The superintendent and the inspector must be able men and the chief foremen engaged in the work should be first-class men or unnecessary cost will be the result.

The particular duties of the inspector are to see that the plans are faithfully adhered to and that the materials are properly received and stored. The cement, sand and stone require special attention. The alignment and cleanness of the formwork and the accurate fabrication and placing of the steel, he should check up while there is yet time to rectify any errors.

The testing and care of the cement is of great importance. Only well-known standard brands of cement should be used. The store-house must be perfectly dry in every particular and the cement must be so piled that no error may result through the use of untested cement. Tension briquettes should be made on all cements, their chief use being the gain in strength through time. On most buildings this of course is quite useless since ordinary requirements demand the use of the cement before the tests are complete. Consequently all but the short

CONCRETE FACTORY, BUDAPEST, SHOWING THE OUTSIDE COVERED STAIRWAY, THE REGULATION EMERGENCY EXIT PLACED ON ALL HUNGARIAN FACTORIES, WHICH EMPLOYEES ARE REQUIRED TO USE DAILY.

period tests are practically eliminated. The "boiling" or "constancy of volume" test is in the opinion of the writer of the greatest importance to detect the presence of free lime. It must be made every time. All the standard brands will always pass the tensile and fineness tests, but the writer has known many of them to fail at times in the boiling test. Failure to pass the boiling test may mean that it is only necessary, if nothing better can be done, to pile the cement with plenty of air space so that the lime may have an opportunity to air slake. This may take six weeks but even at that it may be the only remedy.

INTERIOR VIEW OF CANADIAN GENERAL ELECTRIC COMPANY'S TRANSFORMER HOUSE, PETERBORO, SHOWING THE STEEL BEAMS AND GIRDERS AND TRUSS WORK OF THE ROOF.

The writer has been forced at times to deal with thousands of barrels of cement in this way—cement which had passed all the other tests quite satisfactorily. Where possible such cement should be removed and replaced by satisfactory material. The writer does not for a moment

INTERIOR VIEW OF CONCRETE FACTORY, BUDAPEST. AN EXAMPLE OF THE EXTREMES TO WHICH THIS MATERIAL IS EMPLOYED, THE SUPPORTING FRAME WORK AND ROOF TRUSS BEING ENTIRELY OF CONCRETE.

wish to belittle the standard tests; he only wishes to point out the advantage of one of the speediest and easiest of the tests on cement, and at the same time for construction purposes one of the most important. The boiling test as described in the latest government specification is as follows: To test the soundness of the cement, at least two pats of neat cement mixed for five minutes with 20 per cent. of water by weight shall be made on glass, each pat about three inches in diameter and one-half thick at the centre, tapering thence to a thin edge. To be well trowelled to work out air bubbles and surplus moisture. The pats are to be kept under a wet cloth until finally set, when one is to be kept in fresh water for twenty-eight (28) days. The second pat will be placed on the rack in "Faija hot bath tank" over the vapor of water heated to 170 Fahr. and allowed to remain there from three to four hours, after which it will be placed in the hot water, temperature 170 Fahr., where it will remain for the balance of the twenty-four hours, and then be allowed to cool. In some cases it will be found desirable to raise the temperature of the water to the boiling point 212 Fahr. Neither sample should show distortion or cracks. If possible all the standard tests should be systematically conducted on important jobs.

The sand used plays a more important part than is generally supposed. There are sands which look all right, but which will not make strong mortar. The sand should be siliceous, not necessarily sharp, but well graded as to size of the particles, and comparatively clean. As an instance of the extreme case of absolutely "sharp" sand with evenly sized grains we have the "standard sand" of the laboratory which is a finely crushed and screened quartz, and it will not make a mortar approaching in strength or density that made by pit sand.

The stone where fireproofing is a consideration should be trap, if it can be obtained. The grading of the particles is also of great importance. For example the resultant concrete will be much stronger and denser if made with a stone varying from 1-8 in. to 1 in. than if made with pieces uniformly 3-4 in.

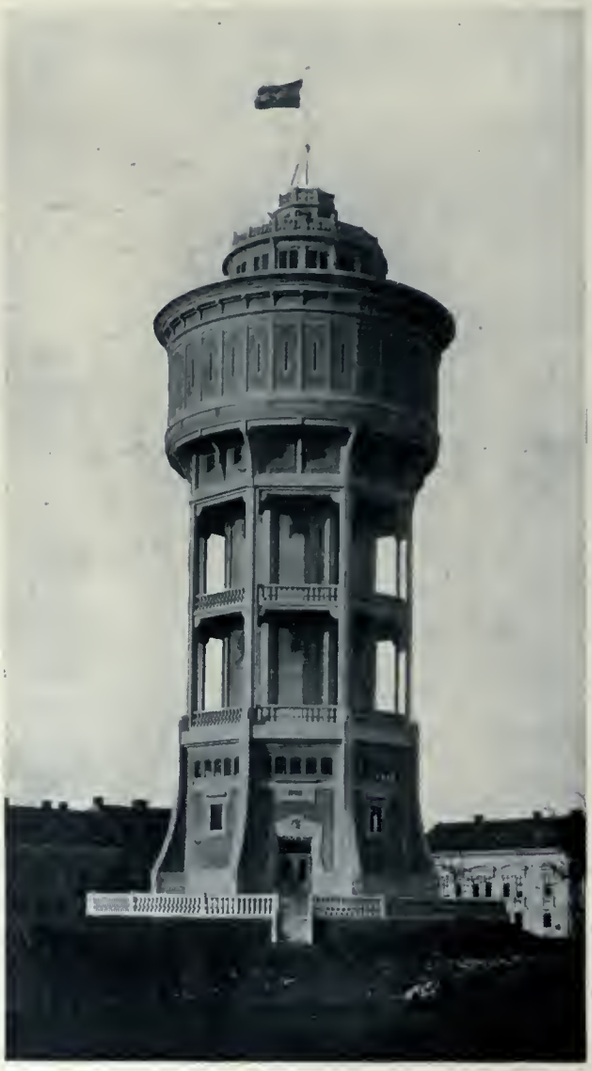
Speaking generally, the strongest, cheapest and densest concretes result from a mixture graded as to size all the way from the cement particles to the coarsest bits of the broken stone. On every job this should be determined by actually making and breaking specimens of concrete and by any of the standard methods of ascertaining the voids in the sand and stone.

Gravel may in some cases be used advantageously to replace stone. The resulting concrete is entirely satisfactory and some pits exist where little or no correction is required to allow the use of pit run. The voids, however must be carefully determined and checked from time to time.

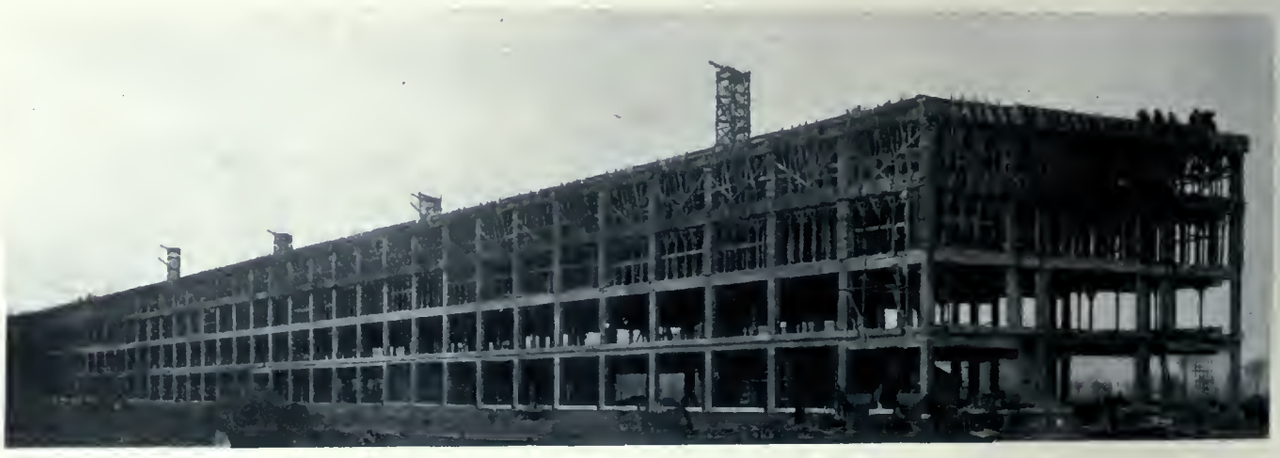
The steel must be kept clean and absolutely free from oil or grease of every kind.

All the moulds should be kept clean, carefully aligned and braced. They should be thoroughly cleaned of all chips, rubbish and dirt before the steel is placed. In columns a small hand hole for cleaning purposes ought to be made in the moulds just above each floor level.

The steel itself should be fabricated in units before being placed into the moulds and be so supported by rigid means that it will not be displaced during the pouring and manipulation of the concrete. If the steel



A CONCRETE WATER TOWER IN BUDAPEST, SHOWING THE ARTISTIC POSSIBILITIES OF THIS MATERIAL, WHEN IN THE HANDS OF CAPABLE DESIGNERS. M. ZELINSKI, ARCHITECT.



VIEW SHOWING CONSTRUCTION WORK ON A SECTION OF THE FORD MOTOR CAR COMPANY'S FACTORY AT HIGHLAND PARK, MICHIGAN, THE LONGEST CONCRETE BUILDING IN THE WORLD.

of any individual member be not rigidly fastened together by wires then the rods themselves should be held in place by small rounds or flats bent to the required shape to hang the members from the moulds. The effect of misplacement is readily seen when it is remembered that if the rods get too low in a beam, say, they are not protected from fire and will probably not be sufficiently encased in concrete to take their proper stresses, while if they are too high they are not so well able to care for the bending moment and will consequently be stressed to a higher limit than the designer intended.

It is quite unnecessary to remark that such glaring errors as the substitution of reinforcement must be carefully guarded against—an error which has occurred through carelessness or in substituting something "just as good" where the intended pieces have been lost.

The mixing or actual making of the concrete is important. It is a well-known fact that a rich mixture may result in a poor concrete through insufficient turning. On the other hand a leaner mix may make an excellent concrete if turned sufficiently. For this reason the writer in every case uses a batch mixer, and of the batch mixers he prefers a type from which a small quantity at a time may be conveniently drawn if desired. This brings up the question of the necessity of thoroughly stirring up a batch that may be standing for a few minutes in a hopper or barrow before drawing off a quantity or depositing it. Unless this is done where the broken stone is very heavy, it will be found to have settled to the bottom and the first part of the effluent will be coarse and stoney, leaving the mortar to follow by itself.

Sufficient water should be used to make a wet mixture. Dry concrete cannot be successfully used because it will not adhere to the steel without a great amount of ramming, and ramming is in most cases absolutely impossible. Water makes one of the best pounders and it insures the adhesion required, but it is not advisable to make the concrete too wet. There is a certain state of wetness which gives the best results and the best descriptive terms the writer can think of are "stickiness" and "toughness," attributes of mortar that cement finishers are very careful to watch and which can be only obtained by experience. It is better to have the mix too wet than too dry. Immediately on depositing, the concrete should be thoroughly manipulated or puddled. For columns this can be readily done with rods or gas pipes. In beams and plain walls a set of prongs formed out of thin steel plate, much like a potato fork with wide prongs, can be used to work back the stone from the wall faces and release the bubbles of air and water which otherwise would form pitted surfaces.

IMPERIAL TOBACCO COMPANY'S BUILDING, MONTREAL. A TYPICAL EXAMPLE OF AN ALL CONCRETE STRUCTURE. NOTE HOW SATISFACTORILY THE CONCRETE HAS ASSIMILATED THE ARCHITECTURAL LINES. MR. ROBERT FINDLAY, ARCHITECT.

IMPERIAL TOBACCO COMPANY'S STABLE, MONTREAL. VIEW SHOWING THE ARRANGEMENT OF STALLS AND THE WELL LIGHTED AND SANITARY CHARACTER OF THE CONCRETE INTERIOR. MR. ROBERT FINDLAY, ARCHITECT.

Where very wet mixtures are used with some cements a coating of slimy, inert material called "laitance" may be found on the top of the concrete a few hours after it has been in place. This should be carefully scraped off the surface before renewing operations.

In pouring floors care should be exercised to see that the slab work is done continuously with the beams to ensure monolithic action. After concrete has set it is difficult to make a perfect bond. This, however, is entirely obviated if the first concrete has not set up and the formulæ of the mix of the two is not very dissimilar. In stopping overnight, it is now generally agreed that the proper place to make the joint is by a bulkhead at the point of no shear, which is generally the centre of the floor beams and slabs. This line is best jogged somewhat and on resuming, if the surface be broken down a little and swabbed with a 1:1 mortar a better joint will result.

In order to permit the concrete to attain its maximum strength it must be given all the water necessary to complete the chemical action of the cement in crystallization.

For this reason, for two or three weeks it is well to sprinkle the work at intervals with the hose, to assist the concrete to mature. In very hot weather the work should be covered with canvas, kept damp.

On no account should reinforced concrete work be

LYMAN SONS & COMPANY'S NEW BUILDING, MONTREAL. THIS BUILDING DEMONSTRATES THE POSSIBILITIES OF QUICK CONSTRUCTION IN REINFORCED CONCRETE, THE FRAME WORK, INCLUDING ALL FLOORS AND THE ROOF, WAS COMPLETE TWO AND A HALF MONTHS AFTER EXCAVATION. MITCHELL & CREIGHTON, ARCHITECTS.

attempted at temperatures below the freezing point unless it is absolutely necessary. The risk involved is great and the necessary expense renders the operation commercially impracticable. The writer was on one occasion compelled to do some building work with the thermometer at 4 below zero. The work was satisfactory, but fo rthe sake of your pocket, your bodily comfort and your peace of mind, don't try it. Incidentally he has done very complicated reinforced concrete work with the thermometer 104 in the shade and 140 in the sun. Again he says "don't try it," and the reasons are the same. At all normal temperatures between 40 and 90 the work can be successfully and economically conducted without unusual precautions. The ideal weather for the work is cloudy at a temperature from 45 to 65.

The question of the removal of formwork requires to be handled with judgment. More time is required to enable the concrete to set up at low temperatures. Ordinarily the forms should reman on the sides of beams and walls ten days, and on the bottom of beams and slabs a week longer. Shores should be left under beams as long as practicable extending from floor to floor and storey to storey. The removal of forms prematurely is responsible for all the accidents to reinforced concrete buildings that have come to the writer's notice.

Throughout the discussion under the head of construction it would appear that the word "careful" has been used too many times. If the writer were considering a revision he would only add the words "Be careful." After all, this is the course pursued in every other high grade construction. Care and experience are exercised right along. In a steel superstructure the designs are by a skillful designing architect or engineer. The details are by experienced draughtsmen. The drawings are made with great accuracy, and are checked by a high priced checker. The material passes through the shop in the hands of experienced men, under the eye of the inspector of the bridge company and also of the architect's inspector. Every operation of riveting, facing, cleaning and painting are watched. In the field, the erectors are really experienced mechanics and the field inspector follows the work to completion. Reinforced concrete requires only a corresponding amount of care and good judgment.

BY-LAWS AND SPECIFICATIONS.

The extremely wide variations in the limits set by the municipal authorities are very unsatisfactory from a constructor's viewpoint. The art has so far advanced that a common basis of permissible stresses should be adhered to. To obtain this, in Canada, the writer would suggest that your Association immediately take in hand the appointment of a representative committee composed of, say, five persons conversant with the practice and limits of reinforced concrete construction for architectural purposes. A very desirable committee would appear to be two architects, one member of the Canadian Society of Civil Engineers and two representing the specialists in the art.

As an instance of the need of some common and rational basis for concrete in compression, the building laws of New York permit 750 lbs. per sq. in. Toronto permits less than half this amount, namely 350. The writer is aware of specifications demanding as low as 300. The French Government Commission recommended 2-7 to 3-5 of the ultimate strength as determined by tests on 90 day concrete, thus permitting about 900 pounds per sq. in.

This question is a large one and should be settled on a reasonable basis at once. Until it is officially dealt with recommendations are useless. The actual strength of various sized masses of concrete in compression must be considered, because four square inches loaded in an

INTERIOR VIEW OF LYMAN SONS & CO.'S NEW BUILDING, MONTREAL. MITCHELL & CREIGHTON, ARCHITECTS.

area of four square inches is an entirely different thing from one hundred inches loaded all over to the same unit

CONCRETE MANSION AT PORT CHESTER, N.Y. A RESIDENTIAL STRUCTURE WHICH COST ABOUT $200,000. THE EXTERIOR WALLS IS A STRIKING EXAMPLE OF THE USE OF CONCRETE BLOCKS IN THE HIGHER TYPE OF RESIDENTIAL DESIGN. CARRERE & HASTINGS, ARCHITECTS.

CONCRETE MANSION AT HAVANA, CUBA. MR. CLEMENT B. BRUN, ARCHITECT. NOTE THE EASE AND GRACE WITH WHICH THE PLASTIC CHARACTER OF THE CONCRETE HAS YIELDED TO THE HAND OF THE DESIGNER. BOTH THE TREATMENT AND FINISH ARE HIGHLY COMMENDABLE.

of load. Again the various mixtures must be taken into account and the strength of the concrete at various ages. At the same time the age at which the building is to be loaded and the possible extent of the maximum live load must also be considered. The results of the most reliable tests must be collected and properly weighed. The records of existing buildings in the detail design of their members and the duties they have performed must also be used. Many of the large American cities as well as the European cities and countries have studied the question and adopted regulations which appear to be generally satisfactory.

EXTERIORS AND EXTERIOR FINISH.

In the present state of the art, and for our climatic conditions, concrete is not recommended for exteriors. With this view most of the exponents of reinforced concrete will agree. This is partly due to the fact that the lines of our present day buildings are the result of the development of building design in wood, brick and stone. It is incumbent upon the architects themselves to develop a general design to suit the new material. That satisfactory exteriors have been produced in concrete all must admit, but these are altogether too expensive when compared with other types. The telephone building in Shanghai, China, was actually cut by hand over the whole exterior and is essentially a carved monolith. What would happen to such a suggestion at American stonecutters' wages? Architects have always risen to the occasion no matter what the available building material and it is only a question of time when this problem will be solved.

If, for certain reasons, concrete must be used for exteriors, then do not make it an imitation of something else. It has enough virtues to render no apologies necessary for its appearance. On general principles of course imitations should be avoided. Originally, the idea in stone structures was to hide the weakest parts—the joints. Appreciating the difficulty of this, designers later adopted them as a feature. Attempts to make concrete look like stone by making marks to imitate joints is inexcusable. Good, honest concrete need not stand as an imitation.

In a general way we think of concrete as a material good enough in appearance to be put into underground culverts or into bald, engineer-designed retaining walls. What a relief then when we find walls performing these utilitarian functions broken up by the introduction of a base course, a coping and possibly a pilaster or two, and yet professing to be nothing more than they are—good, honest concrete.

It is the ordinary custom after removing the forms from concrete exteriors to daub the outside wall surfaces over, with cement grout on a whitewash brush. A more unworkmanlike, pasty-looking, characterless surface cannot be imagined. Certainly, satisfactory surfaces are difficult to obtain, but is must be a very poor surface that a wash will improve. Plastering, also, in any form is to be condemned both on account of its lack of permanency and absence of character. The only way to obtain a reasonably uniform coloring is to have the whole supply of cement necessary for the exterior, as well as the whole supply of sand, mixed thoroughly, separately, and stored in bins to be drawn from as required. This of course is a difficult thing to do.

DAMAGED WAREHOUSE OF THE DAYTON MOTOR CAR COMPANY, DAYTON, OHIO, WHICH IS DEMONSTRATIVE OF THE FIRE-RESISTING PROPERTIES OF CONCRETE. THE FIRE STARTED ON THE FOURTH FLOOR OF THE CONCRETE STRUCTURE ON THE RIGHT, WHERE IT BURNED ITSELF OUT. THE ADJOINING BUILDING TO WHICH THE FIRE WAS COMMUNICATED WAS COMPLETELY GUTTED.

The possibilities of the material are great, but for exteriors, practical systems and designs yet remain to be developed. The custom of using a fairly dry mortar for face work deposited simultaneously with what is called a dry-body concrete or even a wet concrete, should be discouraged. In such a structure there are two widely different substances; one, mortar exposed to all changes of temperature, the other, concrete, more protected. The result is in the best of work that the hard mortar surface will crack into squares of about 8 ft. each way, the cracks extending to the heavy concrete backing. The writer knows of many such cases in concrete as good as to be beautifully crystalline in structure. A very rich face-work mortar may set so much faster than the body concrete that a distinct cleavage crack will result. Ordinary

wet concrete will give as good a surface without a facing mixture, will not crack the same way and is much cheaper.

Crazing or map cracks result from the improper floating of too much pure cement to the surface, combined with lack of opportunity to properly mature.

GRAIN WAREHOUSES IN TUNIS, AFRICA. A REMARKABLE PICTURE SHOWING TWO LARGE CONCRETE STRUCTURES THROWN 25 DEGREES OUT OF PLUMB, OWING TO ESCAPE OF QUICK SAND ON WHICH THEY WERE BUILT. BOTH WERE BROUGHT BACK TO A VERTICAL POSITION WITHOUT DEVELOPING A CRACK IN EITHER STRUCTURE. THIS WAS DONE BY LOADING SAND ON THEIR HIGH SIDE AND EXCAVATING UNDERNEATH.

INTERIORS AND INTERIOR FINISH.

For the interior of factories there is not the slightest difficulty in producing a surface right off the forms and good enough for anything. In many instances too great care is demanded in the finish of surfaces because it is thought "form boards can be easily planed." Too much planing and carpentry adds materially to the cost and serves to accentuate the slight warping of the boards inevitable as soon as they are called on to retain the wet concrete. Such demands do not appear to be reasonable when the same proprietors would be perfectly satisfied with the very rough surface of an interior brick wall and the irregularities of structural steel connections and surfaces. The alignment of the forms, however, should be good.

Interiors for factories may be finished in cold water paint applied directly to the concrete and if desired on the lower parts of the walls a dado may be painted in oil. Take care, however, that the concrete is dried out, for the result of the combination of the paint, oil and the alkalies out of the cement may give something that looks suspiciously like soft soap and it may be found next morning that the most of the dado has slipped down into the hospital cove. On dry concrete there is no trouble with oil paint.

In cases where a good finish is desired the writer does not believe in trying to get it in concrete. Make a regular plaster finish. Use rough lumber for the forms, thereby cheapening the formwork and getting a better surface to plaster on. To plaster on smooth concrete walls is difficult even with Keen's cement.

The wearing surface of floors may be of cement or other material. If of cement the best results are obtained, if time permits, by finishing the floor immediately after making the slab and then protecting it against damage from continuing the building operations. For many purposes hardwood floors are excellent. They are best secured by embedding 2 in. x 2 in. screeds in a layer of cinder concrete, deposited at a convenient time on top of the concrete slab and after the cinder concrete has dried out swab it with roofing tar, nail an under floor diagonally on the screeds and the hardwood to the under flooring.

In floor systems where shallowness of slab is not a consideration several types of construction have been devised. One of these, quite inexpensive and satisfactory, is of combination tile and reinforced concrete, in which between each roll of tiles the reinforced concrete plays the part of a joist.

For lighter floor work, as for residences, slabs are now being cast in factories in lengths up to 21 ft. and widths of 4 ft. ready to span from wall to wall without beams of any kind. Metal lath fastened on the ceiling provides a sure bond for the plaster which hides the joints.

ADVANTAGES OF REINFORCED CONCRETE SYSTEMS.

In a general way some qualities of reinforced concrete buildings obtrude themselves very forcibly. The principal of these are fire-resistance, absence of vibration, increasing strength with age, rigidity and economy.

Instances of the fire-resisting qualities of reinforced concrete buildings are numerous. The great conflagrations as well as individual fires bear testimony to this virtue. A consideration of the nature of the members

INTERIOR VIEW OF WAREHOUSE, TUNIS, AFRICA, SHOWING WORKMEN EXCAVATING UNDER HIGH SIDE SO AS TO PERMIT THE BUILDING TO SETTLE TO A VERTICAL POSITION.

shows clearly why this is so. A natural stone, if heated to say 1,500 or 1,700 degrees F. is apt to crack from end to end or to continue spawling off until the bulk of it is removed. Steel if heated to such temperatures reddens and is unable to bear any load. Good concrete only dries out and continues by non-conduction to preserve the interior steel from heat injury.

The writer is frequently asked about the safety of reinforced concrete buildings when heavy vibrating machinery is placed on upper floors. There is practically no vibration. He knows of one building in which batteries of trip hammers are at work about the fifth floor and no difficulty is experienced. In another building high speed, heavy chopping machines are at work and in the floors above and below the occupants know nothing about it from noise, vibration or in any other way. In the Kitterlinus buildings in Philadelphia there is an interesting comparison of two buildings used for printing machinery and the like. One is of steel, the other of reinforced concrete. In the former the vibration is considerable while in the latter it is scarcely perceptible. The sound proofness is also remarkable.

It cannot be said that any type of building other than reinforced concrete improves with age. Some types remain as strong as when new but none except concrete increase in strength. For this reason the contractor himself runs probably more risk with his building than anyone else. He has the structure in its tenderest stages and it is not recorded as far as the writer is aware that difficulty in the matter of strength has ever occurred after the building left the contractor's hands. True, many accidents have happened, but we believe these have in almost every case resulted from the premature or improper removal of forms.

That reinforced concrete buildings possess a remarkable amount of rigidity or power to act as a unit is well known. Explosions have occurred in them without serious damage to the structure. One of the columns supporting a loaded coal pocket in France was accidentally knocked out by a derailed locomotive—but the loaded coal pocket with its thousands of tons of coal did not come down. Two grain warehouses in Tunis, having settled about 25 degrees out of plumb through the escape of quicksand on which they were built were loaded down with sand on their high side and thus with the assistance of excavating beneath the high side were brought back to the vertical without developing a crack in the structures.

As to the cost it is impossible to give general figures other than to say that the actual cost depends altogether on local conditions and requirements. Everything being equally favourable for, say, steel and reinforced concrete, the cost may not be materially different, although the writer is aware of heavy reinforced concrete buildings that have been completed for 10 per cent. less than the tendered price for the same in steel. As to formwork itself the cost of it may be made to run from 25 per cent. to 75 per cent. of the total cost of the concrete work.

CONCLUSION.

In the present state of the art, the highest type of a reinforced concrete building is that with a brick or stone exterior. What may be evolved in the next few years no one can say. At the present, we cannot fully understand and appreciate some of the unusually excellent results obtained in tests, but it is only a matter of time, with the co-operation of the architect, the engineer, the laboratory expert and the concrete exponent, when we shall know all about them and how these results are to be obtained in daily practice. The system has developed fast and is still developing. Development means modification and who can say what the final result may be? Enthusiasts are spending their lives in trying to perfect new cements. Capital is being added to the general industry daily. Already hundred of millions of dollars worth of buildings have been built of this new type in a few years. One firm of specialists alone has erected over twenty-five thousand reinforced concrete buildings. The subject is receiving the attention of all the leading scientific bodies in the engineering world. That it is sound engineering to make haste slowly along well tried lines, however, no one will deny.

The subject is a large one and constantly growing. Possibly an appropriate closing remark of this brief discussion is a definition of reinforced concrete, namely Portland cement, sand, stone, water, steel and—brains.

GROWTH OF INTERIOR WOODWORK.---Beamed Ceiling and Panelled Walls Gaining Favor.---Dull or Natural Finish Popular.

WHAT IS KNOWN as the mill work business, the manufacture and putting up of interior woodwork, in dwellings especially, has developed wonderfully the last few years, not so much in point of quantity as in quality. There has been a continual seeking for something better, for something different, and at present the builders of good homes want a wood that furnishes naturally something near the color scheme they have in mind, and this they want finished natural or with a slight stain. They don't want the old paint coloring, but they want a wood that shows a grain and has distinct characteristics of its own and generally they want it dull finished; not highly polished or covered over with a cheap, flary varnish, but well rubbed and neatly finished.

All this is pretty well known to the woodworking trade, but now there comes a new idea that is startling at first, but eventually carries us back to old times, says a writer in a recent issue of the Woodworker. There is quite a tendency to decorate rooms all over; that is, finish the interior walls with woodwork of one kind and another instead of plastering, calcimining or papering, especially where the builder can afford it. It is rather expensive to do this in conformity with modern ideas because of the artistically laid panels and the use of practically clear stock that can be finished natural. But in spite of its expensiveness it is gaining in favor with those who can afford it and it is adding materially to the volume of the woodwork of the planing mill.

This recalls old times inasmuch as in the earlier days, in what might be termed the pioneer days of modern home building in this country, most of the houses were ceiled with lumber, both on the walls and overhead, and either finished natural or painted in whatever colors were desired. Lots of excellent lumber has been put up and had the figure spoiled by painting. Some of the old-time houses, instead of ceiling overhead, had dressed and beaded beams or heavy joists which were painted, and the bottoms of the floor on top of it were painted, too, and this made the ceiling of the room. There is now quite a tendency to turn to this old beam effect also, but, of course, in a different manner, just as they would return to interior wood decorating in a different manner.

In the earlier days the idea was to get an interior lining for the house at a comparatively small expense, and very little was thought of the artistic features of the wood itself. Generally where some one wanted to put on style, as it was called in those days, they painted the ceiling. Then came the plastering, which began in the cities distant from the source of supply, where wood was scarce, following next into the prairie sections of the country, where lumber was also valuable, but finally coming into such general use that plastering lath and plaster practically crowded out wooden ceiling in nearly all house building. So now to have plastering begin to give way to interior wood decorations for the walls naturally recalls old times, but it is not carried out in the old-time way. Artistic effects are studied and designs are varied wonderfully and different kinds of woods are used, making it expensive rather than economical, but the people want it, and it looks like there is going to be quite a lot of this kind of interior woodwork in the next few years.

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Vol. 2 March, 1909 No. 5

Current Topics

VANCOUVER HAS THE ONLY FIRE HALL in America that is exclusively equipped with motor car machines. This certainly speaks volumes for Western Canada enterprise.

* * *

FIVE HUNDRED AND FIFTY FEET above the water is to be the height of the bridge which is shortly to be built across the Snake River Canyon at Shonshone Falls, Utah. This will be the greatest altitude at which a bridge has ever been placed. The span of the structure from cliff to cliff will be 1,140 feet.

* * *

IN GENERAL DIMENSIONS the concrete piers of the Clover Bar bridge on the Grand Trunk Pacific Railway at Lethbridge will, it is said, outrank anything of their kind in Canada, and perhaps in the world. There are four of them, two of which are 140 feet high and the others seven feet less in height. The bridge from abutment to abutment is 1,660 feet in length. The piers extend forty feet below the surface of the water.

* * *

WOOD IS TO BE EXCLUDED almost entirely in the construction of the new Government building to be erected by the United States at San Juan, Porto Rico, for use as a post office, court house, and customs house. One reason why this material is being avoided is because there is an omnivorous small ant indigeous to the island, which eats its way up through wooden doors, casings, chairs and desks and makes them spongy on the inside. The structure is to be built of reinforced concrete. All interior doors will be rattan and the only place about the building where wood will be employed, will be in the window sashes on one side of the edifice.

WHAT IS DECLARED will be the first town of exclusive concrete construction in the world is to be established at Metaline, Washington, in the heart of the lead-mining district of the same name 105 miles north of Spokane. The cement which is to be used in the construction of the buildings will be supplied by a large Eastern company who owns large deposits near by. The company will erect a 2000 barrel plant at a cost of $1,500,000.

* * *

MR. MARK L. BUFFY, a well-known architect of London, Ont., recently passed away at his home, 905 Dame street in that city. Mr. Buffy was born in Aylmer, and at the time of his death was 63 years old. He came to London nineteen years ago, where he built up an extensive practice. Besides his wife he is survived by three sons, Messrs. R. Buffy, A. C. Buffy and W. A. Buffy, of London, and one daughter, Mrs. A. G. Bayles, of Toronto.

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EIGHTY THOUSAND CUBIC YARDS OF ROCK was recently removed in one blast from the big bluff which obstructed the right of way of the Grand Trunk Pacific into Prince Rupert. This is declared to be the largest and most successful blast in railway construction work on that line west of Montreal. Two months were consumed by the contractors in tunnelling and cross-cutting beneath the bluff on grade level and facing the harbor. These huge pockets were loaded with 75,000 pounds of explosives and connected by wires with a powerful galvanic battery several hundred yards distant. When the shot was fired, the whole mass was lifted with almost volcanic force several hundred feet in the air and dropped into the sea. It is estimated that nearly $15,000 worth of dynamite was used in the blast.

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A TECHNICAL CLAY-WORKING SCHOOL will be established in Western Ontario if the petition to be presented to the Provincial Government, asking that $10,000 be appropriated for that purpose is favorably acted upon. A resolution authorizing that the Legislature be asked for this amount was passed by the Western Ontario Brick-makers' Association at their fifth annual convention recently held at Blenheim. The need of a school of this character is said to be very urgent and it is suggested that the Government immediately establish an institution to be conducted along similar lines to the several clay-working schools in the United States. Officers of the association elected for the ensuing years are: Honorary president, Adolph Whelan, Rodney; president, John Milner, Kingville; 1st vice-president, A. W. Hill, Essex; 2nd vice-president, John Wadell, Blenheim; secretary-treasurer, A. Whelan, Cairo.

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EDMONTON'S NEW BUILDING BY-LAW has been approved of by the city council, and will be formally passed at its next meeting. The measure is modelled somewhat after the Winnipeg code, and is said to cover the ground very thoroughly. It is understood that the by-law will bring about a number of reforms in the construction of buildings which will be of great benefit to the city. No structure under two stories in height will be permitted to be erected within the first class fire limits, and the practice of appealing from the decision of the building inspector to the city council for special permits to build in violation of the restrictions, is to be done away with. The alleged action of the council in the past in conniving at breaches in the building law, and the increasing rate of insurance, some time ago brought forth a strong protest from the Edmonton Board of Trade, with the request that a new set of regulations be drafted and rigidly enforced.

CEMENT MAKERS IN THE UNITED STATES have recently perfected a combine which is said to practically include all the big mills in that country. The organization is known as the Association of Licensed Cement Manufacturers, and it is capitalized at $200,000,000. The president of the Association is John B. Lober, head of the Vulcanite Portland Cement Company, and the concerns interested in the merger are said to have a collective annual output of 36,610,000 barrels. Recent advices state that the selling price of cement will be fixed at $1.50 per barrel at the mills.

* * *

STEAM ENGINES AND BOILERS and other forms of motive power are fast outstripping manual labor as means of operation in the industrial life of Japan. In a recent report to Department of Trade and Commerce, Trade Commissioner W. T. R. Preston, of Yokahama, states the importation of machinery of this class, which was little more than $100,000 in the year preceding the war with China, has now grown to a total annual valuation of approximately $1,500,000. Of the motive power used, steam stands first, with the electric and kerosene or gas engine in second and third place respectively. Practically all engines and boilers of over 50 h.p., as well as a certain class of special small engines, are imported, the trade at the present time being proportionately divided among Great Britain, United States, France and Germany in order named.

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THE THIRD ANNUAL CONVENTION of the Canadian Naitonal Builders' Association, held in Ottawa, the early part of this month, went on record as being decidedly in favor of extending the Industrial Disputes Act so as to include the building trades disputes. The question was taken up by a deputation appointed for this purpose, with Hon. Rudolphe Lemieux, who pointed out that the Federal Government had no jurisdiction over questions of civil and property rights, and that the matter rested with the provincial authorities. It was also suggested by the deputation that the Federal Government enact a general employer's liability law, basing the amount of compensation on the earning capacity of the victim. The convention was a most representative one in every respect, delegates from all parts of the Dominion being present. The officers elected for the ensuing year were: President, J. A. Crain, Ottawa; vice-president, William Tytler, London; secretary-treasurer, J. H. Lauer, Montreal; vice-president for Ontario, John Whittaker, London; director for London, Geo. S. Gould.

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FRESHLY PLASTERED ROOMS are said to be perfectly dried in three days' time by an apparatus in which considerable interest has been taken by the builders of Sheffield, England, where it was recently demonstrated. It is claimed that by this system all excessive moisture can be completely removed from the walls without any deteriorating effect. The apparatus consists of a stove with a fire box, suitable for coke fuel, surrounded by a number of small diameter tubes, similar to gas pipes. By means of the apparatus fresh, dry outside air enters constantly into the air-supply tubes, and is highly heated in the tubes surrounding the fireplace. It ascends in a dry-heated state in the room, passes along the ceiling and walls, and absorbs the dampness, sinking down after being saturated with the same and reentering the apparatus. It then mixes with the coke gases in the outlet tube for the smoke, and eventually escapes into the chimney. This constantly renewed fresh outside air furnishes an abundance of carbonic acid to the mortar, thus hardening it, and producing in a short time the same effect as if the mortar had dried naturally. It is claimed by this system that no moisture can possibly show later on.

NEW AUTOMATIC EXIT DOORS which have recently been place on three Toronto theatres, have proved so efficient and reliable in operation that the City Architect and the Chief of the Fire Department will insist on all playhouses in the city being equipped with them. This type of door, which is not barred or bolted in any manner, necessitates only a slight pressure of a person's body against large plate in the centre to cause it to spring open. The door cannot be opened from the outside but any crush or jam on the inside will immediately release the catch and make it fly outward. The door, it is said, is a most excellent device, and one that will facilitate egress in event of an emergency.

* * *

ESNACH BARRAGE, the final unit of the great system of works by which the Nile floods are to be controlled, has been completed. This interesting piece of engineering had its beginning in the construction of the Assouan dam which is capable of retaining 2,300,000,000 tons of water, to be delivered to the lower reaches of the river when required. To control the distribution weirs or barrages were built at intervals along the river, one at Zifta, and one at the arm of the Delta; one at Assiout 230 miles from Assouan, and the Esnach which has just been opened. The dam at Assouan has gates which lift at the touch of an electric button. Every morning a message from Cairo tells just how much water is needed. The new barrage is situated at a distance by the river of 162 kilometers north of the Assouan barrage, and stretches across the Nile at a height of 9.2 meters above low water mark. It is 900 meters long, and is piereed by 120 doors with locks.

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NINE HUNDRED MILLION GALLONS is to be the capacity of the mammoth water tank which is to be erected at Calcutta, India, for municipal purposes. This huge receptacle, the contract for which was recently awarded to Messrs. Clayton, Sons and Company, Leeds, England, in a world wide competition, is to be the largest water tank in the world and over 7,000 tons of steel will be required in its construction. The reservoir itself will be 321 feet square and 16 feet deep, and it will be divided by cross frames into four equal sections. In order to insure a pressure that will adequately supply all parts of the city, the bottom of the tank will be placed at a height of over 90 feet above the ground level. It will be supported upon 81 steel trestles, each composed of four heavy rolled-steel beams, braced together at intervals by smaller beams, and each trestle will carry cross beams at the top to support a 40-foot section of the tank floor. The weight of the contents of the tank, it is estimated, will be equal to 40,000 tons.

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AN INGENIOUS RAILWAY GATE, which automatically lowers and raises with the approach and departure of trains at grade crossings, has been perfected in a working model just completed by Mark Ridout, a Glace Bay, N.S., inventor, who has been at work on the problem for several months. The gates used are of the ordinary drop pattern type with back balance, and they are operated by a suitable gearing attached to a small steel rope which passes over a pulley and extends along the track to a shoe placed beside one of the rails. The shoe projects slightly above the rail and upon the approach of a train, the weight of the engine on it causes the gates to immediately descend. They remain down until the last car passes over a releasing shoe on the other side of the crossing, when a catch is freed and the gates swung up out of the way by the balance weight attached to them. Both an operating and a releasing shoe are provided on either side of the crossing so that mechanism will work upon a train coming from one side or the other.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—The Nasmith Company has taken out a permit for a two-storey bakery to be erected on Sterling Road at a cost of $40,000. J. F. Brown, Board of Trade Building, is the architect.

Toronto.—The factory of the Jones Bros. Company, at the corner of Richmond and Sheppard streets, has been damaged by fire to the extent of approximately $3,500.

Toronto.—A permit has been issued for a five-storey brick factory and two-storey brick boiler house to be erected on Richmond street, near Jarvis street, for Robertson Bros., 103-113 Queen street east, at a cost of $40,000. M. Hall, 180 Crescent road, is the architect.

Woodstock, Ont.—The Oxford Knitting Company has awarded the contract for its new factory to be erected on Ingersoll avenue to W. J. Taylor. The building, which is to cost $18,930, will be 200 by 57 feet, two storeys and basement in height, with boiler and dye house separate.

Welland, Ont.—Plans have been prepared for a factory to be erected for the Welland Stove Works, Limited, which has just been organized. The directors are: E. A. Playfair, Buffalo; W. S. Davis, Ann Arbor, Michigan; B. J. McCormick, Capt. Hugh A. Rose and W. J. Telford, Welland.

Niagara Falls, Ont.—The McGlashan-Clark Silver Works have been badly damaged by fire. Loss not stated.

Demeretsville, Ont.—The grist mill owned by the Crowe Estate, and leased by Mr. McKibbon, of Cherry Valley, have been destroyed by fire.

Hamilton, Ont.—Messrs. Stewart & Witton have purchased the old Central Church property, on which they will erect a four-storey building to be used for light manufacturing purposes.

Hamilton, Ont.—Messrs. Stewart & Witton have taken out a permit for a $5,000 brick addition to the Canada Steel Goods Company's factory on Arthur street.

Berlin, Ont.—Mr. D. Knipfel, Berlin, will erect a new block to be occupied by the Pearl Laundry.

St. Catharines, Ont.—Architect A. E. Nicholson, 15 Queen street, has prepared plans for a forge shop to be erected for the Whitman & Barnes Mfg. Co., Ltd. The building will be of stone, with steel trusses, corrugated iron roof, electric lighting.

Preston, Ont.—The Preston Car & Coach Company's building, in course of construction, has been destroyed by a wind storm.

London, Ont.—The McClary Co. are contemplating the installation of sprinkler system in its plant at the corner of Adelaide and Trafalgar streets. Their plant comprises a power house, finishing shops and storage warehouse.

London, Ont.—The Murray Shoe Company has taken out a permit for the erection of a factory building on Richmond street.

London, Ont.—The premises of the Roberts Engraving Company have been badly damaged by fire. Loss not stated.

London, Ont.—The Globe Casket Company has made arrangements for the rebuilding of its plant, which was recently destroyed by fire.

Sault Ste. Marie, Ont.—Manager Franz of the Lake Superior Corporation, which has recently been taken over by English capitalists, states that the company will immediately commence extensive additions to the open hearth furnaces at the Algoma steel plant in the Canadian Soo. It is reported that the company will erect new blast furnaces and a structural steel plant.

St. Thomas, Ont.—The coal hoist plant and buildings of the Pere-Marquette railroad at this place have been destroyed by fire. Loss on plant and buildings estimated at $10,000, partly covered by insurance.

Bruce Mines, Ont.—The boiler house, air compressor building, electric light plant and hoist house, together with all the machinery, with the exception of two dynamoes, at Bruce Mines, Ont., have been destroyed by fire.

Montreal.—Architect Joseph Perrault, 17 Place d'Armes Hill, has awarded the following contracts for the erection of the Campbell Mfg. Co.'s new factory in Ville St. Louis: Stone work, Chas. Charbonneau; mill work, Paul Demers; cast-iron, Canada Iron Corporation; architectural iron, Montreal Architectural Iron Works.

St. John's, P.Q.—The St. John's Straw Works have been destroyed by fire. Loss not stated.

Norton, N.B.—Harmer's flour and corn meal mill has been totally destroyed by fire. Loss estimated at approximately $15,000, with $11,000 insurance.

Sydney, N.S.—It is stated that the directors of the Dominion Iron and Steel plant, at this place, are contemplating the erection of a large extension to their plant, for the manufacture of rolled steel.

Montreal.—Architects MacVicar & Herlot, 104 Union avenue, have awarded to Messrs. D. G. Loomis & Son, 261 St. James street, the general contract for the erection of the Eveleigh factory in St. Henri.

Calgary, Alta.—The Calgary Windmill & Pump Company, Limited, a new incorporation, with capital of $50,000, will erect in the near future a large factory for the manufacture of pumps, windmills, saws, etc. The officers of the company are: Thomas Armstrong, President; John McGowan, Vice-President; D. D. McGillvray, Secretary and General Manager; R. A. Brocklebank, Director.

Gas Plants, Elevators and Warehouses

Toronto.—The Copp-Clark Publishing Company has applied for a permit to erect a two-storey warehouse and factory, to cost $40,000, on Wellington street west, near Portland street.

Sarnia, Ont.—Plans have been prepared for terminal facilities for the Northern Navigation Company, at Sarnia, including the construction of docks 750 feet in length, extending from Cromwell street, on which will be built warehouses for freight, and waiting rooms. An umbrella awning of steel will be erected to protect the passengers from inclement weather. It is intended to have the changes and improvements completed by June 1st.

Orangeville, Ont.—Messrs. Clarke & Hannah's grain elevator has been completely destroyed by fire. Loss not stated. Partly insured.

Victoria Harbor, Ont.—The Canadian Pacific Railway has awarded to the John S. Metcalf Company, of Chicago, the contract for the erection of a 2,000,000 bushel grain elevator at Victoria Harbor, Georgian Bay. Contract price, $200,000, this sum including the building of wharves and other necessary equipment.

Montreal, P.Q.—Mr. J. T. Molson, 906 Notre Dame street east, has taken out a permit for alterations to warehouse. Cost of improvement, $19,500.

Montreal.—Architect H. C. Stone, 84 St. Francois Xavier street, has awarded the general contract for the erection of a warehouse in Dolorimier for E. M. Heney Co., Ltd., to D. G. Loomis & Son, 261 St. James street.

Winnipeg, Man.—Mr. E. F. Hutchings, of the Great West Saddlery Company, will erect a large wholesale house on James street.

Prince Rupert, B.C.—The Grand Trunk Pacific Railway will in the immediate future construct a warehouse, 300 feet long, on the wharf at this place.

New Westminster, B.C.—It is understood that the Board of Trade will take active steps toward the establishing of an elevator in this city.

Vancouver, B.C.—Mr. K. Burnett, of Nanton, Alta., has secured a site here near the foot of Heatley avenue, on which he will erect a large grain elevator and warehouse.

Vancouver, B.C.—Plans have been completed for a warehouse to be erected on Powell street, near Campbell avenue, for Mr. R. Bowman. It will be of concrete and brick construction, and will cost approximately $30,000.

Vancouver, B.C.—Messrs. H. Mooers & Company, Kingston, Ont., will erect a large elevator on the Vancouver waterfront. The company are negotiating with the C.P.R. for a suitable site. Messrs. Webber & McConnell, Flack Block, are local representatives of this firm.

Saskatoon, Sask.—Messrs. A. Carruthers & Company, of Winnipeg, have purchased a site here on 23rd street, adjoining the Wentz-Birkland Lumber Company, on which they will erect a large warehouse.

Rouleau, Sask.—Messrs. Conger & Company's elevator at this place has been destroyed by fire. Loss not stated.

MacLeod, Alta.—Mr. E. F. Hutchings, of the Great West Saddlery Company, Winnipeg, will erect a large warehouse at this place.

Edmonton, Alta.—The Exchange Mart and the warehouse of the Great West Implement Co. at this place were damaged by fire to the extent of $10,000 and $3,000 respectively.

Electrical Construction

Toronto.—The Hydro-Electric Power Commission has awarded contracts for the electrical equipment of twelve stations on the transmission lines between Niagara Falls and Toronto, and Niagara Falls and St. Thomas. The Canadian General Electric Company has secured a contract for about two-thirds of the total equipment, and the Canadian Westinghouse Co. for about one-third.

Toronto.—The Hydro-Electric Commission will in the near future call for tenders for the building of eleven transformer stations, at the following points: Niagara Falls, Dundas, Toronto, Guelph, Preston, Berlin, Stratford, St. Mary's, London, Woodstock and Brantford.

Niagara Falls, Ont.—A survey is being completed by W. D'Arcy Ryan, illuminat-

ing expert, for the permanent illumination of the cataract, Niagara Falls. The principal battery will be located at the transformer house of the Ontario Power Company, on the upper river bank; another at a point opposite the middle of Goat Island, and a third at the spillway of the Ontario Power Company. It is understood that the cost of installation alone will be at least $150,000.

Guelph, Ont.—Tenders will be received up to 4.30 p.m. March 17th for electric fixtures for the Guelph Armoury. Plans and specifications are on file at the Department of Public Works, Ottawa, and at the office of Mr. W. Mahoney, architect, Clerk of Works, Guelph. Napoleon Tessier, Secretary, Department of Public Works, Ottawa.

Montreal.—The Eastern Electrical Engineering Company, 76 Victoria Square, have been awarded the contract for the electric wiring of the low level pumping station at Point St. Charles.

Winnipeg, Man.—Tenders will be received at the office of the undersigned up to 11 a.m., April 15th, for the manufacture and delivery at Winnipeg of two testing transformers, viz.: One 30 K.W. at 80,000 volts, and one 200 K.W. at 200,000 volts, also for control equipment therefor. Specifications are on file at the Power Engineer's office, Carnegie Library Building, Winnipeg, or at the office of Smith, Kerry & Chace, Confederation Life Building, Toronto. M. Peterson, Secretary, Office of Board of Control, Winnipeg.

Toronto.—A by-law will be submitted to the local ratepayers in April for the purpose of authorizing the expenditure of $400,000 for the completion of the seawall.

Brantford, Ont.—Plans and estimates will be prepared for the erection of a new bridge on South Market street. City Engineer Jones can be addressed.

Sault Ste. Marie, Ont.—The ratepayers have passed a by-law granting a bonus to the company of capitalists which proposes to erect a drydock and shipbuilding yards at this place. The company agrees to build a drydock valued at half a million dollars, also shipbuilding yards at cost of several millions. The principals behind the project are Mr. M. J. O'Brien, mining owner and contractor; Mr. J. J. McFadden and Mr. Anderson, of Ottawa.

Port Arthur, Ont.—The Provincial Government has decided to construct a dam at Dog Lake, near Port Arthur, to raise the level of the river, provide a large storage, and increase the water power. It is understood that on the completion of the dam, the power will be administered by the Hydro-Electric Commission.

Lindsay, Ont.—Mr. John Ritchie, Beamsville, Ont., has been awarded the contract for the erection of the new bridge, locks and dam at this place. The work will be commenced at one.

Port Hope, Ont.—Damage to the extent of approximately $25,000 has been caused at Port Hope by the over-flowing of the Ganeraska River. The following are some of the structures destroyed, viz.: the Canton bridge, Helms' dam, the electric light plant footbridge, the Barrett's Hill bridge and the C.P.R. foot bridge. The north side of the cement bridge on Walton street has also been badly damaged.

Peterboro, Ont.—City Engineer Hay has prepared a new set of plans for the proposed Smith street bridge, which call for an expenditure of approximately $30,000, and provides for an eighteen foot roadway, with sidewalk on each side, two piers, and two abutments.

Peterboro, Ont.—Representatives of the County of Peterboro, the Township of Harvey, and the Town of Bobcaygeon have taken up the matter of reconstructing and relocating a number of bridges across the new Trent Canal, and the extension of the wharf at Lakefield.

St. John, N.B.—At a meeting of the Navy Island Bridge Committee preliminary plans were submitted by Mr. E. W. Holt, C.E., for the proposed structure, which it is estimated will cost $750,000. The bridge will be a double decked structure, providing for railway, vehicular and foot traffic, and will be fifteen hundred feet in length.

St. John, N.B.—At a meeting of the Board of Works it was decided to recommend to the City Council that rebuilding of Wiggins wharf be made to provide for a three hundred foot ell at the end, to cost $3,500.

Annapolis, N.S.—Tenders will be received up to 4.30 p.m., March 23rd, for the construction of three ice piers in the Annapolis River at Annapolis Royal, N.S., according to plans and specifications on file at the offices of C. E. W. Dodwell, Resident Engineer, Halifax, N.S.; E. G. Millidge, Resident Engineer, Antigonish, N.S.; the office of the Postmaster at Annapolis Royal, and at the Department of Public Works, Ottawa. Napoleon Tessier, Secretary, Department of Public Works.

Victoria, B.C.—Repairs to the collapsed section of the outer wharf will be commenced at once. Plans have been prepared for the work, which it is expected will cost approximately $25,000.

Vancouver, B.C.—Messrs. Hermon and Burwell have presented the Civic Harbor Improvement Committee detailed plans for the proposed enlargement of the deep water harbor. The scheme embraces the construction of a breakwater two miles in length, the construction of a canal from English Bay to Coal Harbor, and the building of locks at the mouth of False Creek.

Edmonton, Alta.—The Provincial Government Engineers have completed plans and specifications for a high level traffic and street railway bridge to be built at some point between Fourth and Ninth streets. The estimated cost of the structure is $300,000.

Waterworks, Sewers and Canals

Toronto.—The following sewers for the Deer Park district have been recommended by the City Engineer: Yonge street, from old city limits to present city limits; Farnham avenue, from Yonge street to a point 1,320 feet west; Olive avenue, from Yonge street to a point 1,330 feet west; St. Clair avenue, from Yonge street to east side of Marlborough Crescent; DeLisle avenue, from Yonge street to Marlborough Crescent; Marlborough Crescent, from St. Clair avenue to Heath street, Heath street, from Yonge street to a point 628 feet east of Oriole road; Clinton avenue, from Lawton avenue to a point 588 feet east of Oriole road; Gormley avenue, from Lawton avenue to west end; Lawton avenue, from Heath street to north of city limits; Jackes avenue, from Yonge street to east end; Rosehill avenue, from Yonge street to east end; Pleasant avenue, from Yonge street to east end; St. Clair avenue, from Yonge street to a point 110 feet east; Alvin avenue, from St. Clair avenue to north end; Ferndale avenue, from St. Clair avenue to north end; Clarence avenue, from Yonge street to a point 870 feet east; Gordon avenue, from Clarence avenue to north end; Glen avenue, from Yonge street to 570 feet.

Burlington, Ont.—Tenders will be received up to 8 p.m., March 23, for the following sections of the proposed waterworks system, viz.: (a) pipe-laying; (b) pump house; (c) water tower; (d) cast-iron pipes; (e) hydrant valves; (g) electrically operated pumping machinery; (f) pump well. Plans and specifications for "a," "c," "d" and "e" may be seen at the office of the Clerk, Burlington, or at the office of Willis Chipman, C.E., Chief Engineer, 103 Bay street, Toronto.

Edmonton, Alta.—The City Council has passed a by-law authorizing the expenditure of $40,000 for sewer improvements.

Vancouver, B.C.—Engineer Burwell has outlined to the Civic Water Committee a proposal for the extension of the waterworks system, including the construction of the Little Mountain reservoir, and its connection with the Seymour mains. Specifications for this work have been prepared.

Weyburn, Sask.—Tenders will be received up to 8 p.m., April 7th, for the following sections of proposed waterworks system. (a) pipe laying; (c) water tower; (d) cast iron pipes; (e) fire hydrants and valves. Plans and specifications may be seen at the office of the Secretary-Treasurer, Weyburn, or at the office of Willis Chipman, C.E., Chief Engineer, 103 Bay street, Toronto.

Railway Construction

Ottawa, Ont.—It is reported that the Grand Trunk Railway will purchase the materials required in the erection of the Ottawa Terminal Station, D. G. Loomis & Son, general contractors, Montreal, having cancelled their contract.

Hamilton, Ont.—The Street Railway Company will lay new tracks on Herkimer, James and Barton streets this year, and will later reconstruct the system on York and King street west, and Locke street. The contract for cement has been awarded to the Lakefield Portland Cement Company.

Bluevale, Ont.—The Grand Trunk Railway station and freight shed at this place have been completely destroyed by fire. Loss not stated.

Montreal.—It is stated that the various railways having entrance into Montreal are considering the erection of a new union depot on a scale equal to the best railway terminals in the world, and envolving an expenditure of from ten to twelve million dollars.

Calgary, Alta.—The City Commissioners have awarded to the Northwest Electric Company, a local concern, the contract for the supply of copper wire for the street railway. Contract price, $17,339.60. Other contracts which have been awarded are: Motor generator, set and switchboard, Chalmers-Bullock Co., $15,950; 750 h.p. engine, Pohl Engineering Co., Amherst, N.S., $14,300; 1,100 tons of steel rails, Gorman, Clancy and Grindley, Calgary, $70,000. The ties will be supplied by the East Kootenay Lumber Company.

Public Buildings

Toronto.—Architects' plans will be received up to April 1st for the new city registry office to be erected on Albert street, at the rear of the City Hall.

Toronto.—A deputation consisting of Ald. Hilton and Chisholm and Messrs. Moneypenny and Clarke have waited on the Public Library with a request that the Board erect a branch building at the corner of Broadview avenue and Gerrard street. Mr. H. T. Kelly, K.C., has been elected chairman of the Board.

Toronto.—The contract for the new Transportation building to be erected at the Exhibition grounds has been awarded to Mr. Frank Armstrong, 296 Berkeley street, at a contract price of $85,279, with $2,640 additional for a top flooring of maple. The building will be one storey in height, 337 by 153 feet, and will be built of cut stone and pressed brick. Geo. W. Gouinlock, 1100 Temple Building, is the architect.

Ottawa.—The Board of Control has approved of the proposal for a new grand stand at the Exhibition grounds, combined with a fire station for the south end. This will involve calling for new tenders for the grand stand. Estimated cost, $35,000.

Ottawa.—The Public Works estimates include the sum of $30,000 to complete the refinery at the Royal Mint. This amount does not include the machinery or the cost of its installation.

London, Ont.—In all probability the City Architect will, in the near future, be asked to prepare plans, specifications and estimates for the erection of a new City Hall.

Lucknow, Ont.—A new library and public hall, towards which Andrew Carnegie has donated $7,500, will be erected in the near future.

Glencoe, Ont.—Mr. Geo. A. Proctor, Sarnia, has been awarded the contract for the new Post Office and Customs Building to be erected here.

Owen Sound, Ont.—The town of Owen Sound has under consideration the remodelling of the interior of the town hall at estimated cost of $12,000.

Montreal.—Labelle & Lessard, 668 St. Urbain street, have been awarded the contract for the erection of the new armoury on Pine avenue for the 65th Regiment. Plans for the building were prepared by Architect R. A. Brassard, 9 St. James street.

St. John, N.B.—It is proposed to either remodel the present City Hall by the construction of an additional storey or to erect a new building. The matter is now under advisement.

Winnipeg, Man.—In all probability a large wing, to cost $200,000, will be built to the Kennedy street Court House. It is understood that work on the structure will be commenced in the early summer.

Winnipeg, Man.—Application will be made by the Winnipeg Horse Association for the privilege of erecting a pavilion, up to the street line, on the property between Osborne and Colony street, facing Broadway. The Association proposes to erect a building to cost $40,000.

Magrath, Alta.—Architect Jas. A. McDonald, Lethbridge, has prepared plans for a new two-storey town hall to be erected here at a cost of $5,000. The building will be of brick construction.

Strathcona, Alta.—The City Council has decided to offer the Government a free site for the proposed Armory, for which the Government has appropriated $10,000.

Fernie, B.C.—Messrs. Gray & Campbell have been awarded the contract for the erection of the new City Hall. The building will be of red pressed brick with Calgary sandstone trimmings.

Banks

Toronto.—Architects Darling and Pearson, 2 Leader Lane, have prepared plans for a fire-proof building to be erected at the corner of Queen and Yonge streets for the Bank of Montreal.

Montreal.—Architects Ross & McFarlane, 1 Belmont street, have prepared plans for the erection of a branch bank building for the Dominion Bank, at the corner of Prince Arthur street and St. Lawrence Boulevard.

Three Rivers, Que.—Architects Daoust & Lafont have prepared plans for the erection of a bank building for the Bank Nationale.

Kamloops, B.C.—The Bank of Hamilton will erect a new bank building at the corner of Victoria street and Third avenue, to cost $30,000.

Business Buildings

Toronto.—The Canada Cycle & Motor Company, Limited, will erect a three-storey building on Richmond street, adjoining the Gayety Theatre. It will be 85 by 112 feet, and includes showroom, offices, garage with full equipment of oil and gasoline storage plant, elevator and repair department.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a two-storey store and dwelling to be erected on Roncesvalles avenue, near Howard Park avenue, for Mr. M. Grogan, 55 Hewitt avenue, at a cost of $3,000. It will be of brick construction with stone foundation, felt and gravel roof, hardwood and pine floors, pine interior finish, open plumbing, hot air heating, combination lighting.

Toronto.—Architect E. R. Babington, 28 Toronto street, has prepared plans for three two-storey stores and dwellings to be erected on Queen street east, near Kew Beach, for Mr. Cecil Lee, at a cost of $6,000. The buildings will be of brick construction, with felt and gravel roof, open plumbing, hot air heating, combination lighting, galvanized iron cornice and skylights.

Toronto.—Messrs. Love Bros., 1000 Gerrard street east, have been awarded the contract for a store and dwelling to be erected on Gerrard street east, near Galt avenue, for Mr. Wm. Segwick, at a cost of $3,000. It will be two storeys in height, of brick veneer construction, with open plumbing, hot air heating, combination lighting, plate glass, leaded glass and electric bells. P. H. Finney, 43 Victoria street, is the architect.

Toronto.—Mr. Chas. A. Grant, 192 Pape avenue, will erect three attached stores and dwellings on the north side of Queen street, near Elmer avenue, at a cost of $7,000. The buildings will be of brick construction, with stone foundation, felt and gravel roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, metal ceilings, plate glass, three mantels and electric bells.

Toronto.—R. H. Graham, 862 College street, will erect a pair of stores and dwellings on Bloor street, near Gladstone avenue, at a cost of $4,000. The building will be of brick construction, with felt and gravel roofing, hardwood and pine wood interior finish, open plumbing, combination lighting, hot water heating, leaded glass and mantels.

Toronto.—Mr. T. Collins has been awarded the general contract for the erection of a two-storey store and dwelling at the corner of Gladstone avenue and Hanam street for Mr. Wm. Collins, 742 Gladstone avenue, at a cost of $3,900. It will be of brick construction, with brick foundation, felt and gravel roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting.

Hamilton, Ont.—Messrs. Southam, Limited, have purchased the premises formerly occupied by Messrs. Morgan & Co., on King street east. The property will be remodelled, and will be occupied by The Spectator Company.

Wallaceburg, Ont.—Mr. D. Gagnier has decided to erect a large departmental store on the property adjoining his hotel, work to be commenced at once.

London, Ont.—Architect Wm. G. Murray has prepared plans for alterations to the building of Wm. Pratt, Hyman street. The work includes new plumbing and hot water heating system, and will cost $2,000.

Berlin, Ont.—Mr. R. Pinke has been awarded the contract for the erection of a two-storey addition to the premises of Messrs. Lang Bros.

Thorold, Ont.—Architect T. H. Wiley will receive tenders up to March 16th for alterations to business block, to be used for grocery and liquor store, for Mr. J. T. Petrie. Specifications include cement work, cut stone, metallic lath, reinforced concrete, ornamental iron, sheet metal work, plate glass, art glass, prismatic glass, refrigerator, oak interior finish, electric lighting and hot water heating.

Montreal.—Architect G. A. Monette, 97 St. James street, has awarded the following contracts for repairs and alterations to the Pratt Estate: Carpentry, F. Lamontagne; painting, D. Lamontagne; heating, E. Lesperance; steel work, Dominion Bridge Co.; elevator, Darling Bros.; metal ceilings, Pedlar People.

Montreal.—Messrs. Reid, MacGregor & Reid, 1552 St. Hubert street, have been awarded the contract for alterations and repairs to the London & Lancashire Building, 164 St. James street.

Montreal.—Architect Joseph Sawyer, 407 Guy street, has awarded the following contracts for the erection of stores and dwellings at corner of Dufresne and St. Catherine streets: Brick work, Marsan Bros.; carpentry, Francis Harel; plumbing, heating and roofing, P. N. Sevigny; plastering, Joseph Fabien; painting and glazing, B. Havert.

Montreal.—Architects Ross & Macfarlane, 1 Belmont street, have awarded to Messrs. D. G. Loomis & Son, Cote St. Paul, the general contract for the erection of a block of stores and offices at the corner of Guy and St. Catherine street west for Messrs. Southam, Limited.

Montreal.—Messrs. Henry Birks & Sons, Ltd., have taken out permit for alterations and repairs to building at 306 St. Catherine street west, to cost $10,000. Hutcheson & Wood, Royal Insurance Building, architects.

Three Rivers, P.Q.—Architects Daoust & Lafont have prepared plans for the erection of a store for Mr. Badeau.

Three Rivers, P.Q.—Architects Daoust & Lafont have prepared plans for the erection of a block of stores and residences for Mr. Balcer.

Moncton, N.B.—Architect W. C. Barnes has prepared plans for a store to be erected for Mr. R. N. Wyse at a cost of $10,000. It will be of brick construction, with stone trimmings, electric lighting, hot water heating, modern plumbing, birch and white wood interior finish, freight elevator, metal ceiling, plate and prismatic glass.

Winnipeg, Man.—Messrs. Oldfield, Kirby & Gardner have taken an option on the property between the new general post office and the Northern Bank Building, on which they propose to erect a large office block. The property has a frontage of 40 feet on Portage avenue, and depth of 110 feet.

Vancouver, B.C.—Architects Grant & Henderson have awarded to J. J. Dissette the contract for the erection of a brick store and rooming house at Davie and Hornby streets. The structure will cost $15,000.

Vancouver, B.C.—Architects Parr & Fee, have awarded to Mr. Peter Tardiff the contract for the Filion building to be erected on Carrall street at a cost of $20,000.

Vancouver, B.C.—Mr. J. S. Helyer has completed plans for an eight-storey structure to be known as the "Exchange Building," to be erected on Hastings street. The owners are Mr. J. S. Helyer, Mr. E. W. MacLean, Mr. J. W. Weart and others.

Vancouver, B.C.—Architects Hooper & Watkins have prepared plans for a six-storey office building to be erected for Mr. Geo. E. Bower. It will be located next to the Eastern Townships Bank, on Granville street, and will be of steel and concrete construction. The stairways will be of marble, and passenger and freight elevators will be installed.

Vancouver, B.C.—A permit has been issued covering the erection of a three-storey brick block on Pender street, between Hornby and Burrard streets, for Mr. F. Fuller. Estimated cost, $24,000. Architects, Parr & Fee. Contractor, George S. Williamson.

Victoria, B.C.—The British American Trust Company is contemplating the erection of an office building in the central part of the city.

Victoria, B.C.—The B.C. Land and Investment Co. is considering the replacing of the present building occupied by Hiram Walker & Sons, corner of Langley street and Fort street, with a new four-storey structure.

Victoria, B.C.—Plans have been prepared for a two-storey building containing twelve stores with offices above, to be erected on Government street, near Chatham street, for Lim Bang.

Lethbridge, Alta.—Mr. Wm. Ott will extend his block on Round street back to the lane. Architect Jas. A. McDonald has prepared the plans for the addition.

Calgary, Alta.—It is reported that the T. Eaton Co., Ltd., has secured lots here on 8th avenue with a view to erecting a large departmental store. It is expected that the sum of $500,000 will be expended on site and building.

Edmonton, Alta.—The Royal Fruit Company, represented here by Mr. H. C. Stockton, has purchased lot 215 on Third street, on which they will erect a two-storey solid brick building. Plans will be prepared at once, and construction started in the course of a month or two.

Edmonton, Alta.—Messrs. Miller, Spencer & Cannell have taken out a permit for the erection of a $30,000 store and office building on Jasper avenue, between Fifth and Sixth streets.

Edmonton, Alta.—Teese & Persse, large wholesalers of Winnipeg, are contemplating the erection of a large business building at this place.

Edmonton, Alta.—Mr. J. A. Powell, Fraser avenue, has taken out a permit for the erection of an office building to cost $12,000.

Regina, Sask.—Messrs. Willoughby and Duncan will erect a large business building this coming summer. The building will be five storeys in height, and the main floor will be laid out for stores.

Regina, Sask.—The Heintzman Piano Company, of which Mr. E. E. Corbeau is local manager, will erect new premises near the Post Office. The foundations will be laid with a view to erecting a five-storey building, but in all probability not more than two or three storeys will be built this year.

Clubs and Societies

Montreal.—An extension to the Y.M.C.A. building on Dominion Square is being considered by the Directors. The following committee has been appointed to further report on the matter; J. W. McConnell, Chairman; G. W. Birks, L. Cushing, W. H. Goodwin, A. F. C. Ross, E. C. Budge and R. H. Macdonald. The proposed addition will cost $250,000.

Asylums and Hospitals

Hamilton, Ont.—At a special meeting of the Board of Works Dr. Roberts and a deputation from the Board of Health

made application for funds with which to build a new isolation hospital. The Finance Committee appointed a sub-committee to consider the matter and report.

Goderich, Ont.—The Hospital Board is considering the erection of an addition to the present hospital building for the accomodation of both the nurses and patients. The following officers have been elected: President, Judge Holt; vice-president, Judge Doyle; treasurer, C. A. Hairn; secretary, H. E. Hodgens.

Montreal.—Architects Hutchison & Wood, Royal Insurance Building, have prepared plans for a building to be erected at the Protestant Infants Home. The structure will be of brick, and cost $50,000.

Halifax, N.S.—Mr. Walter Lownds has been awarded the contract for the erection of a building for the Children's Hospital, Halifax, N.S., as per plans prepared by Architect W. M. Brown. The building will cost $15,057.

Winnipeg, Man.—In all probability the management of the Children's Home, River avenue, will either make an extension to the present building, or replace it with an entirely new structure of much larger dimensions.

Vancouver, B.C.—The Associated Charities propose taking immediate steps to secure funds for the building of an infirmary ward in connection with the General Hospital.

New Westminster, B.C.—Plans prepared by Architect Salt have been submitted to the Royal Columbia Hospital Managers for the central section of the proposed hospital building. The plans call for a brick and stone structure, 250 by 130 feet, to cost over $100,000.

Toronto.—Plans have been prepared by Architect A. J. Rattray, 18 Washington avenue, for a Rescue Home, for which an option on a property on College street has been taken. The building will be known as the Burn Memorial.

Toronto.—A site for a sailors' home has been requested of the Board of Control by the Upper Canada Tract Society, of which Mr. J. K. Macdonald is President. The proposition is to erect a building to cost $15,000.

Toronto.—The Trustees of the House of Industry have made application to the Board of Control for a grant of $50,000 to enlarge the institution.

Toronto.—Architects Dennison & Stephenson, 20 King street west, have prepared plans for the Nurses' Home and new wing to be erected in connection with the Hospital for Incurables, Dunn avenue. The buildings will be of brick construction, with brick foundation, slate roof, hardwood floors, hardwood and pine interior finish, open plumbing, steam heating, combination lighting, metal lath, plate glass, steel beams and steel columns.

Churches

Toronto.—The congregation of Fern avenue Presbyterian Church purpose erecting a new edifice to cost $50,000, at the corner of Garden and Roncesvalles avenue.

Toronto.—Tenders will be received at the office of the undersigned up to 5 p.m. March 19th, for the plastering of St. Helen's Roman Catholic Church, Dundas street and St. Clarens avenue. J. P. Hynes, architect, 199 Yonge street, Toronto.

Port Colborne, Ont.—The Presbyterian congregation propose to expend the sum of $3,500 for remodelling their church, which was recently damaged by fire.

Ottawa, Ont.—The congregation of St Bartholomew's Church will erect a new church on Buena Vista Road, Rockcliffe, on a site which has been donated for that purpose.

Stratford, Ont.—It is estimated that $15,000 will be spent in improvements to St. Joseph's Roman Catholic Church this year. It is intended to install new seats, remodel the interior, and tile the aisles.

Peterboro, Ont.—At a meeting of the congregation of Knox Church it was unanimously decided to erect a new edifice sometime during the coming summer. A large sum of money has been donated towards the new structure, and a committee has been appointed to have plans and specifications prepared.

London, Ont.—The Trustees of St. John the Evangelist Church have purchased a lot on the corner of Adelaide and Grosvenor streets, on which they intend to erect a new church. Rev. W. T. Hill, pastor.

Montreal.—Architect Chas. Bernier, 70 St. James street, has prepared plans for the erection of a Roman Catholic Church in Ville St. Paul.

Montreal.—Architects Ross & Macfarlane, 51 Bank of Ottawa Building, have prepared plans for a new church of St. Matthias to be erected on the corner of Cote St. Antoine Road and Churchill avenue. The building will be of the Gothic style of architecture, 90 by 150 feet, and will be built of Indiana limestone. It will cost $45,000.

Bedford, Que.—St. Damien's Roman Catholic Church at this place has been destroyed by fire, entailing a loss of $40,000, with insurance of $7,000.

Winnipeg, Man.—The congregation of the Dufferin avenue Presbyterian Church will erect a new church.

Vancouver, B.C.—Plans are being prepared and work will be commenced at once on the erection of a new church at West Burnaby. Rev. W. H. Barraclough may be addressed.

Regina, Sask.—The Baptist congregation has decided to erect a new church to cost $48,000.

Lethbridge, Alta.—Mr. T. O. Johnston, of North Dakota, will erect a three-storey brick block at this place on the corner of Burdett and Dufferin street. The building will be used as lodging house and restaurant, and will be 34 by 125 feet. Architect, James A. McDonald, Lethbridge.

Saskatoon, Sask.—Architects Storey & VanEgmond, Regina, have prepared plans for a large addition to the Empire Hotel at this place. It will be of brick construction, and modernly equipped.

Residences and Flats

Toronto.—Architect E. R. Babington, 28 Toronto street, has prepared plans for a pair of semi-detached two-storey dwellings to be erected on Lee avenue for Mr. W. N. McEchern, Leuty avenue, at a cost of $4,500. The building will be of brick construction, with felt and gravel and shingle roof, pine floors and interior finish, open plumbing, hot air heating, electric lighting, electric bells and two mantels.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a two-storey dwelling to be erected on College street, near Roncesvalles avenue, for Mr. E. B. Atkinson, Harvard avenue, at a cost of $3,500. It will be of brick construction, with oak and pine floors and interior finish, open plumbing, hot water heating and combination lighting.

Toronto.—Architects Ellis & Connery, Manning Chambers, have prepared plans for two detached two-storey dwellings to be erected on Rowenwood avenue, near Scarth Road, for Mr. Samuel Young, Jr., 69 Hazleton avenue. The buildings will be of brick construction, with slate roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, four mantels and electric bells.

Toronto.—Architects R. J. Edwards & Saunders, 20 Toronto street, have prepared plans for a two and a half storey pair of residences to be erected in South Parkdale at a cost of $8,000. The buildings will be of brick construction, with slate roof, hardwood and pine floors and hardwood interior finish, open plumbing, hot water heating, combination lighting, electric bells and refrigerator.

Toronto.—Architects R. J. Edwards & Saunders have prepared plans for a two and a half storey residence to be erected in Avenue Road Hill district, at a cost of $9,000. It will be of brick construction, with slate roof, hardwood and pine floors, hardwood interior finish, open plumbing, hot water heating, combination lighting, four mantels and electric bells.

Toronto.—Architects Simpson & Young, 17 Toronto street, have prepared plans for a two and a half storey residence and stable to be built at Bain and Broadview avenues for Mr. W. T. Harris at a cost of $16,000. It will be of brick construction, with brick foundation, slate roof, hardwood and pine floors, open plumbing, hot water heating, combination lighting, stayed columns and mantels.

Toronto.—Architect E. G. Wilson, 77 Victoria street, has awarded the following contracts for a two and a half storey brick residence to be erected on Geoffrey street for Mr. W. Dinsmore: Masonry, H. Manley, 1058 College street; carpentry, Thos. Farley, 350 Wellesley street; plastering, Hanna & Nelson, 271 Rushdime Road; painting and glazing, Fletcher Co., 93 Pearson avenue; plumbing, Chas. Tyler, 1208 Yonge street; heating and galvanized ironwork, Howard Furnace Company.

Toronto.—Architect Ewart G. Wilson has prepared plans for a three-storey apartment house to be erected in the north end of the city, at a cost of $17,000. It will be of brick construction, with felt and gravel and slate roof, hardwood floors and interior finish, open plumbing, steam heating, electric lighting, mantels and dumb waiters. Owner's name withheld.

Toronto.—Architect Ewart G. Wilson has completed plans for three attached two and a half storey dwellings to be erected on Manning avenue at a cost of $6,000. The buildings will be of brick construction, with open plumbing, hot air heating, combination lighting, three mantels and electric bells. Owner's name withheld.

Toronto.—Architect J. Hunt Stanford, 34 Yonge street Arcade has prepared plans for a pair of two and a half storey dwellings to be built on Shannon street, near Dovercourt Road, for Mr. J. T. V. May, 22 Shannon street. The buildings will be of stucco on brick, with slate roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, three mantels and electric bells.

Toronto.—Architect J. Hunt Stanford has prepared plans and specifications for a two-storey garage and chauffeur's suite, to be erected on Lynwood avenue, near Poplar Plains Road, for Mr. H. Hutson, 43 Victoria street. It will be of brick and half timbered construction, with open plumbing, hot water heating, electric lighting, concrete and pine floors, pine interior finish, mantel and electric bells. The building will be erected by day work, the owner supplying all materials.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and a half storey residence to be erected on Warren Road, near Clarendon avenue, for Mr. W. W. Ecclestone, Balmoral avenue, at a cost of $9,000. It will be of brick and stone construction, with slate roof, hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, ornamental columns and five mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a pair of two and a half storey residences to be erected at 201-3 George street for Mr. W. A. Forester at a cost of $6,000. The buildings will be of brick construction, with felt and gravel and slate roof, pine and hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, metal lath, electric bells and two mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and a half storey residence to be erected on Palmerston Boulevard for Mr. H. F. Squires at a cost of $5,000. It will be of brick construction, with pine and hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, metal lath, electric bells and three mantels.

Toronto.—Architect J. Hunt Stanford has completed plans for three pairs of semi-detached dwellings, to be erected on Smith street, near Broadview avenue, for Mr. Nicholson, 1117 Yonge street. The buildings will be of brick veneer construction, with rough-cast exteriors, felt, gravel and shingle roof, gas lighting, open plumbing and hot water heating. Estimated cost, $7,500.

Toronto.—Architect J. Hunt Stanford has prepared plans for five attached two and a half storey dwellings to be erected on McGill street, near Yonge street, for Mr. W. A. Forester, Ann street, at a cost of $11,500. The buildings will be of brick

construction, with stone foundation, slate roof, hardwood and pine interior finish, plumbing, hot water heating, combination lighting, mantels and electric bells.

Toronto.—Architect J. Hunt Stanford has completed plans and will receive tenders from March 20th to April 1st for the erection of a $9,000 two and a half storey residence on Warren Road, near St. Clair avenue, for Mr. Z. Gallacher, Maynard avenue. It will be of brick construction, with slate roof, oak and pine interior finish, open plumbing, hot water heating, combination lighting, dumb waiters and five mantels.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has prepared plans for a two and a half storey residence to be erected on Brunswick avenue, near Bloor street, for Dr. Slade, at a cost of $4,500. It will be of brick construction, with slate roof, oak interior finish, open plumbing, hot water heating, combination lighting, ornamental columns, two mantels and electric bells.

Toronto.—Architect P. H. Finney, 43 Victoria street, has drawn plans for a two and a half storey residence to be erected on Brooklyn avenue for the Rev. Wm. Bushill, Brooklyn avenue, at a cost of $4,000. It will be of brick construction, with slate roof, open plumbing, hot water heating, combination lighting, two mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for a pair of two and a half storey dwellings to be erected on Huron street, near Dupont street, for Messrs. Wilkins & Co., 70 Wellesley street, at a cost of $6,000. The buildings will be of brick construction, with slate roof, oak interior finish, open plumbing, hot water heating, combination lighting, mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for a two and a half storey residence to be erected on Rose avenue for Mr. D. Campbell, Seaton street, at a cost of $5,000. It will be of brick construction, with slate roof, oak interior finish, open plumbing, hot water heating, combination lighting, two mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for a pair of semi-detached dwellings to be built on Victor avenue for Mr. W. S. Appleton, Logan avenue, at a cost of $5,000. The buildings will be of brick veneer construction, with felt and gravel roof, open plumbing, hot air heating, combination lighting, electric bells and two mantels.

Toronto.—Architect P. H. Finney has prepared plans for a pair of two-storey dwellings to be erected on Dovercourt Road for Mr. R. Burkell, 318 Crawford street, at a cost of $5,000. The buildings will be of brick construction, with slate roof, open plumbing, hot air heating, combination lighting, two mantels and cut stone sills.

Toronto.—Architect W. G. Hunt, 255 Westmoreland avenue, has completed plans for a two and a half storey residence to be erected on Palmerston Boulevard for Mr. J. B. Shields, 529 Euclid avenue, at a cost of $6,000. It will be of brick construction, with shingle roof, hardwood and pine interior finish, open plumbing, hot water heating, combination lighting and three mantels. The owner will let contracts for the various trades.

Toronto.—Architect W. G. Hunt has prepared plans for a pair of two and a half storey dwellings to be erected on Marmaduke street, near Roncesvalles avenue, for Messrs. Robertson & Summers, 186 Ontario street, at a cost of $5,500. The buildings will be of brick construction, with open plumbing, hot air heating, combination lighting, two mantels and electric bells. The owner will let contracts for all trades.

Toronto.—Architect J. W. Siddall, 75 Yonge street, will receive tenders up to March 23rd for a two and a half storey residence to be erected on Roxborough street east for Mr. W. D. Tummis, at a cost of $18,000. It will be of brick construction, with slate roof, hardwood interior finish, open plumbing, hot water heating, electric lighting, mantels and electric bells.

Toronto.—Hall and Son have the contract for a $16,000 three-storey brick apartment building, to be erected on King street west, near Jamieson avenue, for Thos. McIlwain, 147 Jamieson avenue. Simpson & Young, 17 Toronto street, are the architects.

Toronto.—Messrs. Elgie & Page, 21 Havelock street, have the contract for a $10,000 two-storey solid brick residence to be built on Dunvegan Road, near St. Clair avenue, for W. M. McLaughlin, 478 Huron street. Architect Chas. J. Gibson, 75 Yonge street, prepared the plans.

Toronto.—Architect J. C. Hedges, 86 Clinton street, has prepared plans for three attached two and a half storey dwellings to be erected on Clinton street, near College street, for Mr. Wm. Greaves, 593 College street, at a cost of $6,500. The buildings will be of brick construction, with felt and gravel and slate roof, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Toronto.—Wm. H. Thompson, 29 Marlboro street, will erect a pair of two-storey stores and dwellings at 1224 Yonge street, near Walker avenue, at a cost of $4,000. The buildings will be of brick construction, with felt and gravel roof, open plumbing, hot water heating, combination lighting, hardwood and pine floors, metal ceilings and electric bells. Architect Chas. H. Wilmott prepared the plans.

Toronto.—Architect C. J. Reed, Confederation Life Building, has awarded the following contracts for alterations to residence in Rosedale for Mr. F. E. Hutton: Masonry, carpentry and plastering, H. Manley, 1058 College street; plumbing and heating, Toronto Furnace Co., 72 King street east; electric wiring, McDonald & Wilson, 187 Yonge street. Cost of work, $3,000.

Toronto.—The following contracts have been awarded for a two-storey and attic brick dwelling to be erected on Admiral Road for Mr. Chas. Bonnick, 65 Prince Arthur avenue; Masonry, E. Smith, Dovercourt Road; carpentry, Jas. Hogg, Adelaide street west; plastering, Hanna & Nelson, Rusholme Road; painting, McCausland & Son, Nelson street; tinsmithing, G. M. Bryan, Yonge street; electric wiring, Federal Electric Co., Bay street. Bond & Smith, 19 Wellington street, are the architects.

Toronto.—Messrs. T. Jones & Co., 600 Manning avenue, will erect a pair of two and a half storey dwellings at 151-3 Brunswick avenue at a cost of $5,000. The buildings will be of brick, with slate roof, open plumbing, hot air heating, combination lighting, electric bells and mantels. A. B. Stroud, 157 Bay street, architect.

St. Catharines, Ont.—Architect Thomas H. Wiley has prepared plans for three dwellings to be erected for Mr. Peter Forsythe at a cost of $5,000. The buildings will be of brick construction, with hot air heating, gas and electric lighting, enamelled iron plumbing and electrical bells.

Windsor, Ont.—Mr. W. W. Cruise, real estate dealer, proposes to erect a three-storey apartment house on the old Meloche property, at the corner of Ouellette avenue, opposite the Liberal Club. It will be of brick and marble construction.

Hamilton, Ont.—Mr. W. A. Noble has taken out a permit for the erection of a $2,600 brick dwelling on Homewood avenue, between Kent and Locke streets; also for six brick dwellings to be built at the corner of Clyde and Cline streets, at a cost of $6,000.

Ayr, Ont.—Architect Wm. G. Murray, London, Ont., has prepared plans for a two-storey and attic residence to be erected at this place for Dr. Ward Woolner. It will cost $4,500.

Montreal.—Architects MacVicar & Heriet, 104 Union avenue, have awarded the following contracts for the erection of the Duncan Apartment House on Mountain street: Masonry and brick, Reid, MacGregor & Reid; carpentry, Wm. Evely, 449 Bleury street; structural steel, Dominion Bridge Co.; plumbing, James Ballantyne, 159 St. Antoine street; electric work, Sayer Electric Co., 14 Beaver Hall Hill; roofing, Geo. W. Reed & Co., 337 Craig street west.

Montreal.—Architect Joseph Perreault, 17 Place d'Armes Hill, has awarded the following contracts for the erection of eight flats on Park avenue for Mr. J. M. Dorion. Roman stone, T. A. Morrison & Co., [illegible] St. James street; brick work, C. Gauthier, Ville St. Louis.

Montreal.—Architect R. Montgomery Redden, 8 Beaver Hall Square, has prepared plans for the erection of three houses on Winchester avenue, Westmount, for W. H. Price. The contract has been let to T. C. Bulmer, 30 York avenue.

Montreal.—Architect J. E. Adamson, Coristine Building, has prepared plans for the erection of an apartment house on St. Mark street for Chas. Shirley.

Montreal.—Architect J. E. Adamson, Coristine Building, has prepared plans for the erection of two houses on Grosvenor avenue, Westmount, for Mr. Sharp.

Montreal.—Architect A. F. Dunlop, Lindsay Building, has awarded the following contracts for the erection of an apartment house on Lorne Crescent for Mr. Tatley: Masonry and brick, Gray & Wighton, 7 Park avenue; roofing, Richardson Simard & Co., 8 Prince Arthur west.

Montreal.—Architect Alphonse Piche, 52 Victoria Square, has completed plans for the erection of two houses on Mount Royal avenue for Mr. H. Vallentine.

Montreal.—Architect Alphonse Piche, 52 Victoria Square, has finished plans for the erection of two houses on Mount Royal avenue for T. A. Gauthier.

Montreal.—Architect J. Rawson Gardiner, New York Life Building, has awarded the following contracts for the erection of a residence on Aberdeen avenue, Westmount, for Mr. F. B. Sherwood: Masonry, Gray & Wighton; carpentry, J. & W. Morrison; roofing, G. W. Reed & Co.; plumbing, Ogilvie Bros.; plastering, F. Beaudoin; painting, J. K. Arcand; electric work, Scott & Rubenstein.

Montreal.—Architect Geo. T. Hyde, 157 St. James street, has prepared plans for the erection of four houses on Montrose avenue, Westmount, for Thomas Lamb.

Montreal.—Jas. Morisen has the general contract for the erection of a $25,000 residence on Drummond street for Mr. R. B. Angus, 240 Drummond street. E. & W. S. Maxwell, 6 Beaver Hall Square, architects.

Montreal.—Mr. E. Lamoureux, 9 St. Elizabeth street, has taken out a permit for the erection of two houses, containing six dwellings, at a cost of $8,000.

Outremont, Que.—Architect Theo. Daoust, 103 St. Francois Xavier street, Montreal, has prepared plans for a four-storey villa to be erected on St. Catherine Road, Outremont, for Mr. Joseph Gravel, St. Catherine street. It will be of pressed brick and Roman stone, with plastic brick foundation, terra cotta partitions, slate roof, hardwood floors, hot water heating, open plumbing, combination lighting. The building will cost $40,000.

Rimouski, P.Q.—Architects Ouellet & Levesque, 115 St. John street, Quebec, P.Q., have prepared plans for a $5,000 dwelling, to contain store and shop, to be erected at this place for Mr. A. A. Portugais, a local plumber. The building will be two storeys in height, of pressed brick construction, with stone foundation, hot water heating and galvanized iron roof.

Three Rivers, P.Q.—Architects Daoust & Lafont have prepared plans for the erection of a residence for Mr. Jutreau.

Winnipeg.—Architect Wm. Wallace Blair, 414-16 Nanton Building, has prepared plans for a six-storey and basement brick building, 50 by 120 feet, to be built on Main street south.

Vancouver, B.C.—Architect Arthur J. Bird, has prepared plans for a frame apartment house to be erected at the corner of Seventh avenue and Bridge street for Dr. W. A. Clark.

Vancouver.—Architect E. Stanley Mitton, 619 Hastings street west, has prepared plans for a residence to be built on Nelson street for Wm. Trythall.

Victoria, B.C.—Dr. O. M. Jones will erect a $10,000 stone residence near the golf grounds, Oak Bay. Plans for the structure have been completed.

Victoria, B.C.—A permit has been issued to Architect Geo. C. Meshor for the erection of an apartment house at the corner of McClure and Cranson streets. The building will be of frame construction, two storeys and basement in height, and will cost $8,000.

Edmonton, Alta.—E. J. Taylor has taken out a permit for the erection of seven apartment houses, two storeys in height, at the corner of Ninth street and Saskatchewan avenue. The buildings will be of brick construction, and will cost approximately $26,000.

Saskatoon, Sask.—Plans prepared by Architect W. W. Lachance, of Regina, have been accepted for an apartment house to be erected at this place on Second avenue for Messrs. Newton and Baldwin. The plans provide for a brick and stone building, three storeys in height, 140 feet by 35 feet.

Hotels

London, Ont.—Mr. B. Harrison has taken out a permit for the erection of a new stone front to his hotel on Talbot street.

Kingston, Ont.—Mr. Walter Telfer, proprietor of the British American Hotel has made an offer to the City Council to put up a five-storey building on the present site, providing the city will guarantee bonds to the extent of $100,000.

Hamilton, Ont.—The Waldorf Hotel has been considerably damaged by fire. Loss not stated.

Three Rivers, P.Q.—Architects Daoust & Lafont have drawn plans for a hotel building to be erected for A. Dufresne.

St. John's, N.F.—The Springdale Hotel, Water street west, of which Mr. B. Walsh is proprietor, has been badly damaged by fire. Loss not stated.

Vancouver, B.C.—Architects Grant & Henderson have awarded to P. F. Perry the contract for the erection of a $22,000 brick rooming house on Cordova street, east of the Sullivan building.

Lumsden, Sask.—The Maple Leaf Hotel has been completely destroyed by fire. Loss estimated at $15,000, with insurance of $8,000.

Fire Stations and Jails

Guelph, Ont.—It is reported that the city will erect a new fire hall on Trafalgar Square, opposite the Royal Opera House.

Montreal.—The general contract for the addition to be erected to the new jail at Bordeaux has been awarded to J. B. Pauze Co., 70 St. James street.

Montreal.—The Civic Legislation Committee have adopted an amendment empowering the city to build a fire station and a police station on land belonging to Mount Royal Park, in the vicinity of Pine avenue and Cedar avenue.

Moose Jaw, Sask.—Negotiations are under way for the purchase of a suitable site on which to erect a new fire hall.

Opera Houses and Rinks

Toronto.—Mr. P. T. Burgess will erect a $20,000 theatre building at the S.W. corner of Queen and Lewis streets, just east of Broadview avenue. The building will be 55 feet by 132 feet, with a seating capacity for 700 people.

Toronto.—Tenders were received up to March 9th for the new Shea's theatre to be erected at the corner of Victoria and Richmond streets. A permit for the structure, which will cost $260,000, has been issued.

Montreal.—Architects Mitchell & Crighton have been awarded the general contract for the erection of a moving picture theatre at the corner of St. Catherine and Aylmer streets, for Cochels and Pules, to Laurier & Grandmaison, Liverpool, London and Globe Building.

Toronto.—Mr. F. Powell has purchased a lot on the north side of Queen street, immediately east of Yonge street, on which he will erect a moving picture theatre, to cost in the neighborhood of $20,000.

Toronto.—A permit has been issued for a $15,000 two-storey brick theatre to be built on Terauley street, near Agnes street, for Chas. Pasternaek and Simon Rabinovitch, 187 University avenue. Geo. W. Gouinlock, 1108 Temple Building, architect.

Schools and Colleges

Toronto.—Tenders will be received up to 5 p.m. March 22nd for all trades required in the erection of a building for the Faculty of Edueation, University of Toronto, at the corner of Bloor street and Spadina avenue. Darling & Pearson, architects, 2 Leader Lane.

Toronto.—The Board of Education has awarded the following contracts for the enlarging of Fern avenue school: Carpentry work, W. H. Martin, 126 Riverdale avenue, $7,400; masonry, J. C. Bayliss & Son, 265 Gladstone avenue, $11,000; paintings, J. Phinnemore, 10 Gerrard street east, $1,025; plumbing, Fred Armstrong Co., Ltd., 277 Queen street west; plastering, Beaver & Company, 62 Winchester street, $1,460; roofing and tinsmithing, Flowers & St. Leger, 5 Denison avenue, $1,000; heating and ventilating, Rutley Warming & Ventilating Co., 36 Toronto street, $1,000; steel construction, Dominion Bridge Co., steel for fireproof doors, Expanded Metal Co.

Toronto.—The Board of Education has awarded the following contracts for the enlarging of the Girls' Home: Carpentry, Frank Armstrong, 69 Oak street, $4,453; masonry, Balderston & Hutchinson, $4,207; painting, James Phinnemore, 10 Gerrard street east, $395; plumbing, Fred Armstrong Co., Ltd., 277 Queen street west, $350; plastering, T. Blackburn & Son, 208 Broadview avenue; heating and ventilating, The Rutley Warming & Ventilating Co., $840; structural steel, Reid & Brosn, 63 Esplanade east, $287; roofing and tinsmithing, R. Rennie & Son, $680; stee. for fireproof floors, The Expanded Metal Co., $558; floor tiles, Aikenhead Hardware Co.

Toronto.—The Board of Control will be asked to grant $20,000, in addition to the $90,000 already granted for the building of eight rooms and an assembly hall at Riverdale High School.

Toronto.—At a meeting of the Board of Education it was decided to ask for the sum of $60,000 for the erection of a new school to replace the Elizabeth street school.

Oshawa, Ont.—The ratepayers have passed a by-law authorizing the expenditure of $20,000 for the erection of a new high school, for which a Special Committee has been appointed to secure a suitable site.

Trenton, Ont.—Architects Ellis & Connery, Manning Chambers, Toronto, have prepared plans for a $19,000 three-storey school building to be erected at this place. It will be of brick construction, with stone foundation, slate roof, maple floors, pine interior finish, open plumbing, steam heating, combination lighting, structural iron, stock brick, fireproofing, ashestos materials, pipe covering. Tenders will be received up to March 20th.

Dorchester, Ont.—Architect Wm. G. Murray, London, is preparing plans for a one-storey school house to be erected in Dorchester, Ont., for the Trustees of School Section No. 15. The building will be of cement block construction, with hot air heating, and will cost $5,000.

Brantford, Ont.—The Collegiate Board have plans for a new structure to cost $73,895, with $5,145 for equipment, and will ask the City Council to provide the money, without again submitting the issue to the ratepayers.

Brantford, Ont.—The Trustees of School Section No. 18 of the Township of Brantford, are considering plans for the erection of a new school building this spring.

London, Ont.—The Catholic Board of Education will erect two new schools in the near future, one to be located in the south-eastern section of the city, and the other probably on Maitland street. The buildings will cost approximately $5,000 each.

Clarke, Ont.—Tenders will be received up to March 25th for a new school building for School Section No. 1. Plans and specifications may be seen on application to Wm. Payne, Secretary-Treasurer, Clarke, Ont.

Windsor, Ont.—The Property Committee of the Board of Education will recommend the erection of a $12,000 addition to the Collegiate Institute, connecting the present building and gymnasium. The Committee will also recommend the erection of a new four room school building, which might later be made into an eight room building.

St. Thomas, Ont.—Tenders will be received up to March 19th for the erection of a two-room brick school for Section No. 18, Yarmouth Heights, one mile from St. Thomas. Plans for the structure were prepared by Architect N. R. Darragh, Southern Loan Chambers, St. Thomas, Ont.

Berlin, Ont.—The Fathers of the Resurrection, who have charge of St. Jerome's College, will greatly enlarge the building.

Stratford, Ont.—It is proposed to erect a four-room addition to Shakespeare Ward School, at a cost of between $15,000 and $20,000. A by-law will be submitted to the ratepayers.

Strathroy, Ont.—School-house No. 9, West Adelaide, about nine miles northwest of Strathroy, has been destroyed by fire.

Haileybury, Ont.—Tenders will be received up to 6 p.m. March 30th for the erection of an eight-roomed brick school. Plans and specifications may be seen at the office of A. D. Piller, architect. Paul A. Corbold is Secretary of the Public School Board.

Berlin, Ont.—The Public School Board has decided to erect two four-room additions to the Rosland avenue and the Margaret avenue schools at a cost of about $21,000. Architect C. Knechtel is preparing the plans for the extensions.

Montreal.—The Government of the Province of Quebec has decided to erect an addition to the Jacques Cartier Normal School, Lafontaine Park. Mr. Chaurest, architect of the department, will prepare detailed plans for the new wing, which will be of granite, four storeys in height, 90 by 55 feet, and cost approximately $60,000.

Moncton, N.B.—The School Trustees are considering the question of issuing bonds to the extent of $15,000 for additional school accommodation.

Sydney Mines, N.S.—A citizens' meeting has been called to consider the voting of sufficient funds to erect a new eight-room school building at this place.

Victoria, B.C.—The choice of a site for the proposed University of British Columbia will be left to a Board of Eastern University experts. The local Government, it is expected, will make a large endowment towards the erection of these buildings.

New Westminster, B.C.—At a special meeting of the Building Committee of the Board of School Trustees it was decided to construct the new eight-room school at Clark Drive and Ninth avenue on the fireproof plan. This will probably entail an additional expenditure of $2,500.

Thunder Creek, Sask.—Tenders for building of the Bird's Eye View school house, No. 2009, will be received up to 1 p.m. March 25th. Plans and specifications may be seen on application to the Secretary-Treasurer, at the S.E. 1-4 section 12-19-3w5, where all neeessary information may be obtained. E. W. Johnson, Secretary-Treasurer, Thunder Creek, Sask.

Mutana, Sask.—The Board of Trustees are having plans prepared for the enlargement of the present school building to make it an eight-room structure, and also for the erection of an entirely new building. Mr. W. P. Pate, Secretary, Bowerman Block, Saskatoon, may be addressed.

Civic Improvements

Toronto.—Notice is given that the city will make the following local improvements: Vitrified block pavement on section of Lake street, estimated cost, $19,846; vitrified block pavement on Shaw street, from s.s. Essex street to the north city limit, estimated cost, $14,717; 24 foot asphalt pavement, with concrete curbing and gutters, on section of Euclid avenue, estimated cost, $4,437; 24 foot asphalt pavement, with concrete gutters, Harbord street, from Bathurst street to Spadina avenue, estimated cost, $11,364; 18 foot asphalt pavement on Shaw street from Queen to Arthur streets, estimated cost, $18,903.

Toronto.—A by-law will be submitted to the rate-payers for the purpose of authorizing the expenditure of $100,000, to carry out a plan of permanent improvements at the Island, for which Park Commissioner Wilson has prepared a plan.

Toronto.—City Engineer Rust has recommended the construction of the following asphalt pavements: Dunn avenue, from Queen street to the railway tracks, $13,085; Dalhousie street, from Gould to Gerrard streets, $2,858.

A WORD FROM MR. DINNIS.---President of Toronto Builders' Exchange Takes Exception to Mr. Smith's Letter.---Advocates Closer Relationship Between Architects and Builders.

Editor CONSTRUCTION:

May I ask for a short space in your excellent publication to comment on a portion of the letter by Eden Smith in your last issue. He says, "My experience of thirty years leads me to believe architects are more honest than the ordinary business man," and "The habit of exacting honesty from others, prompts honesty." Did anyone ever read a more egotistical statement. How pharisaical, almost thanking God, architects are not as other men. I believe, (also with an experience of thirty years), that the builders of Toronto with whom the architects transact most of their business, are rated by the community quite as honest as the architects.

With what kind of men can Mr. Smith have been associated, that it was necessary to exact honesty? One does not require to exact honesty from those who are honest, and who would no more to their knowledge do a dishonest act than try to fly. How can architects be more honest? There are no degrees to honesty; a man is either honest or dishonest. If he means more architects are honest in the city than a like number of men in any other business, let me lift the scales from his eyes by telling him that while, thank God, there are very many architects in this city whose honesty has never been, and never can be in question, men who are the soul of honor, there are also some architects who are not above reproach as the evidence of many builders and others can prove.

May I suggest that it would be beneficial if Toronto architects mingled more with their fellow men, that they might be better able to judge men. Last month Mr. Smith was invited to the Builders' Exchange Banquet, but failed to attend. Had he done so, he would have met over one hundred prominent Toronto builders, whom the Mayor of Toronto, members of Dominion and Provincial Parliaments, clergymen, and other representative men, evidently did not think too dishonest to associate with.

At the banquet given by the Canadian Cement and Concrete Association last week, while two eminent architects came all the way from Montreal, and the tenor of the speech made by Mr. Francis was, "Don't Knock, Boost," only one Toronto architect was present, who admitted he was "two removes" from the man who ought to have been there; he being a substitute for a substitute, and in the course of his remarks had not one good, kind or encouraging word to say of cement or concrete.

There is a Builders' Exchange in Toronto with a membership of about two hundred, composed of honest, upright men, in all branches of the building trade, who with a view to demonstrating their integrity, would be glad to have an opportunity of meeting the architects of Toronto in closer relationship than has been the custom in the past.

Yours truly,

ARTHUR DINNIS.
President Builders' Exchange.

March 15, 1909.

TORONTO BUILDERS' EXCHANGE BANQUET.---Annual Event a Most Enjoyable Affair. ---Many Prominent Guests Present.

ABOUT ONE HUNDRED members and guests sat down at the eighteenth annual banquet of the Toronto Builders' Exchange recently held at McConkey's. The affair was a most enjoyable one in every respect, and the evening will long be remembered by those present as a cardinal event in the social happening of this organization. Mr. A. Dinnis, president of the Exchange, presided as chairman, and among the guests were Dean Galbraith, of the School of Practical Science; Rev. A. L. Geggie, Rev. Wm. Hincks, Mayor Oliver, Architect G. W. Gouinlock, W. D. MacPherson, M.P.P.; Joseph Russell, M.P.; S. Harris, president of the Employer's Association; Fred Armstrong, W. E. Robertson of the Presbyterian; R. S. McIntyre, A. S. Purdy, Joseph Wright, George Evans and Jas. Thompson.

The toasts of the evening were in capable hands, and were both entertaining and practical in character. After the toast to the King was duly honored, Mr. W. J. Hill, in a few well chosen remarks, proposed a toast to the building interests of Toronto. In responding, President Dinnis dwelt upon the growth and importance of the Exchange. Of the $12,000,000 of work carried out in Toronto last year, over three-fourths was executed by its members. The building fraternity was a big factor in the industrial life of the city, and one which was active in its material advancement. In his opinion, the credit given the builders was not commensurate with what they deserved for their work. The reason for this was that they themselves failed to properly estimate the value of their services, and the indifference of the public was a natural consequence. He believed that the builders should be allowed, the same as the architects and officials, to place their names on all important public buildings so that posterity might know who had constructed them. It would be a deserving recognition, and stimulate them to their noblest and best efforts. Regarding the present year, Mr. Dinnis took an optimistic view, and gave as his opinion that operations in the building line would be most active.

Mr. W. D. McPherson, M.P.P., in response to the toast "Canada," spoke of the greatness of the Dominion and the position it was destined to take among the nations of the world. There was enough arable land within its confines to produce sufficient wheat to supply the world and still leave a billion bushels for home consumption, while the mineral resources were practically inexhaustible. He referred to the increasing amount of outside capital that is being invested in Canada's industrial development as the best indication of the confidence that was held as to her future and stability.

The toast to the "City of Toronto" was replied to by Mayor Oliver. In the course of his remarks, His Worship pointed out the importance the city was attaining as an industrial and financial centre. He had seen the city increase in population ten-fold, and at no time was its growth more pronounced than at the present. Outside firms were continually negotiating with the Board of Control for factory sites and other accommodations, and he predicted a great future for the city. The time was at hand when a comprehensive scheme should be adopted to render Toronto more beautiful. There was a need for widening certain streets, and immediate steps should be taken to bring this about. While the work would represent a big financial outlay, it would in all probability cost much more in the years to come.

Mayor Oliver then pictured the city as it would appear when it extended from East Toronto to the west of the Humber river and north of Danforth avenue, with a driveway along the water front and up one side of the Humber and down the other. He also referred to the big improvements the city has in project at the present time. These included the trunk sewer and municipal electric plant, which would soon be under way. Plans for the proposed viaduct to be built along the water front would shortly be submitted to the city by the railways, and if these were acceptable, he hoped to see the structure completed within the next two or three years.

The toast to the Ontario Association of Architects was replied to by Mr. Geo. Gouinlock, while Dean Galbraith responded for the Canadian Society of Civil Engineers. Other speakers of the evening were: Messrs. S. Harris, Rev. A. L. Geggie, Rev. Wm. Hincks, Joseph Russell, M.P., and Fred Armstrong.

Officers of the Canadian Cement and Concrete Association

1. President, Peter Gillespie, Lecturer on Theory of Construction, Toronto University. 2. Vice-President, Gustave Kahn, Trussed Concrete Steel Company, Toronto. Councillors:—3. Kennedy Stinson, Stinson-Reeb Builders' Supply Company, Montreal; 4. C. H. Thompson, Canadian Art Stone Company, Toronto; 5. C. A. Lingham, Canadian Portland Cement Company, Toronto; 6. T. L. Dates, Sun Portland Cement Company, Owen Sound; 7. D. Raymond, Concrete Engineering & Construction Company, Toronto; 8. J. G. Murphy, Excelsior Paving Company, Toronto.

FIRST ANNUAL CONVENTION OF C.C.C.A.---Initial Event Well Attended and Representative of All Branches of the Industry.---Daily Sessions Replete with Instructive Papers and Interesting Discussions.---Splendid Array of Exhibits at St. Lawrence Arena.

IT IS A WELL-KNOWN and generally conceded fact that the cement industry has been greatly aided and substantially improved through the formation of organizations, designed to serve as clearing houses, for information, knowledge and technical data relative to the manufacture and application of cement and concrete in building construction and civil engineering.

The National Association of Cement Users was formed but five years ago in the United States, since which time numerous organizations have been formed in several of the States in the American Republic. All these associations were started with but one purpose in view and that was to promote the sane, intelligent use of cement in accordance with the best known scientific practice.

In keeping with the justified enthusiasm of the exponents of this new material, the formation of each of these individual organizations was attended with almost unparalleled interest by those engaged in almost every branch of the industry.

We can however say, without the least fear of contradiction, that the first annual convention and exhibition of the Canadian Cement and Concrete Association recently held in Toronto, Mar. 1st to 6th, far outstripped the first meeting of any other cement association now in existence, in the size of attendance, intensity of interest, excellence of programme and the number and character of exhibits.

Even the initial convention of the National Association of the United States, held in Indianapolis five years ago, was in no way to be compared with the meeting, just concluded of the C.C.C.A.

In view of this fact, in addition to the highly successful condition of like organizations in the United States, formed under less favorable circumstances, the promoters of the C.C.C.A. have great reason to feel highly elated and greatly encouraged over this their first convention and exhibition.

Apart from the benefits to be derived from the successful existence of such an organization in Canada, by those materially interested in the various branches of the industry, the Canadian public, in general, has every reason to assist in the promotion of the work undertaken by the C.C.C.A. for the reason that every Canadian must necessarily be interested in the dissemination of reliable knowledge and information that will assist in producing a stable, lasting and fire-resisting type of construction. As a new country we have the very material advantage of profiting by the experience of our neighbors to the south, where it has been proven, beyond all peradventure, that to build of wood is to invite inevitable disaster.

To promote the intelligent use of cement in building construction and engineering projects is not to discourage the proper use of brick, or steel, or terra cotta, or wood, but to encourage the application of this modern material in conjunction with the use of stone, brick, steel and terra cotta in such a manner as to secure the best construction possible from both scientific and economic standpoints.

A very pleasing and much appreciated feature of the convention was the kindly and hearty co-operation of the many visitors from the United States. Engineers, architects and manufacturers from the south contributed a large number of papers and discussions on the programme and without exception expressed the most ardent hopes for the success of the new Canadian Association.

The presence of President Humphrey, of the N.A.C.U. was most appreciated and the very excellent talks he gave, before the convention, will, without question, bear much fruit. Mr. Humphrey was the father of the Association in the United States and his successful experience in his work renders him a most able counsellor on matters pertaining to cement and on questions affecting the promotion of its proper use.

The association is most fortunate in having so able a president as Peter Gillespie. Mr. Gillespie's position as Lecturer on Theory of Construction at Toronto University renders him one of the best authorities in Canada on cement and its application. The fact that he is connected with no commercial enterprise engaged in any branch of the industry is a guarantee against his actions, rulings and views being affected by partiality, prejudice or favor.

His energetic and untiring efforts on behalf of the Association, free from self interest and personal gain will ever be remembered and appreciated by the interests which the organization aims to serve. Fifty years hence, when the Association will, undoubtedly, have reached proportions never dreamed of by its most optimistic promoters of to-day, its members may have forgotten the circumstances and conditions under which the C.C.C.A. was founded but the effective, unselfish and untiring work of Peter E. Gillespie will never be forgotten.

Opening of Exhibition

THE EXHIBITION, which proved to be one of the most important features of the Convention, was well attended every afternoon and evening during the entire week. Almost every foot of space in St. Lawrence Arena was filled with some 60 exhibits, which included cement, artificial stone, concrete blocks, concrete reinforcing, concrete block machinery, concrete mixers and in fact almost everything that could be included in the manufacture of cement products.

On Monday evening, March 1st, at 7.30 Hon. Dr. Reaume, Minister of Public Works of the Province of Ontario, officially opened the exhibition.

President Gillespie, in introducing Dr. Reaume, outlined the objects of the Association and referred, as a precedent for the Canadian Association, to the Concrete Institute of Great Britain, with the Right Honorable Earl of Plymouth at its head. This Institute had some 500 architects and engineers as members, and had been organized for the purpose of popularizing the proper uses of cement and concrete. Hon. Dr. Reaume thanked the Committee on Arrangements for having invited him to take part in the opening ceremonies of the exhibition. He was pleased to see that so many people in the Province of Ontario were taking such a deep interest in the industry as was exhibited by the large attendance. He pointed out that during the past few years the Ontario government had devoted a great amount of time, attention, observation and study to cement and concrete work. His department had recommended the use of cement to municipalities and farmers throughout the province with the result that all bridges of any importance in Ontario were to-day built with cement abutments and cement floors.

He then referred to the many concrete bridges already built, being built and contemplated by the provincial government, and explained how much more serviceable they were as compared with the old wooden type of bridge.

He was glad to learn that the country at large was not only satisfied with concrete bridges but that they were building their barn foundations and floors of concrete, and were using cement for sidewalks and pavements. In his own town cement blocks were now used, and they had proven durable, serviceable and practical, and owners were well satisfied.

At the present time he figured that cement as the most permanent and surest of all materials and the cheapest in the end, but the men in charge of this industry must unite and work hand in hand to see that good honest work was done. "Employ honest men to do your work and see that your material is well mixed." His experience had proven to him that it was not always the mixing that was responsible for bad work. Oft times the cement was not clean. It was most important that the manufacture of a first grade of cement should be

encouraged. He pointed out that 100,000 barrels of American cement was imported for the Canadian end of the big international tunnel being constructed at Windsor, and the reason given by the contractors for importing cement was that they could not secure a clean cement in Canada. While he was kindly disposed toward Americans, Dr. Reaume said that Canada after all was for Canadians.

Canadian manufacturers should make a cement that would compare favorably under actual test with any foreign product. Something was wrong if such was not the case.

In closing he wished the Association success in its first convention and exhibition. Cement was the coming building material, and it was for the cement interest to unite and foster the industry.

Amidst the blowing of the whistles of the concrete mixers, the hon. Dr. Reaume declared the first exhibition of the Canadian Cement and Concrete Association open.

Opening of Convention

The Convention proper was opened at 2.30 p.m. in the Banquet Room of the King Edward Hotel, on Tuesday, March 2nd, by Dean Galbraith, head of the Faculty of Applied Science of Toronto University, with President Gillespie in the chair.

Mr. Galbraith stated that he was pleased to be present on the occasion of the opening of the first Convention of the C. C. C. A., and as a representative of Toronto University, wished to express the sympathy of that educational organization with the work in which the Society was interested. He did not believe that such an Exhibition as that at the St. Lawrence Arena was possible fifteen years ago in Canada, and outlined the enormous increase in the production of Portland cement in America. During the next few years, in view of the fact that the plants already in existence were not working to the full extent of their capacity, we could not look forward to the construction of new cement plants, but that instead methods and means would be found for making better use of the materials the plants already in existence were capable of producing.

At this point, Dean Galbraith grew rather reminiscent, and told of some very interesting experiences he had had in the use of cement in construction work, in the early seventies, and contrasted the vague knowledge of the proper use of this material, of those days, with the scientific investigations that are being carried on at the present time.

He referred to the two processes now in vogue in the manufacture of Portland cement, and dwelt upon the relative merits of each, showing that the wet method was, for all intents and purposes, by far the most practicable in modern construction work. Cement was especially adapted for construction work. It had strength and elasticity and denseness. For this reason, inventors will still continue to stick to cement, for the purpose of finding out new posibilities in its use. Cement concrete, being non-combustible, was fireproof in that sense.

Concrete had acted very creditably in the severe tests to which it was subjected in recent large conflagrations, in which it showed that it could hold its own. It was not only incombustible, but would hold its own better than stone, and possibly as well, or better than brick. "There is no doubt at all that when the public generally becomes convinced of the fireproof properties of concrete, there will be a greatly increased use of it," said the speaker.

He believed that in the near future a great field would be opened for cement in the construction of houses, and, to his mind, the two structural materials that were of the greatest importance to the engineer, the manufacturer, and the builder of the present day were steel and cement.

He believed that the use of cemeit in construction work would greatly aid in the attempts now being made along the lines of forest conservation, that even in this one particular, cement would have served a great purpose in that it would aid in maintaining sufficient forest lands at the heads of the streams, and thus preserve the nature s irrigation methods.

President's Address

IT IS DOUBTFUL indeed, if any industry of magnitude can show a record of growth and expansion comparable at all with that exhibited by the manufacture and use of Portland cement, on this continent. It began in 1875, when D. O. Saylor, the father of the industry in the United States, erected his first plant in the Lehigh Valley. The domestic output totalled a million barrels in 1895; 8,482,000 barrels in 1900; upwards of thirty-five million barrels in 1905, and nearly fifty million barrels in 1907.

With this phenomenal record, a comparison of the growth of the iron industry in the Republic is interesting. As early as 1812, long before Joseph Aspdin in England had conceived the idea of making Portland cement, the output of pig iron in the United States was fifty thousand tons per annum. By 1840, this had grown to 287,000 tons; by 1864, to one million tons, and by 1875, when Saylor erected his first kiln at Coplay, Pa., the production of this material was in the neighborhood of two million tons per annum. Since that time, this industry, which is generally conceded to be a kind of industrial thermometer, has grown with rapid strides, reaching an aggregate output in 1905 of 23,360,000 tons. Between the years 1880 and 1886, the growth in the iron industry was 48 per cent., while between the latter year and 1904, it was 311 per cent. The statistics of the United States Government show during the same periods, increases in the cement industry of 256 per cent. and 23,400 per cent., respectively. In Canada, the growth has been scarcely less marked. The output in this country for 1892, the first year for which statistics are available, was 29,000 barrels. By 1900, this had grown to 283,000 barrels, and for 1907, to 2,368,000 barrels. In short, the home production has doubled itself every second year since 1901. It is interesting to note that whereas the per capita consumption of Portland cement in the United States for 1905 was 161 pounds, that of Canada for the same year was substantially half that quantity.

In consequence of this marvellous growth, a situation inevitable though unfortunate has been created. The advocates of cement construction through misguided enthusiasm, inexperience or commercial knavery, have made declarations concerning the cheapness, strength and excellence of their product, which never have been and doubtless never will be true. The American people have come to recognize the merits of the new material long before they were truly appreciative of its limitations. Its easy manipulation, its relative cheapness, its immunity from decaying influences and its fireproof qualities were recognized before its behavior under stress and its elastic properties were known sufficiently to permit of intelligent and economic construction. The inexperienced designer, without data, without precedent and without standard, has made mistakes, some of which, be it regretted, have proved fatal. Incompetent supervision and careless inspection have been unfortunately too common. There is no doubt, that most of the failures in concrete and reinforced concrete structures, during the past decade, are traceable to some or all of these various causes, and, as may be expected, the public at large has attributed the failure to the material rather than to the method of its manipulation.

Fortunately, of late years, much investigation and experiment, both inside and outside of the laboratory, have been carried on. As a result, our knowledge concerning the properties of concrete has become more exact, our methods of manipulation have been improved and our practice in design has approached something like standardization. Such organizations as The American Society for Testing Materials, The American Railway Engineering and Maintenance of Way Association, The American Society of Civil Engineers, The Canadian Society of Civil Engineers, The National Association of Cement Users, and others have had committees working on the various problems in the manufacture and use of Portland cement. Much valuable information has been collected, and much important work has been done. The publications of these bodies are generally regarded as authoritative, and represent the focused opinion and experience of the best men available. That their work is not yet concluded, is evidenced by the fact that recommendations looking toward changes, sometimes, indeed, quite radical, are frequent. As experience and investigation reveal additional information, the necessity for such changes becomes imperative. Manifestly then, the control of the methods of employing this material is largely in the hands of such organizations, and if the industry is to be saved from discredit through ignorance, incompetency or dishonesty, it must be through their good offices. How can the Canadian Cement and Concrete Association assist in this work? I think, in several ways, viz.:

First, by becoming an outlet for valuable contributions on the manufacture, testing and use of Portland cement.

Second, by adopting as an organization, either in toto or with modifications, specifications which other reliable organizations have evolved, or by creating others which seem better suited to the conditions under which they will have to operate.

Third, by similarly assisting in the standardization of methods of testing cement and cement products.

Fourth, by becoming a "clearing house" for the ideas and experiences of manufacturers, users, engineers, architects and chemists. In the last analysis, what is best for an industry as a whole will be best for the individuals who are identified with it in any capacity.

There are many problems before the cement man to-day, which must be honestly met, and the ultimate status of this organization will depend pretty much on its integrity and independence in facing them. To publish authentic information is one of its prime functions, and it will be judged solely on whether it properly discharges that function. The usefulness of concrete in sewer construction has recently been a live topic in Toronto and other places, and there are no doubt many persons who are honestly seeking information on this very important subject. The fire-resisting qualities of concrete and its efficiency in this regard relative to that of clay products, has been much debated of late. The effect of steel on the elastic properties of concrete adjacent to it, the ability of such imbedded metal to resist corrosion, the failure of cement sidewalks, the care of expansion and contraction in the large masses of concrete, the effect on concrete of chemical re-agents and products of organic decay and putrefaction, are some of the things concerning which many sincere but inexperienced people, and perhaps too, some experienced users of cement are not absolutely clear. There are in the employ of the cement plants in Canada, chemists whose opportunities for studying these problems of manufacture and use have supplied them with data of undoubted value, and there are contractors, engineers and architects whose constructional experience has been extensive. For all such who, through experiment or experience, successful or otherwise, have learned something which will likely prove of value to their fellow-members, the publication of a method, process or discovery is a duty to their Association. Reciprocity in ideas ought to be the watchword of this organization.

A specification that is too severe defeats its own object; one that is not severe enough is a menace to both parties to the contract. Most of our Canadian cities have incorporated into their building codes, rules for the regulation of concrete construction. These rules are generally conservative, sometimes unduly discriminating as to the use of concrete and reinforced concrete, and err in that they are not sufficiently

elastic and fail to recognize that different requirements should be demanded for different kinds of construction. This Association should throw the weight of its influence toward the procuring of specifications that avoid these objectionable features and that will properly safeguard the public by insuring for them reliable and workmanlike products. Such specifications, representing in compact form, what a large number of intelligent, honest, and experienced men have found to produce the best results, will do much to win the confidence of the architect, the builder and the residence owner, and will prove in the long run a protection to both producer and consumer.

To obtain, prior to acceptance, information concerning the fitness of any material or method to perform the work expected of it, is the purpose of a test. Concerning this purpose and the efficacy of a test to serve that purpose, Dr. Charles Dudley has this to say:—

"The knowledge of the properties of materials of construction has increased, methods of testing and testing appliances have grown up in delightful profusion and it is to-day entirely possible, we feel safe in saying, for an engineer to be reasonably sure that defective material does not go into his structures. . . . . In view of present knowledge and present means and appliances for testing, are engineers or their principals any longer entitled to offer as an excuse for defective materials, that they were brought from the best makers? Can they equitably do so? Can they legally do so? Is not the time near at hand when engineers and their principals will be compelled, if not legally, then by force of public opinion, to acquire, by the establishment of laboratories and means of testing, by the making and enforcement of specifications, such knowledge in regard to the materials they are putting into structures, as will give the public greater security than it now has against disaster?"

Granted then, the wisdom of the practice of testing, what about the method employed. One of the chief difficulties in making comparisons between results obtained in different places at different times and by different operators, is that the methods of conducting tests are often widely different. The drafting of specifications designed to obviate that difficulty has been one of the commendable acts of the technical societies, and I feel that to this worthy object, our Association should contribute something.

In the fourth place, this Association exists for the purpose of interchanging experiences among its members. Here is the opportunity for those whose experiences have been similar, to rub shoulders,—to compare notes. It is in such ways that progress will be made, that the repetition of failures will be prevented, that the successful method will be perpetuated and the organization made an educational factor. The meetings belong to the members—and the public—and it is hoped that they will take advantage of every opportunity afforded to give and receive useful information.

As many of you are aware, the Canadian Society of Civil Engineers at its recent meeting in January, discussed at considerable length the question of Government research laboratories along lines similar to those conducted by the United States Geological Survey at St. Louis, Mo. These laboratories, which are the outgrowth of the model testing laboratory of the Association of American Portland Cement Manufacturers at the St. Louis Exposition, 1904, are now maintained by the Federal Government at an annual cost of $100,000 for "the investigation of structural materials belonging to or for the United States, such as stones, clay, cement, and so forth."

It is to be regretted that in Canada, no provision for such investigations on anything but a small scale, at present exists. How important to the industries of Canada would be the creation of such a laboratory? It would not exist for the purpose of commercial testing, but rather as an institution where, under capable and unbiased direction, the facts concerning the materials of construction could be investigated according to a comprehensive plan not now possible. If a beginning were made, I feel confident that its usefulness would soon justify its creation. It has been estimated that the tests reported to date from the St. Louis Structural Materials Laboratories indicate the possibility of reducing the amount of material used in public buildings and structures made wholly or in part of reinforced concrete, so that the cost will be lowered ten per cent.

The efficient conduct of a technical society necessitates the appointment of a Permanent Secretary. This is essential in order that there be continuity of method. Since he must act frequently without the advice of the Council, he must be a man of some administrative capacity. Further, the status and influence of the Association, its numerical strength and its resources are pretty much measured by his energy. He must oversee details, take the initiative, and, in brief, perform all the functions of a general manager. In order to do this, he must be a person who is prepared to devote a large portion of his time to the work of the Society, and for this, it is only reasonable that he be paid. It will be very much to the interest of the Association if its financial condition will permit the appointment of such an official.

Finally, let it not be forgotten that the Canadian Cement and Concrete Association is a national organization. Its membership must include representatives from both parties to the transaction—the buyer and the seller; the maker and the user. On its committees, should be found the manufacturer and the builder, the engineer and the architect, the investigator and the scientific writer. That the best interests of this wide constituency may be properly conserved, it is imperative that no one section shall dominate the work of the Organization. Only by resting on this broad democratic basis, and by recognizing that in a multitude of counsellors there is safety, can the Association do its part in furthering the interests of all who are concerned in the building up of what is destined to be one of the great national industries of Canada.

Need of Testing Laboratory

Dean Galbraith made some remarks with regard to that portion of the President's paper in which he dealt with the discussion by the Canadian Society of Civil Engineers, with reference to approaching the Government for the establishment of an Investigation Laboratory. Mr. Galbraith pointed out that what was required was a testing laboratory along the lines of the one conducted by the United States Government, at St. Louis, for examining and investigating all materials of engineering interest.

It was not intended that this laboratory should be simply a testing plant for the purpose of determining whether materials came up to certain clauses in specifications, but a laboratory which would investigate the properties of all materials, with a view to aiding in the proper scientific use of each in its proper place. He did not believe that Canada should depend upon the investigations conducted by the St. Louis laboratory, but that the different climatic conditions in Canada necessitated possibly a somewhat different line of investigation, and that it was altogether possible that a Canadian testing plant would have a line of investigation altogether different to that of the United States. Although he was not authorized to speak for the Canadian Society of Civil Engineers, he felt that their council would welcome any help that would come through such an association as the C. C. C. A.

Why Sidewalks Fail

Mr. Kinney, at this juncture, read a paper, illustrated with lantern slides, on "Why Sidewalks Fail."

Mr. Kinney's paper opened up considerable discussion, and it was very evident that a large number of sidewalk men were present, from the nature of the questions asked. Mr. Kinney did not believe that a rigid standard of specifications for all localities would be practicable, in so far as there were local conditions that greatly affected the construction of sidewalks and the aggregates employed.

Dean Galbraith opened up the question as to why granolithic sidewalks, during the wet and cold season, were so slippery. He wanted to know what caused this, and how it could be avoided. Mr. Kinney explained that this was almost entirely due to too much trowelling, and could be avoided by not bringing so much of the cement to the surface. He was also opposed to the method of sprinkling the top of the sidewalk with cement, and trowelling it down.

The question came up as to what was the best protection against frost, in the laying of sidewalks, and if there were any injurious effects in manure or sawdust. Mr. Kinney pointed out that manure would keep the sidewalk warm, without question but it would be apt to stain the concrete. He however believed that about two or three per cent. of salt would lower the freezing point sufficient to give the concrete time to set. The question of the use of Calcium Carbide was brought up, but Mr. Kinney did not believe that it was practicable, because of the fact that it took up too much dampness from the air, and was too hard to keep.

The President then opened up the question of the use of slag concrete and cinder concrete in the construction of sidewalks. Mr. Kinney stated that the Universal Portland Cement Company, which was connected with the Carnegie Steel Company, were at the present time making a series of tests, and although he did not have data with him to show the effects or the results arrived at thus far, he could state that their investigation, as far as it had gone, had favored concrete made of a slag of the proper quality, when mixed and used intelligently. He expected that in the course of two or three years this firm would have completed a series of tests that would, beyond all question, settle the advisability of the use of this aggregate.

The meeting was then adjourned until 8.30 p.m.

Evening Session, March 2nd

The Evening Session was opened with an address by Mr. J. E. Moore of the Robert Hunt Company, on the subject of "Tests and Inspection of Cement." Mr. Moore went very thoroughly into the history, importance and methods of testing cement, and pointed out that, while some few years ago the cement manufacturer was not wholly in favor of having individual, private tests made of his product before it was used on the job, that later experience had proven that such tests served as a favorable check on their product, and had a tendency to establish a much more thorough method of testing at the plant, with a view to producing a very much more uniform material.

Mr. Moore further brought out the necessity of having the setting time of cement adapted to the season of the year in which it is to be used. He pointed out that in cold weather the manufacturer has a demand for quick setting cement, and in the summer a demand for the very opposite. The setting time of cement is determined as a sort of a guage to find out whether it is safe. If cement could be mixed with mortar and got in the work previous to the time at which it would take on its initial state, any disturbance of it is attended with a subsequent loss of strength. He further pointed out that the setting time of cement made in the laboratory is also influenced a great deal by differences in temperature of the water and of the room.

Mr. Moore then brought out the necessity for uniform quality of sand in making laboratory tests. The sand generally adopted was a pure white silica, which was shifted through a twenty mesh sieve and remained on a thirty mesh sieve,

Mr. Moore went very thoroughly into all of the various methods employed by testing laboratories, in the various types and characters of test made, and his address gave the hearers present a very thorough and comprehensive insight into what the testing of cement really means to both manufacturer and user.

Mr. Barber, York County Engineer, gave a paper on "Concrete Bridges," which went very thoroughly into the subject. Mr. Barber's position rendered his experiences as related in his talk very instructive. Through lack of space, we are unable to treat Mr. Barber's paper in this issue.

Mr. J. Augustine Smith, of the Ideal Concrete Machinery of South Bend, Indiana, read a carefully prepared paper on "The Present and Future of the Concrete Block—Their Manufacture, Availability and Cost." His was one of the most noteworthy papers delivered at the Convention, first because it was the only treatise given on the manufacture of concrete blocks, and secondly because it dealt with every phase of the concrete block industry in a most elaborate and scholarly manner, showing much careful investigation and study of the problems at hand.

It would be an injustice to Mr. Smith's paper to publish it without accompanying it with reproductions of some of the excellent slides given with the paper. For this reason, we when it will be given in full with a number of illustrations, have deferred the publication of same until a later date,

Representative of O.A.A.

Mr. Gordon, of Toronto, addressed the Convention on behalf of the Ontario Association of Architects. He referred to his visit to the St. Lawrence Arena, where he had had the pleasure of seeing the exhibition. He had listened to the fund of information in the papers presented, and came to the conclusion that the gentlemen who got up this Exhibition and Convention were a concrete sample of progress. He recalled the time when he had started practicing as an architect. Manufacturers of cement blocks had induced him to specify them in his buildings; afterwards he had occasion to regret his moment of weakness. He was now glad to see that the industry had passed through the experimental stages, and that experiments were being continued upon a very high and scientific plane, that was almost beyond the comprehension of the ordinary architect.

He was willing to accept the statements of concrete enthusiasts, that there was something very wonderful in this material, that in ages to come people would be standing looking at these monuments erected of cement, and wondering at the wonderful skill of the men who planned such material, and what awful bad taste the architects had that designed such buildings.

There was an advantage about perishable material, for, after the architect had passed away, things that were not particularly nice would have passed away also, but he believed that his new material would require a very much greater care on the part of the architect, for he understood that one remarkable character of this material was that the longer it lived the stronger it got. He believed that while cement manufacturers, manufacturers of machinery and cement engineers were endeavoring to solve the problems of constancy in mixture, and practicability of construction that the architects were confronted with the tremendous problem of suitability of design for concrete buildings.

He did not know whether it was policy for them to follow too closely Ruskin and other men, who were so dreadfully opposed to imitation, but he did not believe that the architects should follow the designs of stone, in concrete. He wished to compliment the man who had made artificial stone, but after all it was necessary for the architect to create new designs suitable for concrete, something that would give the idea of stability, the idea of conscious strength, and the idea of enduring power, something that would give strength and vigor and power to the design. The cement men were solving their end of it, and he was going to tell his fellows that they must get their thinking-caps on.

Afternoon Session, March 3rd

The first paper to be presented at this Session was that of Mr. A. G. Larsson, of Owen Sound, on Portland Cement Mortars. Mr. Larsson went very thoroughly into the various mixtures adopted in concrete construction, showing the advantages of each combination of aggregate, as well as the results to be obtained from each. He first brought out the necessity of having the aggregates properly graded so that all the voids would be filled. He stated that the strongest possible construction was obtained when every available space was taken up at the time the hardening process was finished; more than this does not improve the concrete, but after a time would act injurious, inso far as the edging of the aggregates in between themselves would cause internal stresses, and thus reduce the strength of the concrete, the soundness of cement, the detrimental effect of free lime, the portions of gypsum and magnesia to be allowed in the cement.

A point brought out by Mr. Larsson was the setting time. He contended that a quick hardener should only be used for work where a rapid set was essential, as for instance, stopping leakage, mortar or concrete work in cold weather, and for decorative purposes.

He gave a number of valuable tables, relative to tests, showing the efficiency of various cements in mortars, under different conditions. Mr. Larsson's paper generally was one that gave an exceptional amount of information upon the subject which it dealt with, and showed conclusively that he had given his subject great care, study and consideration.

Mr. Larsson's data with regard to the advisability of the use of clay in sand, as used as a concrete aggregate, brought forth some discussion. Mr. Larsson maintained that ten per cent. of clay in sand increased the strength of mortar from 312.06 to 316.04.

In answer to the question as to whether he believed it good practice in case a wash material was used to add ten per cent. clay, Mr. Larsson stated that such matters had to be tested in each individual case. He believed, however, providing it was desirous to waterproof the material, it would be well to add from five to seven per cent. of clay, and get good results. He had experienced creditable results from five, seven and up to ten per cent.

Designing and Testing of Reinforced Concrete Beams

The next paper on the programme was that of Prof. Brown, of McGill University, Montreal, on the subject of designing and testing of reinforced concrete beams.

Prof. Brown's paper will be published in full with illustrations and diagrams in a later issue of CONSTRUCTION.

The President wished to know if in Prof. Brown's experiments he had obtained results that would lead him to consider it advisable to recommend a somewhat smaller percentage of metal than would be called for by the assumption that the entire stress is carried by the steel, and if he would recommend the use of high carbon steel for reinforcing. Mr. Brown did not believe it desirable to reduce the strength of steel. The tensile strength of mortar and neat cement was known. But there was no basis upon which the tensile strength of concrete could be determined. He believed that engineers would be sailing too near the wind in making any attempt, in practice, to rely upon the tension strength of concrete. He believed that the proper method was to assume that all tension should be carried by the steel.

The President asked the question if concrete in the presence of steel could be subjected to extraordinary strains and not rupture, and whether there were microscopic fractures that were not visible, or whether the material was so radically changed in the presence of steel that its elastic properties were quite different. Mr. Brown dealt with this question at some length, and stated that he was of the opinion that while the tensile strength of concrete in the early stages of setting could not be measured, he had conducted experiments that led him to believe that through the setting and hardening process of concrete in ordinary construction, the strength of the material itself would be sufficient to stand the stresses far beyond those which it was originally figured to stand—he had beams that were two years old that he had tested recently and the results were so extraordinary that he believed that the maturity of the concrete would add so enormously to it in the intervening time, that it would be safe to figure on the bolts and columns to carry the load, and that the natural maturing of the concrete would provide some margin for the subsequently increasing loads.

Mr. Kahn brought up the question of what should be a satisfactory percentage of steel in a concrete beam. Mr. Brown admitted that this was a very broad question, and he did not think that any precise statement of this percentage could be formulated. Mr. Kahn stated that his reason for asking this question was that building laws are adopted in different sections of the country, which specify a certain percentage of steel as being capable of developing, under ordinary conditions, a uniform load. Mr. Brown replied that there was no use putting more steel in a beam than would carry the weight that was required. Data was, however, required as to the particular concrete to be used. He did not see why it would not be possible to prepare tables for different mixtures of concrete, allowing a reasonable amount for variations which are inherent in the different conditions of mixing. It would be a very excellent thing if some uniform specifications or standardization could be arrived at, based upon the results of practice in the particular direction in which these specifications were to be applied, together with the results of these experiments. He did not believe, however, that it would be practicable to formulate any statement as to what percentage of steel should be used.

Representative of Paving Association

Mr. James Pearson then addressed the Association on behalf of the Paving Association of the city of Toronto. After having complimented the Association upon bringing the Convention to Toronto, and upon their fine Exhibition, he went into the question of concrete sidewalks and pavements. He called attention to the fact that no good city pavement to-day could be constructed without a concrete foundation, and that this fact was recognized by not only municipalities, but by the manufacturers and engineers who are engaged in street paving. He had something to say about sand, and contended that the only sand that should be permitted to be used as an aggregate in concrete, was a clean, sharp material, one that did not have the corners worn off. He referred to an address by Mr. A. L. Barber, the father of asphalt pavement, to a body of paving men in Washington, D.C., in which he had recommended macadam roads for districts located at distant points from thickly populated centres.

There was, however, a problem with which the paving contractor was confronted, and that was the providing of permanent and economical pavement for roadways in close proximity to cities. For this he recommended a concrete foundation, with macadam surface. He wished to ask the question why it was that pavements in the city of Toronto, upon concrete foundations, would remain in good shape the first year after they were laid, but that in the second year great cracks would appear in them, at distances of about fifty feet apart. The President stated that the cause of such

cracks were pretty well known, though he did not state what the scientific cause was.

Twenty Years' Experience in Cement Walk Building

Mr. C. W. Cadwell, of Windsor, Ont., read a paper on the subject of "Twenty Years' Experience in Cement Walk Building." Mr. Cadwell gave a very interesting talk upon his early experience in the cement sidewalk business. He related how twenty years ago he left his business as a travelling dry goods salesman, and was led to investigate the cement industry. At this time, however, little was being done with cement for walks. Lumber was cheap and plentiful, and good cement was scarce and high priced, and the majority of cement walks erected at this time had proven a failure, and most of the people whom he had solicited for business gave him a very flat and abrupt refusal.

At this time, with cement at $4.00 a barrel and hard to get, the few contractors that exploited the business with secret and patent formulaes, of very questionable character, managed to more or less monopolize the business.

He described the early methods of constructing concrete sidewalks, and compared them with the generally accepted modern methods of to-day. At that time from 5,000 to 10,000 feet was considered a big job, and caused a great deal of talk, but now a contract for many times that size would cause little or no comment.

The cement walks, to insure success, must be made good as it is only a thin sheet spread over a long space of ground, and every inch of it is subjected to severe tests, and none but the best cement and materials will in time show up to advantage. In many cases failure is due to carelessness of the men employed.

The greatest care must be taken in watching the workmen, and see that they do their work honestly. At other times failure comes from bad materials, for, in different localities where sand and gravel is more or less scarce, much faulty material is used, and contractors take chances, as material is hard to get, and highly expensive. Such practice, however, is bad, and very detrimental to the trade. Every contractor should have positive proof that the materials with which he works are of the very best, and he must treat those materials in accordance with their properties. Cement should not be used that sets too quickly, in warm season, and yet a quick setting cement is required in a colder season.

In speaking of foundation for cement walks, he stated that years ago, the one great object was a good foundation, which meant an excavation of from ten to twenty inches, filled with sand and gravel, or cinders well tamped, and in some cases even more, with a layer of cobblestone on the bottom. In his experience he had proven that this was unnecessary, and would rather guarantee a walk laid on heavy soil with one inch of fill than with ten.

He pointed to the great and rapid growth of the cement industry, and stated that none can guess what its future would be. He believed that all in the cement business would take courage in looking at the great accomplishments in this industry, and strive for higher attainments, knowing if cement was given its just due, it would not fail in its severest trial.

Mr. James Pearson in commenting upon Mr. Cadwell's paper, spoke of some failures in sidewalk construction that had taken place in the city of Toronto. Sidewalks had gone to pieces by the frost blowing them up, and he contended that it was the depth of the cinders in these walks that caused the trouble. These failures took place in clay soil, always where there was a concrete curb between the sidewalk and the ordinary street pavement. The filling of cinders in the springtime, absorbed the water, and when the frost came the water blew the sidewalk up. He did not believe that if clay had been used for the foundation, these failures would have been possible.

The President wished to know if there were any engineers present who had had any experience with the use of tile in sidewalks. To this Mr. Cadwell replied by stating that he had built a sidewalk in front of his house some seventeen years ago, with a twelve inch foundation. The walk had a fall of eighty-three feet in a slope of two hundred feet. A four-inch tile was placed under it, directly connected with the sewer. The results were not satisfactory. A year after, he built a walk on the opposite side of the street, with a foundation of two or three inches of cinders, and there was much less heaving. He believed in a one-inch foundation, which was practicable for the reason that if the walk was level on one side and had a slope on the other, the cinders would soak away the water. Apart from this, he would do away with cinders altogether.

Modern Methods of Waterproofing Concrete

Mr. Lucius E. Allen, of the Ontario Limestone and Clay Company, read a paper on "Modern Methods of Waterproofing Concrete," in which he took up the subject in a most comprehensive and interesting manner. He especially pointed out the use of a waterproofing compound in the concrete building blocks. To demonstrate the necessity for such precaution, he described several cases in which concrete block wall of dwellings had proved to anything but moisture proof. His paper opened up a very wide discussion in a general way of the necessity or advisability of the use of a waterproofing compound. Mr. Allen's paper will be treated in full in a subsequent issue of CONSTRUCTION.

The President called upon Mr. Hassen to open the discussion on Mr. Allen's paper. Mr. Hassen wished to know if Mr. Allen had made any tests as to the porosity of either monolithic structure, or concrete structure, in any shape or form, also as to the solubility of concrete in water. He did not believe it was essential to waterproof concrete, and in power-house construction, he had never found it necessary to waterproof any cement or concrete.

Mr. Allen replied that he had made tests of concrete blocks and had found that they were not damp proof; that houses built of this material, he had found, absorbed moisture, and he believed that the sooner concrete workers adopted some waterproofing method, the better for the industry. If, however, concrete was properly mixed and blocks were faced with one-to-two or one-to-three mixtures, that was sufficient, but the trouble was that there were so many blocks that were not properly mixed.

Mr. Cadwell wished to know if blocks could be made dense through the use of ordinary aggregates, properly mixed and properly tamped, without the use of some water resisting substance on the exterior of the block.

Mr. Smith of the Ideal Concrete Machinery Company remarked in connection with this discussion, that concrete building blocks, if properly made, of the proper aggregates, properly tamped, with a rich mixture on the face, were waterproof, and that no waterproofing was necessary. He had found, however, that it is necessary to deal with all sorts and conditions of men in these days, and for this reason his firm had recommended the use of waterproof compound, only to make assurance doubly sure. The harder the blocks were rammed, the better and more condensed the concrete.

Mr. Cadwell related an experience he had had eighteen or twenty years ago, in building a concrete block house, the only objection being to the material was that the walls were not waterproof, and he believed that if there was any compound that would serve as a surface for the blocks and throw off the water, it should be adopted, as a further means of prevention of absorption.

Mr. Lewis agreed with Mr. Smith, stating that he had made blocks absolutely waterproof without any compound of any kind. The mixture on the face was what counted. He referred to a little cottage that he was building at the present time, and stated that the sleet and ice were so dense that the east face of the building was absolutely covered with ice, but the block on the interior was as dry as possible.

Mr. Smith did not believe that it was good policy to plaster directly on the blocks, but lath at all times should be used. Block manufacturers had made great mistakes in recommending that the products of their machines, when erected in walls, should be directly plastered upon. Irrespective of the non-porosity of blocks, his firm had strongly recommended the use of lath in all cases.

In reply to a question from Mr. Smithson, Mr. Allen stated that the concrete block house he referred to in his paper was lathed and plastered, and was built about five years ago. The President remarked that this discussion confirmed the findings of Mr. Humphrey, of St. Louis, that a great deal can be done in the matter of waterproofing, by a judicious selection of materials.

The next paper on the programme was presented by Mr. A. W. Birge, of the Trussed Concrete Steel Company, on the subject of Reinforced Concrete Design from the Standpoint of Practicable Engineering.

Evening Session, March 3rd

The first number on the programme for this Session was a paper by Walter J. Francis, M.S.C.E., of Montreal, on Field Made Concrete. Mr. Francis' paper went very thoroughly into the subject and was illustrated by a large number of lantern slides, which proved both interesting and instructive. Owing to lack of space, same will be published, with illustrations, in an early issue of CONSTRUCTION.

The next number on the programme was an address by Mr. Campbell, Deputy Minister of Public Works for the Province of Ontario, on the subject of the Use of Concrete in Municipal Work. Mr. Campbell outlined very thoroughly the work that had been done throughout the Province of Ontario, by the Provincial Government, in educating municipalities in the proper use of concrete in roadway construction, etc. He also gave a very interesting account of what the Government had done in concrete construction in Provincial work, and spoke of the wooden bridges and structures erected by the pioneers in the Province of Ontario, and referred to the fact that even the wooden bridges erected in the earlier days which were primitive and crude, had been greatly improved upon in the wooden structures of more recent date.

It was a conceded fact that one of the greatest expenditures in connection with roadmaking was the rebuilding of bridges, culverts and sluices, and it was most important that materials should be adopted that were durable. Experience had proved that the cheapest, most durable, and most economical material to be used for this purpose was cement concrete. He called attention to the vast amount of carelessness that prevailed in designing such structures, in the selection of cement and aggregates, and in the proper mixing and use of same. He referred to the proportions that were usually recommended for sidewalks, street foundations, culverts, etc., and wished to know what they meant. He stated that specifications called for so much cement, so much sand, so much crushed stone or gravel. The problem that arose was the securing of a cement of the proper character, clean sand and sharp gravel. It was one thing to make a specification, and quite another thing to see that it was properly carried out. The foundation, he believed, was of the first importance, and that in small sluices it was proper to use cement concrete pipes, up to a certain size, reinforced to a safe limit. This same precaution should be exercised with bridges where they were built of cement reinforced with steel for the substructure, and cement for the superstructure. In his mind there was nothing more pleasing to see than splendidly designed steel bridges resting on well constructed cement or stone piers.

His department had been working upon street improvement for twenty-five years, and the transformation in the cities and towns throughout Ontario was marvellous. He referred to

the fact that pavements made of cement concrete were being used in some Ontario municipalities at the present time, and that he believed that in the near future experiments would prove that cement concrete would be very largely adopted for street paving, especially where the road is level; the grades could be treated with some other material.

With careful drainage, careful selection of materials, careful manipulation, proper ramming and watering, and care in laying he believed that cement would rapidly grow in public favor, and that the future popularity of cement concrete pavements would add another very strong demand for the cement now being produced in the Province of Ontario.

The President then introduced Mr. Emile G. Perrott, of Philadelphia, who read a paper on Reinforced Concrete in Building Construction. Mr. Perrott's paper was a very valuable one. It entered into almost every phase of reinforced concrete as a structural material, and was illustrated with a very large number of slides, showing concrete structures from the cottage to the tall skyscraper. Owing to our limited space, we are unable to treat Mr. Perrott's paper in such a manner as it deserves, and will deal with same in a future issue of CONSTRUCTION.

The President at this juncture introduced Mr. Fred. A. Norris, Consulting Engineer, Boston, Mass., who read a most interesting paper on ornamental concrete stone. His address was illustrated with a number of views, which showed beyond all question the architectural possibilities of this plastic material. Mr. Norris' paper will be given consideration in a later issue of CONSTRUCTION.

Business Session

On Wednesday morning the Association held its annual business meeting, at which the reports of the various committees were received, and officers for the ensuing year elected. Mr. Peter Gillespie was elected by acclamation for President; Mr. Gustave Kahn was chosen Vice-President. The following are the members of the Executive Council for 1909:—C. A. Lingham, Canadian Portland Cement Co., Toronto; T. L. Dates, Sun Portland Cement Co., Owen Sound; C. Canliff, Expanded Metal & Fireproofing Co., Toronto; J. G. Murphy, The Excelsior Constructing & Paving Co., Toronto; D. Raymond, Concrete Engineering & Construction Co., Toronto; C. A. Thompson, Canadian Art Stone Co., Toronto; Kennedy Stinson, Stinson-Reeb Builders' Supply Co., Montreal.

A resolution was adopted by the Convention, extending a vote of thanks to Mr. Fren, the Secretary for last year, and instructing the Executive to present him with an honorarium for the excellent services rendered the Association during 1908. A resolution was adopted instructing the Executive Board to appoint a permanent publicity committee, and also to take steps towards the employment of a permanent secretary, who should be paid a salary, commensurate with the services which he should be obliged to render. A resolution was adopted instructing the Executive Board to undertake to promote the formation of local organizations in various centres throughout the Dominion of Canada.

Another business meeting was called Friday morning, for unfinished business. A motion was adopted instructing the Secretary to address a communication to the King Edward Hotel, expressing the appreciation of the Association of the very excellent service rendered, and the kindly co-operation of the officials and employees of Toronto's famous hostelry.

Afternoon Session, March 4th

The first paper on the programme for this Session was that of Mr. C. R. Young, lecturer on Applied Mechanics, of the University of Toronto, entitled "Artistic Concrete Bridges." Mr. Young's paper went very thoroughly into the principles of design and construction in concrete bridges. His remarks were very appropriate, in view of the talk by Mr. Campbell Deputy Minister of Public Works for the Province of Ontario, on the previous evening. Mr. Young's talk was illustrated with a number of lantern slides.

The Vice-President, Mr. Gustave Kahn, introduced Mr. Edmund Burke, representative of the Architectural Institute of Canada. Mr. Burke called attention to the fact that he was representative of the youngest architectural organization in Canada, and he was very much interested in Mr. Young's paper on artistic bridges. He believed that it had struck the right note in many instances.

With regard to reinforced concrete, architects had some complaints to make. They found that as a rule a great deal more careful supervision was required on reinforced concrete work, than in other types of construction, for the reason that many irresponsible contractors did not give the care that was required in seeing that the reinforcement was properly placed in the work, that the materials were properly mixed and rammed.

He referred to some of the columns shown in structures that had been illustrated on the evening before, and stated that in Toronto it would be impossible to erect such structures in accordance with the city's building by-laws, which demanded heavier structural members than were really required, unnecessarily increasing the cost of construction.

The Vice-President, Mr. Gustave Kahn, wished to express the appreciation of the Association for the words from Mr. Burke, as representative of the Architectural Institute. Reinforced concrete he believed had been carried on very successfully in many portions of the country, but was somewhat handicapped in Toronto. In time, however, he hoped that they would be able to wear away the prejudices of the local authorities.

Mr. Charles D. Watson, Consulting Engineer, of Cleveland, gave a paper on Factory Made Concrete Building Products. Mr. Watson opened by stating that it afforded him much pleasure to address the Association, as a pioneer in concrete construction in Canada. He knew something of the trials and tribulations that had to be contended with, but that a great amount of prejudice had been overcome.

Mr. Merrill Watson, of the Associated Expanded Metal Companies, New York City, then addressed the Convention. Mr. Watson's remarks were more or less of a humorous nature. He had been in the concrete business so long that he had become really old, and, inasmuch as he was scheduled for a number at the banquet that evening, he wished to be excused. He expressed congratulations from the United States, and particularly from the National Association of Cement Users, organized some four years previous, and of which he had had the honor of being an officer during the greater time of its existence. They had been doing just what the Canadian Association had been organized to do—educate the public to concrete; first educating the architects to think and design in concrete, then educating the public to live in concrete, and how to build and use it. It was only a question of education, but that would come on gradually and profitably.

Banquet

The annual banquet of the Association was held on Thursday evening, at the King Edward Hotel, and was attended by nearly 100 guests, including prominent architects, engineers, contractors, as well as men representative of the various branches of the Cement Industry.

A most entertaining toast list was provided, and the speeches were brief, witty, and highly interesting. Music was supplied by the King Edward Hotel orchestra, and very excellent vocal selections were rendered by Mr. Marley Sheriff, of Toronto, and Mr. Quigley, of Hamilton.

President Gillespie, who occupied the chair, proposed the toast "Canada," which was responded to by A. W. Horn, of Toronto. Dean Galbraith, of the School of Applied Science, Toronto, proposed the toast to "The Industry," responded to by Messrs. Augustine Smith, South Bend, Ind.; Merrill Watson, of New York, and Thos. Dates, of Owen Sound. Messrs. W. J. Francis and M. Morssen, of Montreal, and J. G. Langton, of Toronto, responded to the toast, "The Men Who Specify," proposed by Ivan S. Macdonald. Mr. J. G. Murphy toasted the "Guests," with which he coupled the names of Messrs. Sanford E. Thompson, of Newton Highlands, Mass., and J. E. Moore, of Chicago. "Municipal Interests" was proposed by Mr. James Pearson, of Toronto, and Messrs. Chamberlin, of Belleville; Griffin, of Buffalo, and Blanchard, of Toronto, responded. Mr. Pearson proposed a toast to the President, which was received with hearty applause.

One of the appropriate features of the evening was the manner in which the newly elected President of the United States, Taft, was heartily toasted, in honor of the guests from the neighboring republic.

Morning Session, March 5th

A special session was called for Friday morning, by Vice-President Kahn, on account of the unexpected arrival of Mr. R. L. Humphrey, President of the National Association of Cement Users of the United States.

In introducing Mr. Humphrey, Mr. Kahn said that more than any other man in America, Mr. Humphrey had advanced the interests of the cement industry, not only as President of the National Association of Cement Users, but as superintendent of the U.S. Government Testing Laboratory at St. Louis.

Mr. Humphrey was received with applause, and he congratulated the Canadian Association on the showing made at their initial convention, not only with regard to the Exhibition, but the Convention itself. He outlined the conditions that had brought about the organization of the National Association of Cement Users in the United States, and told how difficult it was to keep commercialism out of the organization. The work of such an organization should be purely an educational one. The National Association was doing valuable work in disseminating information as to the proper uses of cement, and he believed that the Canadian Association had a very worthy work in that particular.

The National Association had been the father of several State Associations, which had sprung up in several States of the Union, to take care of local conditions, and these Associations were doing excellent work in conjunction with the National organization. He was greatly surprised at the lack of information on the elementary principles connected with the use of cement, at the early Conventions, but this ignorance had gradually disappeared, until to-day it was possible in this U.S. organization, to discuss the subject on broad lines.

He referred to the awful fire losses in the United States, by stating that this country was burning up yearly as much as it built. Cement was not fireproof, but it offered one of the best materials for fireproofing. Houses could be built so that they were sanitary, durable, and fire resisting. The use of cement in the construction of dwellings he believed to be one of the most important to the industry, especially since the lumber supply was becoming exhausted.

It was all right for the engineer and architect to know how to use these materials, but it was infinitely more necessary for the man who is working under the instructions of the architect and engineer to have an intelligent knowledge of the material and how it could be used to the best advantage. It was along

these lines that the Association should look for its greatest success.

The Canadian Association should not be discouraged by the small number of members. The National Association of the United States after the first year, notwithstanding the fact that over 650 men registered, only had 189 members who had paid their dues. This did not discourage them however. Year after year the membership had grown until to-day they have nearly 1,000.

He believed in experience meetings. It was, of course, well to have learned men give long papers on technical subjects, but in his experience as President of the N. A. C. U., the meetings that were most profitable to the greatest number of members were those in which everybody was free to give his experience and views on the minor details connected with concrete work. One of the difficulties to be overcome was the successful work of procuring better knowledge of the use of cement and concrete, or in getting in touch with the man who really did the work. This man, as a rule, did not care much for the usual proceedings of the Convention, and Mr. Humphrey believed that the forming of local organizations was really the solution of the problem.

He believed that the cement industry to-day was just beginning. The experimental stage was passed, and that it was more and more realized that standards were required of various kinds. One of the first things the Canadian Association should undertake was the formation of standard specifications covering the various uses of cement. Those who represented the architectural and artistic side of the Canadian Association should give their attention to developing methods that apply to this plastic material, so as to make the material speak for what it is and not resort to base imitations.

There was a great deal that was not known about concrete at the present time, and the joint committee of the N. A. C. U., composed of some thirty men, had been engaged in the work of trying to formulate rules governing the use of concrete, but they had found that data was not sufficient to enable them to reach positive conclusions.

For this reason the experiments at St. Louis were undertaken under the auspices of the United States Government. Unfortunately the terms of the appropriation for the conducting of the United States Laboratory at St. Louis were such that tests were required for different departments, and demands had been made upon this laboratory for investigations and tests of materials that entered into the various Federal buildings. This had made it impossible to set aside any very large amount of money for the investigation of concrete itself. He had noted with a great deal of interest and satisfaction that the Dominion Government was to be asked for a similar appropriation for a Canadian Laboratory. Not until the properties of concrete were more thoroughly established could the great economy be attained, which was possible with cement, and, strange as it seemed, the most of the demand for economically built concrete structures comes, not from the architect or the engineer, but the owner.

The committee on the insurance of the N. A. C. U. had received letters from various owners, stating that they had cancelled their insurance entirely on concrete buildings, because they believed it unnecessary. In Minneapolis, recently, the contents of a building was entirely destroyed, but the damage to the building was so slight that the owners decided to cancel their insurance.

He wished to impress upon this new Association the importance of the great work they had undertaken, and he hoped that they would always keep the educational features foremost, and permit nothing that would tend to promote commercialism. Those who are interested in commercial lines, of course, should affiliate in every possible way, but everything should be subsidiary to the best interests of the Association, which, first, last and always must be the promotion of the best knowledge of the proper use of cement.

He was glad to welcome the Canadian Association into the field in its efforts in the campaign of education, and wished it every possible success. It could always rest assured that the National Association would ever be ready to lend its hand in co-operation.

In reply to the question as to whether the United States Government had made any investigations with regard to cement tile, Mr. Humphrey stated that this had been one of the most active of their recent investigations. He had been asked by the United States Department of Agriculture to prepare a bulletin on cement drain tile. It first looked like an easy problem, but after investigation he had deferred the matter until after he had made further investigation.

The action of alkali on cement tile seemed to be the most difficult of problems to solve. In his investigations and experience, while he had tile in his possession that was thirty or forty years old, that showed little or no effects from its age and use, he was of the opinion that there was only one way to make a really good, durable cement tile, and that was with a wet mixture. It had been argued by clay tile manufacturers that as a result of various tests, such as boiling test, a test where hardened concrete had been subjected to a solution of hydrochloric acid, that the solubility of cement rendered it impracticable as a material with which tile should be constructed; still, it might be, also, said that clay tile when boiled in water was found to contain a certain amount of soluble salts. He had recently found occasion to make tests of bricks to determine their fireproof qualities, and, when they had been subjected to extreme weather in the winter season, had found that they had returned to common clay, but this fact did not prove that clay brick was a poor construction material. It only demonstrated that there were good and bad products in all materials. It was, therefore, unfair to say that all concrete was bad. It was true that cement tile made from a dry mixture, through being very porous, would yield somewhat to the effect of alkali, but cement tile could be manufactured from the proper aggregates, properly treated, with sufficient water, that would have a metallic ring, just as a cast iron pipe.

Five years ago he had recommended at the North-West Cement Products Association, in Minneapolis, the use of a wet mixture, and was there declared an enemy of the industry. At the last Convention he found that every manufacturer was looking for information as to how he might be able to make his mixture wetter.

Mr. Humphrey then spoke of the importance of having absolutely clean sand, as an aggregate, and also of putting sufficient cement in the mixture. Sands had been submitted to him for testing purposes that were coated with clay, while they appeared to the eye to be a perfectly clean aggregate. He further pointed out the importance of proper mixing. There were concrete mixers on the market in which the materials that passed through the machine never got an opportunity of becoming acquainted. The resultant mixture was, therefore, very defective. It was absolutely essential that all materials that go into mortar and concrete should keep in an intimate relation, for a period of at least one minute. This was easy to understand, because to get a dense mortar it was necessary that all the air be eliminated from the mixture. Tamping would not drive out the air. It simply compressed the air, and it was still there. The only way that air could be gotten out of a mixture was by working the materials together into intimate relation, so that the sand coated every particle.

Mr. Beaumont Jarvis opened up the question of standardization of concrete. He wanted to know if there was not some means whereby some standard specifications could be arrived at that would eliminate the necessity of making columns and beams about four times as strong as necessary, simply to satisfy the whims of a City Architect. Mr. Humphrey replied that he believed that standardization was one of the essentials of the Association. Methods of testing should be simplified in such a manner as would provide simple rules that could be used in the field. Such standards were of utmost importance to the success of cement products. There was no question but that concrete beams and columns and other parts of concrete structures were designed perhaps to the best of present knowledge, but without an adequate idea of just how strong they are. A great many of our concrete structures of to-day were made so strong that we shall never find out how strong they really were. They were unnecessarily strong. The question of standards was a very hard one to determine. Mr. Humphrey did not believe that one-tenth of the time the cement was at fault. The sand and the mixture were as a rule at fault. Steel structures were not erected to-day without making tests at the mill, and there was no reason why concrete work should be fabricated in the field without the use of the same methods used in structural steel construction. One of the greatest curses to the business were the men who worked upon the principle that "all you have to do is to have something mixed up in any old way, and it would stand through eternity." This was where failures could be traced to. To obtain success in concrete construction all that was necessary was to use the same care in construction as it was customary to use in any other material. A standard or something of the nature was essential to work to. It might be low at first, but as the industry grows it could be brought to the standard to which it was destined.

Vice-President Gustave Kahn called attention to the fact that the standardizing of concrete was one of the main objects of the Association. He stated that President Humphrey's remarks were not only gratifying but encouraging to the promoters of the Canadian Association. The great success of the National Association, from a small beginning, would encourage the C. C. C. A. in its humble beginning. He hoped, with the encouragement that they might get from the Association in the United States, and also the encouragement and co-operation from the allied industries in Canada, that the results that have been accomplished elsewhere would be possible in Canada. He wished to state for Mr. Humphrey's information, that the first thing decided upon in the early organization of the C. C. C. A. was the leaving out of all commercialism, and he was pleased to say that up to that time there had been no remarks of any sort made before the Convention which could in any way be construed as commercial remarks.

Afternoon Session, March 5th

Mr. Morssen, Consulting Engineer, Montreal, presented a paper on Factory Made Cement or Concrete. Mr. Morssen referred to the real excellence of concrete, as had been shown at the Exhibition, and described in the papers read at the Convention. Concrete had been exploited by large numbers of practical men, and by a goodly number of enthusiasts, but enthusiasm would not produce good concrete. Everything could be done in concrete, but to do it well was the question.

A fair idea had been given before the Convention as to how concrete might be used in field work. It was Mr. Morssen's endeavor to tell how it was being used in the factory. One of the essentials in concrete was density. This was only possible through a careful study of the materials used, proper grading of them, and intelligent mixing. The machine itself could not do the work. In Europe, where the production of concrete materials had been carried on to a very great extent, special machines for crushing and kneading together the materials were used. The careful study of the properties of cement and aggregates was each day bringing better results, with fewer failures. The concrete product was not finished when it was formed. It must be treated. A certain amount of water is required for setting, and care must be taken that it was not unduly subjected to the sun or wind.

Concrete blocks should be kept in a cool place, sometimes in water; they should be sprinkled. In other words, it was necessary to make a careful study of the materials that were being used, and to constantly be observant of the result acquired. In Europe, sidewalk blocks were produced, eight or ten inches by one and a half to two inches thick. These blocks

BANQUET OF CANADIAN CEMENT AND CONCRETE ASSOCIATION HELD ON THE EVENING OF MARCH 4TH AT THE KING EDWARD HOTEL.

are made on special machines, under great pressure, with surface corrugated, smooth, sometimes colored. These blocks have made very artistic sidewalks in cities in Germany, France and Belgium.

In Germany concrete pipes for sewers and water conduits consumed about one-fifth of the output of cement. Concrete sewer pipes have been a success, for the reason that the contents did not seep through them. He referred to artificial cement stone, and stated that although architects were not willing to accept an imitation, . must be remembered that the fact that both the architect and public had been accustomed to certain materials for many years, and - would take several years before cement could really find its place.

While reinforced concrete was to-day being used to a great extent in factory buildings, it was, nevertheless, a fact that whole structures could be put together by unit system, using concrete elements cast on the plates and put together in the structure. Concrete tiles had been used to a great extent in both Europe and the United States. In the United States many buildings were now constructed of concrete units, and large savings have been possible through this system of construction.

Mr. Morssen's talk was illustrated with a number of lantern slides. The question came up as to the efflorescence and waterproofing of these blocks. Mr. Morssen stated that a dense product could be procured by the proper grading of the materials and that to give a still further assurance of waterproof properties, there were several waterproof fluids to be procured that would mix with the concrete and effect a crystallization that would close up all the voids.

The President introduced Mr. Sanford E. Thompson, who addressed the Convention on the selection of concrete materials Mr. Thompson was sorry to bring the Convention down from the finished structures to the hard, cold, dry facts of sand and stone. Still, in order to produce these houses and factories, and concrete tiles, the ingredients had to be carefully selected and put together. In so far as his paper would doubtless be in print, he wished to omit certain portions and substitute some experiences.

Mr. Thompson spoke of the difference between rounded and sharp sand. Sand that appeared poor because of being apparently round, was dead sand, not because it was round, but because the grains were coated with dirt. One of the best ways to determine whether sand was adapted for concrete work was to take it between the hands and rub it together. If the sand was dirty, a coating of slime or fine dirt, which was largely vegetable matter, would be found between the fingers.

The engineer sometimes had to act, as it were, as coroner and hold a post mortem on concrete, and ofttimes some very interesting facts were brought out. There had never been a failure in concrete that could not be attributed to either poor design, poor workmanship, or poor material. He related an instance where some abutments for a small bridge, built under water, did not harden. The cement used had passed the standard test. When the concrete was analysed, it was found to have proportions of 1-5-9, whereas the contract called for 1-1½-5. The reason for this was that the cement had been washed away by the water passing through a bad floor in the coffer dam.

He spoke of a covered reservoir that had fallen down. It was a groined arch roof, and a large portion of the roof was laid in the early winter, in the cold weather, and the forms were taken down in April. Examination revealed, of course, that the form work was taken down too soon. There was also a truss of the arch which contributed to the danger, and on close examination it was found that the gravel was dirty, and the proportions, which were supposed to be 1-3-5, were really 1-1-4. When the failure first occurred, he had taken a piece of the concrete away with him, which was so soft it could be crumbled with the fingers, but when it had been exposed to the air for a month, it became very hard. Slow hardening was affected partly by the materials, and partly by the cold weather.

Mr. Thompson then went into several failures and tests that had come under his notice, and in each and every case the difficulties had arisen, as he had stated at the commencement of his talk, from either bad design, poor materials, or poor mixture. It was most important that the porper proportions be used in concrete, that absolutely clean materials be employed, and that great care should be taken in the workmanship. All the trouble he had ever known of with sand or aggregates occurred in the placing of concrete, resultant from slow hardening. When the concrete once set, it was pretty certain that it was all right.

Some discussion arose over Mr. Thompson's paper, as to the tests that he had referred to, showing 15,000 per square inch in compression strength in one instance, 200 lbs. per square inch tension in another instance, and 25 lbs. per square inch tension in another instance. The question arose as to what had caused this great disparity in the extremely low test of 25 lbs. Mr. Thompson stated that it was organic

matter in the sand, which amounted to two-tenths of one per cent.

Concrete Sewers

President Gillespie then introduced Mr. R. L. Humphrey, who addressed the Convention on "Concrete Sewers." It was Mr. Humphrey's good fortune to be associated with the construction of sewers in the early days, and last year he was enabled to inspect sewers in various large cities, that had been inexistence for a good many years. There had been only one case, to his knowledge, where a concrete sewer had proven inefficient, and under the same conditions a brick sewer had also failed. This was in Great Falls, Montana, where alkali had caused disintegration and softening. In all of the cities the concrete sewers were in an excellent state of preservation. He had examined sewers that had been inexistence as long as thirty or forty years, and there was no reason why concrete did not form one of the most admirable materials for the construction of sewers.

He had seen concrete sewers in which the discharging waters of manufacturing plants had flowed through them, containing a great quantity of acid, which in no way affected the sewer, for the reason that there seemed to be an oily substance that acted as a kind of a lining on the surface of the sewer. He referred to the excellent grade of concrete sewers in Philadelphia, in Brooklyn, and in New York. There was one condition, however, in which concrete could not be used without some protection; that was sewers where there were high grades, and where the scouring of the sewerage is likely to have a tendency to rub or wear down the green concrete. Under such conditions it was advisable in brick as well as concrete sewers, to use Belgium block or a very dense vitrified brick, as a lining.

A short time ago he had inspected an egg-shaped sewer in Minneapolis, that had been down for over thirty years, and the condition of this pipe was so good that after having been taken up, to be replaced by a larger sewer, it was to be re-used this spring in laying another sewer.

Reinforced concrete pipe could be used with great saving as compared with brick. In Cleveland they were laying concrete trunk line sewers with diameters as great as from 18 to 20 feet.

In laying a concrete sewer, the essentials were that the concrete should be well proportioned, so as to secure the maximum density. Concrete should be put in wet. The sewerage water should not be turned into it too sudden, so as to give the concrete a chance to attain a fair degree of hardness.

Mr. C. H. Thompson asked the question, if it was a general practice to make one continuous section, or to make it in small sections put together with joints filled in. Mr. Humphrey replied that this depended largely upon the size of and conditions under which the sewer was laid. Pipes had been very successfully made in sections and the joints filled in with a neat cement mortar, so that an almost perfect continuous pipe was possible.

He spoke of tile for drainage purposes, and stated that there had been a somewhat mistaken idea that they should be porous, so as to allow the water to seep through into the pipe. This was entirely wrong, and the idea undoubtedly came from the tile manufacturers, who could not make a tile on their machines that was not porous; hence the argument. The tile should be as dense and non-porous as it was possible to make it.

Mr. Keating, formerly City Engineer of the city of Toronto, now in the employ of the Toronto Street Railway Company, related some very successful experiences with concrete sewers while he was engineer for the city of Halifax. They had had endless difficulty with their brick sewers, and finally decided to build sewers of concrete. These sewers were made in blocks, and the condition of same after twenty-four years' service was most excellent. The sewer blocks were made from 20 inches to 4 and 5 feet in diameter, and in reply to an inquiry, the present City Engineer of Halifax told him that they were still following the same principle in making these sewers. The proportion used was 1-3-5.

Mr. Essery wanted to know what the ingredients of concrete were in the United States, and Mr. Humphrey replied that they differed in different portions of the country. In Philadelphia they used crushed stone as well as gravel. Throughout the West, limestone was used. He did not believe, however, that it made any difference as to the character of the ingredients, if they were used in proper proportion.

Mr. Essery wanted to know the effect of acid on concrete sewers. Mr. Humphrey did not believe that it should be considered at all, in so far as the entire surface of a sewer is coated with a greasy scum which practically makes the surface of concrete immune against acid action.

Mr. Essery stated that his father had taken a trip through the United States recently, and inspected a large number of concrete sewers. In every place he brought up the question of acid and he did not find a single place in the United States where they thought acid should be considered. At this point there was some discussion as to the effect of acid on sewers of various characters, with the result that it was the general opinion that the question of acids should not be considered, only in cases where there was a concentrated discharge from a manufacturing plant. Even then, disintegration would be only on the surface, and the action would be very slow. Mr. Humphrey said that he, under no circumstances, would hesitate to use a concrete sewer where there was water coming from plants which to a large extent were diluted and still further diluted from the sewer by sewage of ordinary character. He believed that concrete was one of the best materials that could be used for such sewers.

Mr. A. C. Blanchard asked Mr. Humphrey's views with regard to comparisons in the retardation of flow, between brick and concrete sewers. Mr. Humphrey replied that he would be greatly in favor of the concrete sewer. It was impossible to lay a brick sewer with a decidedly smooth intake. Mr. Humphrey had recently gone through one of the main trunk line sewers in Brooklyn, with a diameter of 22 feet. Metallic forms had been used, and the surface of the sewer, after the forms were pulled, was almost like granolithic finish. Several instances were spoken of by several present of cases in which the cement mortar had out-worn the stone blocks or brick in sewers, leaving the cement joints protruding up upon the surface of the sewer.

The next number on the programme was a paper by Mr. Blanchard on "The Evolution of Concrete in Municipal Engineering." Through our inability, before going to press, to get a copy of this MSS., we will be obliged to deal with it in a later number of CONSTRUCTION.

Closing of Convention

In closing the Convention, President Gillespie stated that as an initial Exhibition and Convention he believed that the Association had reason to be gratified at what had been accomplished.

The Association had conducted a Convention at which upwards of twenty papers had been contributed. The gentlemen who contributed these papers had received no reward, and their only motive had been their devotion to good engineering construction. In view of that fact, the Association should be considered as a purely educational organization, and was entitled to the co-operation and support of engineers, architects, contractors and cement manufacturers. If the Association was ever going to attain, and maintain the position of authority, which was essential, it should receive the support of these professions, as well as the industry. Mr. C. H. Thompson moved that a tender of the hearty thanks of the Association be extended to those who had contributed to the success of the Convention. This was seconded by Mr. Essery, and was carried amid applause.

NOTE

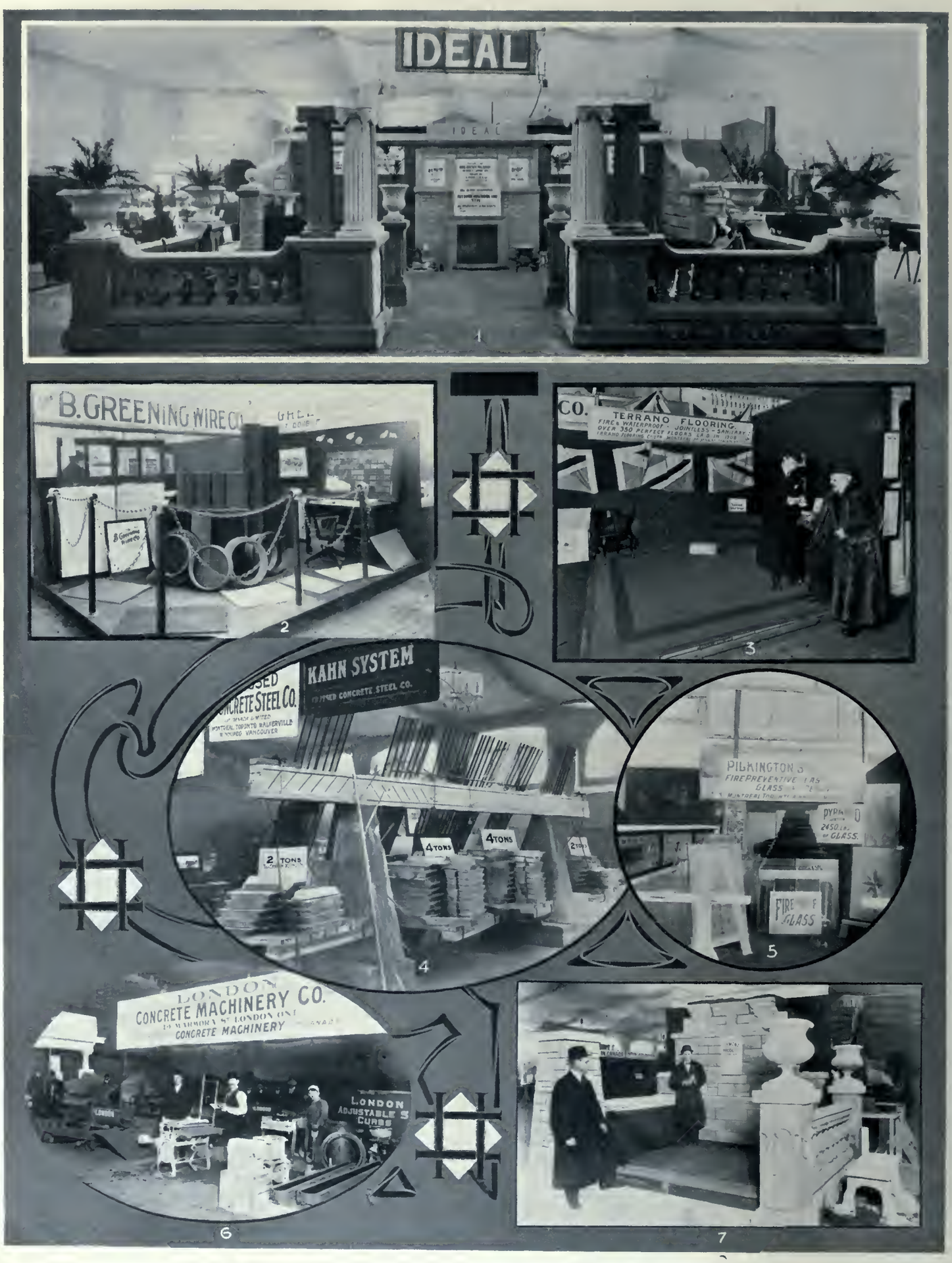
It had been the intention of the publishers to give, in condensed form, the complete proceedings of the entire convention, including all papers, but the large number of lengthy papers and the great amount of discussion made such an undertaking impossible, in one issue. We therefore have given in condensed form an outline of the proceedings and will treat in the near future the papers crowded out of this report.—*Editor.*

A DEVICE WHICH OBVIATES SOLDERING in the suspension of trolley lines has been patented by the manager of the Haslingden Corporation Tramway. As described in a report from Trade Commissioner J. B. Jackson, of Leeds, England, the invention consists of a special tool which grooves and flanges the wire at the required point, and a correspondingly grooved and flanged metal holder which clips the wire and makes the necessary connection. The holder is in two parts and is securely fastened by countersunk screws. The invention does away with the risk of weakening a line by soldering, with resultant risks of fusing. It also eliminates the danger of wires falling from the insecure soldering. Although it has just been patented, it is said, that the device has already been highly approved of by a large number of engineers and experts.

All are architects of fate,
Working in these walls of time,
Some with massive deeds and great,
Some with ornaments of rhyme.

For the structure that we raise
Time is with materials filled;
Our to-days and yesterdays
Are the blocks with which we build.

—*Longfellow.*



Some of the Exhibits Seen at the Cement Show

1. Ideal Concrete Machinery Company, London, Ont. 2. B. Greening Wire Company, Hamilton, Ont. 3. Eadie-Douglas Company, Montreal and Toronto. 4. Trussed Concrete Steel Company, Toronto. 5. Pilkington Bros., Montreal, Toronto, etc. 6. London Concrete Machinery Company, London, Ont. 7. Cement Products Company, Toronto.

Some of the Exhibits Seen at the Cement Show

8. A. B. Ormsby, Ltd., Toronto. 9. Canadian Portland Cement Company. 10. Roman Stone Company, Toronto. 11. Lehigh Portland Cement Company. 12. Expanded Metal & Fireproofing Company, Toronto. 13. Mussen's, Limited, Montreal. 14. Canadian Art Stone Company, Toronto.

CANADA'S FIRST CEMENT SHOW.---Vast Array of Materials, Products, Machinery and Appliances Shown at St. Lawrence Arena. ---All Available Space Occupied.---Many Elaborate and Artistic Exhibits.

THE EXHIBITION which was held at St. Lawrence Arena, not only reflected great credit upon the Canadian Cement and Concrete Association, but also upon the many enterprising firms who took part in it. Every branch of the industry was represented and in the sixty some odd booths, some of which were very elaborate in character, was to be found everything from the raw material up to the finished product. Concrete mixers, concrete block machines, brick machines, and cement working tools and appliances were much in evidence, and there was also some very practical demonstrations in the way of reinforced concrete construction.

It was impossible to lose sight of the vast improvement that has been made in the manufacture of artificial stone and cement blocks, and the numerous splendid exhibits of this kind to be seen had an educative influence which augurs well for these materials in the future.

All in all, the Exhibition was comprehensive, interesting and instructive in character, and in general scope, number of exhibits and effectiveness, it was said by the many United States visitors, to take rank with the cement shows which are held by the more advanced organizations on the other side.

IDEAL CONCRETE MACHINERY CO.

THE REPUTATION of the Ideal Concrete Machinery Company for making fine exhibits was fully sustained in their artistic display which was pronounced by many of the American visitors present to have eclipsed anything that has ever been atempted at various cement shows which have been held on the other side. The company occupied a large double space, the front portion of which was enclosed by an ornamental concrete fence having a base course of concrete blocks, concrete base rail, square and round spindles and curved top rail. The entrance was effectively set off with concrete columns and caps while at the corners were panelled pedestals surmounted by appropriately designed lawn vases. These corners introduce an entirely new idea in concrete pedestals or piers construction which can be worked out so as to meet almost any size or width required.

The great diversity of facings which it is possible to produce with the Ideal block machine, was strikingly demonstrated in wall of 24 inch blocks which formed the background of the exhibit. The lower panel on the right was composed of bush hammered blocks, while that on the left was built of one-quarter inch bevel, one-quarter inch panel blocks. These were carried up six courses, above which were four-inch rock-faced blocks laid in alternating courses with vertical and horizontal tooled blocks on each respective side. In the centre of the wall was a fire-place of white-faced brick with a pleasing mantel-piece worked out in white-faced egg and dart design. The wing walls on either side of the exhibit completed the enclosure and were in perfect keeping with the general scheme.

All the work shown in the exhibit was manufactured on the Ideal Machines and molds, and it must be said that the company has done much to advance this type of construction. Demonstrations of these machines were given during each day and evening and a large number of sales were made during the week. The booth was in charge of C. F. Pulfer, the Canadian manager, J. Augustine Smith, United States sales agent, and F. M. Leach, representative for the State of Michigan.

THE B. GREENING WIRE CO

THE B. GREENING Wire Company, Hamilton, displayed a large number of their lines at an attractive booth near the main entrance. One feature of their exhibit which created a large amount of attention was a practical demonstration of the Greening trussed hard steel wire lathing, a new product which the company placed on the market. This lathing offers a taut, rigid surface to which plaster takes hold in a ready manner, and it is fast gaining favor with the architects and builders. Wire cloth for cement screening, also shown in a variety of mesh and widths, as was also the company's crimped wire, which, owing to its continuous bond make an excellent reinforcement for floors or roof construction. Other products of the Greening make displayed wire rope for hoisting and derrick work and a full line of perforated sheet steel, copper and brass.

TERRANO FLOORING.

THE MERITS of Terrano flooring were explained at the booth of the Eadie-Douglas Company, where a practical application of this material proved to be of unusual interest to the daily visitors. This material is now being extensively employed for surfacing concrete floors. It is applied in a plastic state and usually laid about three-quarters of an inch thick. When set which requiries only a short time, it produces a hard, smooth, jointless surface. In addition to being jointless, Terrano flooring also possesses fireproof, waterproof and sanitary qualities that greatly recommend its use. While Terrano has only been before the Canadian building public for a short time, it is rapidly growing in popularity, and up to the present time, the Eadie-Douglas Company has laid over 350 floors.

One of the important recent contracts executed by this firm was in the new addition to the Chateau Frontenac, Quebec, where all the bath room floors are of Terrano instead of terrazo, as was erroneously stated in the previous issue of CONSTRUCTION.

The exhibit was in charge of Mr. Macdonald of the Toronto office, and included a large number of samples showing various colors and designs in which Terrano can be executed.

TRUSSED CONCRETE STEEL CO.

A LARGE ELECTRIC SIGN emblazoned with the words "Kahn System" indicated the location of the Trussed Concrete Steel Company's exhibit where a concrete beam loaded down with pig lead, proved to be an irresistible attraction of an interesting and instructive nature. The beam was eight inches in width by twelve in depth, with a span between the supports of twelve feet from centre to centre, and a cantilever at each end 3 feet 6 inches long. The beam was reinforced with Kahn bars, the location of which was indicated by black lines painted on the exterior. These consisted of two ¾ inch by 2 inch bars which extended through the entire length of the beam at the top and two ¾ inch by 2 inch bars placed near the bottom of the span to take the centre load of four tons. The cantilever load carried at each end was two tons. The company also exhibited their Hy-Rib lath and a number of other interesting pro-

ducts used in concrete construction, in addition to showing a number of photographs of buildings which had been erected according to the "Kahn" system.

ROGERS SUPPLY CO. ∴ ∴ ∴

SOMETHING NEW to the Canadian field in the way of a concrete mixer was shown at the exhibit of the Rogers Supply Company, where a Hadsel non-tilting concrete mixer proved to be a mighty magnet. It is doubtful if there was any place in the exhibition hall where greater interest centered than around this interesting machine, and it was the concensus of opinion of the large crowds who gathered about it, that the merits of the mixer fully speak for themselves. Among the many visitors who called at the Rogers Supply Company's exhibit were representatives of the C.P.R., G.T.R., and T.H.B. railway companies; members of various boards of public works, municipal engineers from many places in the province, and a large number of prominent concrete engineers and contractors; and from

EXHIBIT OF ROGERS SUPPLY COMPANY

the warm endorsement expressed, it seems quite evident that the Hadsel mixer is destined to play an important part in future construction work to be carried out by these various departments and interests. In construction, the Hadsel is a simple, strong, compact built machine, with an octagonal mixing drum, built of cast iron segments thoroughly rivetted together. On the inside of the drum are pressed steel buckets attached to each segment and steel deflectors which give the materials an additional turn, as they are carried by the buckets to a point near the top, from which they are dumped in the course of every revolution.

PILKINGTON BROTHERS ∴ ∴ ∴

FIREPROOF GLASS, and glass of all descriptions, was displayed to advantage at the artistic exhibit of Pilkington Brothers, Limited. This firm are the proprietors of the St. Helen's Glass Company, St. Helens, England, and their Canadian trade has grown to such proportions that they now maintain offices and ware rooms in Montreal, Toronto, Winnipeg and Vancouver. A pyramid containing 245 lbs. of Pilkington's patent wire rolled glass, in a wide array of sizes, formed the central feature of the booth. The fireproof and other excellent qualities of this glass has been universally recognized and to-day the Pilkington products are being specified by architects and engineers the world over. There was also displayed a complete line of the Company's patent prismatic glass which is made in three different angles, together with a number of specimens of beautifully wrought art and fancy color cathedral glass which fully demonstrated the firm's capabilities in this respect.

LONDON CONCRETE MACHINERY CO. ∴

BY FAR THE LARGEST individual display of cement machinery and appliances was shown by the London Concrete Machinery Company, who always had an interested group about their large double space. Included in this exhibit were concrete block machines, concrete brick machines, tile and sewer pipe moulds, moulds for sill, steps and window caps, continuous mixers, hand mixers, etc., all of which were of the company's own manufacture. These machines were operated throughout the week, turning out the particular class of work for which each was designed. The continuous mixer and other machines, which were operated by power, were driven by gasoline engines, also of the company's make. An attractive feature of their exhibit was a curb for the construction of concrete silos which are becoming so popular in the rural districts. This curb is adjustable and will build any size silo from five feet up with walls varying from twelve feet at the bottom to six feet at the top.

Mr. Henry Pocock, president and manager of the company, and Mr. J. C. Doidge, its secretary and treasurer, were personally in charge of the display, and they were both enthusiastic over the success of the show in general. At the present time the company has in contemplation a large addition to their plant in London in order to better take care of their growing trade.

THE CEMENT PRODUCTS CO. ∴ ∴

THE CEMENT PRODUCTS COMPANY, 19 Wellington st. west, Toronto, showed in a most practical manner the excellent quality of its blocks and kindred materials at a well arranged booth. This company makes a specialty of manufacturing a cement stone which bears a striking resemblance to broken Ashlar. The wall and pier construction, which formed a part of the exhibit showed effectively the application of this material. So well was the monotony and ugliness of the ordinary cement block overcome that the work was hardly distinguishable from the real stone. The corners, posts and piers were surmounted by vases which were also the products of the company, while along the sides its handiwork was revealed in the turned spindles and railing of the concrete fence.

Although the company is new in itself its products show the result of years of experience on the part of those who are identified with it. They have succeeded in overcoming the many objectionable features in work of this kind, and to-day are manufacturing a cement stone which is free from hair cracking, of great strength, practically non-absorbing, and attractive in appearance.

The Cement Products Company can furnish this stone with smooth, tooled or rock face, in any color or shape, and is prepared to fill large or small orders promptly in any part of the Province.

A. B. ORMSBY, LIMITED ∴ ∴ ∴

MUCH INTEREST CENTERED during the week at the exhibit of A. B. Ormsby, Limited, where many visitors availed themselves of the opportunity to inspect the fireproof building appliances which this company makes. These consisted of fireproof windows, Kalameined and Terne Clad fireproof doors, rolling steel doors, fire door hangers, etc., all of which have become important factors in present day building construction. It was an education to a large number present to note the great improvements that have been made in work of this kind within the last few years. The artistic appearance of the Kalameined and Terne Clad door, and the fireproof windows were especially admired and it was the common expression that the company's work in general, represents the very best in the sheet metal-workers art. The popularity of the A. B. Ormsby's goods is rapidly growing, and the company, in addition

to its factories at Toronto and Winipeg, now maintains branches in London, Eng., Montreal and all the principal cities in Western Canada.

CANADIAN PORTLAND CEMENT CO.

A VERY ACTIVE WEEK was spent by the Canadian Portland Cement Company, which found among the visitors many customers of the well-known Star Brand. They had a neatly decorated booth on the outside of the entrance where they displayed samples of their cement in various stages from the raw material to the finished product. About the booth were several large views showing the extent of the company's works, and also one of the standing piers of the collapsed Quebec bridge, in which the Star brand was used.

The Canadian Portland Cement Company have two plants in operation, with a total daily output of 3,000 barrels. These are located at Marlbank and Port Colborne, Ontario. The company has direct shipping facilities on both Grand Trunk and Canadian Pacific railways, and they are enabled to ship by boat from their own dock at Port Colborne to Port Arthur, Fort William and ports on the Great Lakes.

ROMAN STONE CO.

A REPLICA of a modern bank building, executed in a classic design, which formed the chief feature of the Roman Stone Company's exhibit, won for the company many a deserved encomium. The idea was certainly a clever one and it gave the company a splendid opportunity to show the adaptability of its stone to high class design. The exceptionally fine texture and color of this manufactured stone excited much favorable comment, and one authority on structural materials, who was present, said that there was a pronounced similarity between it and Indiana limestone.

Other specimens of the company's work was to be seen in two vigorously modelled lions placed on each side of the entrance, and in the coat of arms for the Bank of Montreal, which has been supplied for five branches of that institution. Two pilaster caps in process of being hand carved were also shown and created no little interest. These fully demonstrated the suitability of Roman stone where sculptured work is required.

LEHIGH PORTLAND CEMENT CO.

ONE OF THE MOST progressive concerns identified with the industry in Canada, to take part in the exhibition was the Lehigh Portland Cement Company, for which the Thorn Cement, 601 Continental Life Building, Toronto, are the sole selling agents. At their appropriately arranged booth, was a particularly interesting exhibit showing the component part of Lehigh cement at various stages during the process of manufacture. Of equal interest was the product of the company in finished work which was shown in the form of a window sill of great density and having a rich white color. Lehigh cement is especially well adapted to sidewalk construction and high grade engineering work. The company's plant at Belleville, Ont., which is one of the modernly equipped on the continent, has an annual output of 1,000,000 barrels.

EXPANDED METAL & FIREPROOFING CO.

FENESTRA STEEL SASH was a conspicuous feature at the exhibit of the Expanded Metal & Fireproofing Company, Toronto, which displayed their concrete reinforcement, steel lath and other fireproof accessories. The booth which was in charge of Mr. Black, was splendidly arranged and showed off the various line to an excellent advantage. Expanded metal was shown in various sizes of web, and there was also to be seen the splendid type of expanded metal locker for schools, offices, commercial and industrial institutions, which the company is marketing with great success. A "Fenestra" steel basement sash set in a concrete wall stood at the front of the exhibit, while at the rear, forming the background, was a "Fenestra" sash of the type which is now coming to be specified for manufacturing and other buildings. A large suspended wash-drawing gave the many callers at the booth an opportunity to gain an idea of the company's new concrete plant on Fraser Avenue, Toronto, in the construction of which the various kinds of materials displayed were used.

MUSSENS LIMITED

POSSIBLY THE DISTINCTION of being the first concrete mixer in operation at a Canadian cement show belongs to the 1909 Model Smith Machine displayed at the exhibit of Mussens, Limited. In a manner quite characteristic of the aggressive and business-like policy of this firm, the big machine driven by an electric motor, got under way simultaneously with the first blast of the whistle announcing the formal opening of the exhibition on the first night.

The Mussens, Limited, exhibit was a most extensive one, and it proved to be a strong attraction throughout the entire week to the many visitors who were in attendance. In addition to the mixing machine, several of the many lines of contractors' supplies and equipment which the company carries, were also shown and resulted in a number of important sales. The Smith mixer exhibited was equipped with an improved side loading device which elicited an unusually large amount of interest. The features of this device are essentially economical and practical ones, in that the attachment does away with the feeding platform, increases the output, and reduces the cost of mixing. By its use all materials are assembled in the skip or car on the ground level and hoisted to the charging device. It does away with the cost and time required in erecting a platform every time the mixer is moved, and because of its portability, large output and low feed it is a particularly attractive outfit for street work.

The 1909 Smith mixer, while of the same style as before, is built more heavily and stronger so as to better withstand the hard usage to which a mixer is generally subjected. An important improvement is the reinforcement which is now employed in the construction of the drum on all sizes of this machine. This reinforcement greatly adds to the rigidity and strength of the drum, and it can be readily replaced when worn out, thus rendering the mixer serviceable for a much longer period.

Another machine which was also demonstrated with much success at the Mussens' exhibit was the Chicago mixer, a new machine in the Canadian field, which is especially well adapted to meet the requirements of small work. This mixer is being introduced by this firm to take care of the trade where a less expensive machine than the Smith is desired. It is very serviceable in character, being strong and substantial, and a most splendid and reliable worker. One of its several salient features is the turbine loader which permits of the material being fed to the machine from a wheelbarrow almost on the ground level.

CANADIAN ART STONE CO.

THE EXHIBIT of the Canadian Art Stone Company, proved to be one of the strong attractions of the show. It would be difficult to imagine anything more artistically conceived or better carried out than their display which demonstrated beyond peradventure, that the term "art stone" is no misnomer. The company's exhibit included a great variety of design in decorative landscape and lawn pieces, consisting of garden tables, seats, vases and similar ornamental features. The possibilities of artificial stone for decorative architectural relief work was also to be seen in several splendidly executed pieces which are to be used in the construction of the World Publishing Company's new building now in process of construction on Richmond street, Toronto. Other products of the company were two strongly modelled statuettes, and a number of grotesque heads which were used effectively to overcome the monotony of the background, and which greatly added to the attractiveness of the general scheme.

SUCCESSFUL TEST OF CONCRETE SLAB.

---Report of Test Conducted by W. G. Swan, B.A.Sc., of Toronto University, at Cement Show.--- Slab Reinforced with Triangular Mesh.

AMONG THE MANY interesting features of the exhibition held the first week of this month in the St. Lawrence Arena by the Canadian Cement and Concrete Association was the testing of a reinforced concrete floor slab, manufactured by James Claxton & Son, contractors of this city, for the United States Steel Products Export Company of Buffalo and Montreal.

The accompanying sketch gives the dimensions of the floor slab and indicates the method of abutment support, a steel framework of I—beams and channels being used for the purpose. The style of reinforcement employed and its position in the slab is also indicated. The following additional information in connection with the slab is worthy of note:

MIXTURE.

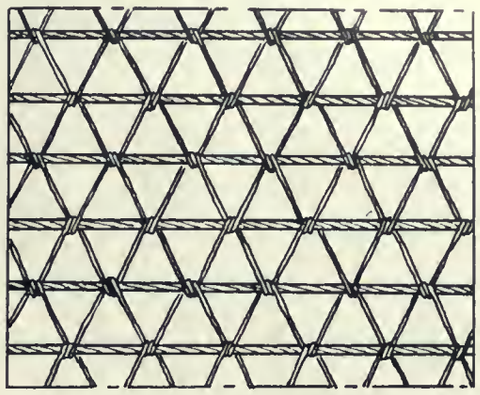
The concrete was a 1: 2: 4 mixture of National brand cement coarse and fairly clean pit sand, and one inch limestone aggregate. The mixing was done by hand much care being taken to make it thorough. Age of concrete 35 days.

REINFORCEMENT.

The reinforcing material known as the "Triangular Mist" was cold drawn O. H. steel with a guaranteed ultimate strength of 60,000 pounds per square inch.

The percentage reinforcement is very low being only 1-4 of one per cent. It will be seen from the accompanying sketch the diagonal wiring system carries the intermediate stresses to the heavier longitudinals whence they are transferred to the abutments.

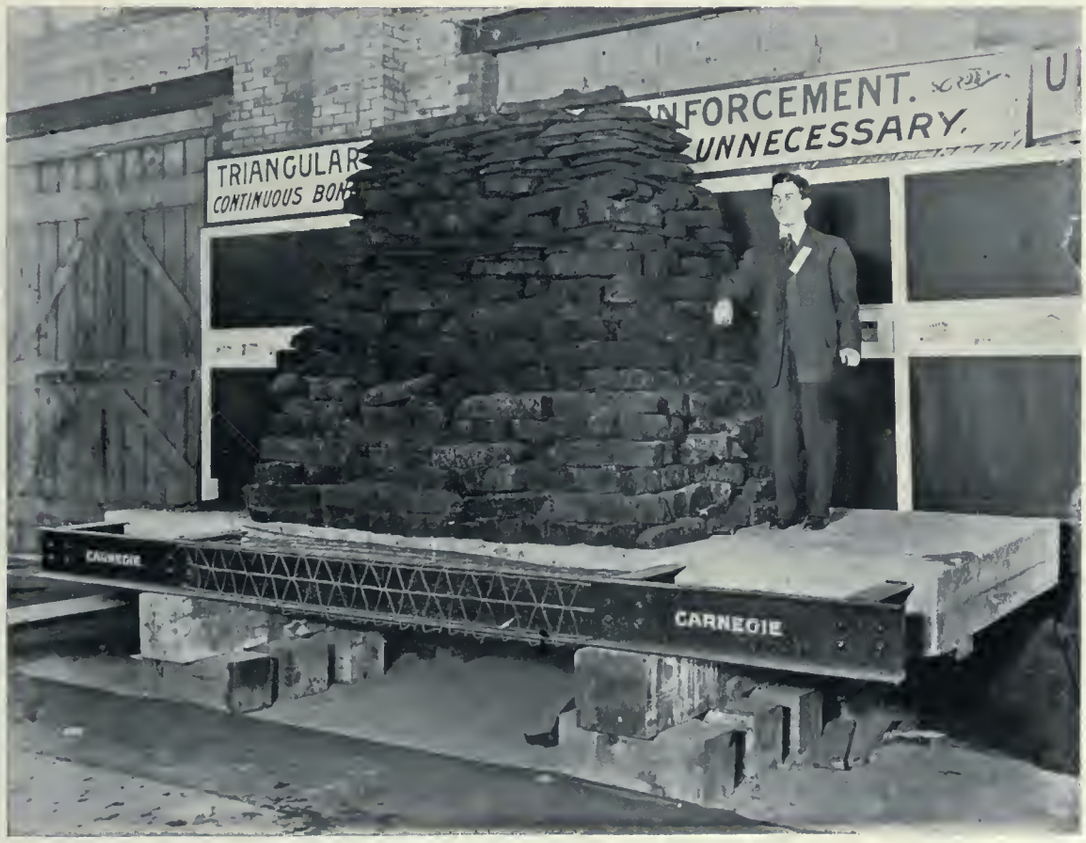
The loading of the floor slab was accomplished by the use of pig iron, each piece being weighed before being



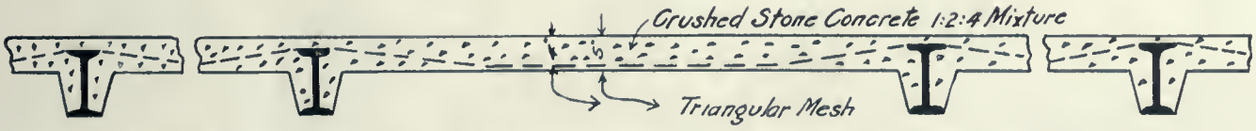
DETAIL OF REINFORCEMENT.

put in place. The pig was loose piled in an effort to overcome the arching effect of the load. The following load-deflection table and graph give a good idea of the behavior of the floor slab under stress.

Total load (Pounds)	Total load (Pounds per sq. in.)	Total Deflection (inches)
0	0	0
12,170	254	.07
21,830	455	.16
34,300	715	.35
40,300	840	.48
52,900	1100	.87



CONCRETE SLAB TEST MADE AT RECENT CEMENT SHOW, TORONTO, SHOWING THE PANEL AS IT APPEARED WHEN SUBJECTED TO 52,900 LBS.



DETAIL OF CONSTRUCTION OF SPAN SHOWING LOCATION OF THE TRIANGULAR MESH REINFORCEMENT.

The first cracks appeared in the slab at a load of 34,300 pounds. Failure occurred at the ultimate load.

In summing up the test the results may be said to be very satisfactory especially since the floor slab was designed to carry a uniformly distributed load at 30 days' time of only 110 pounds per square foot with a safety factor of four. As we may note the values obtained are

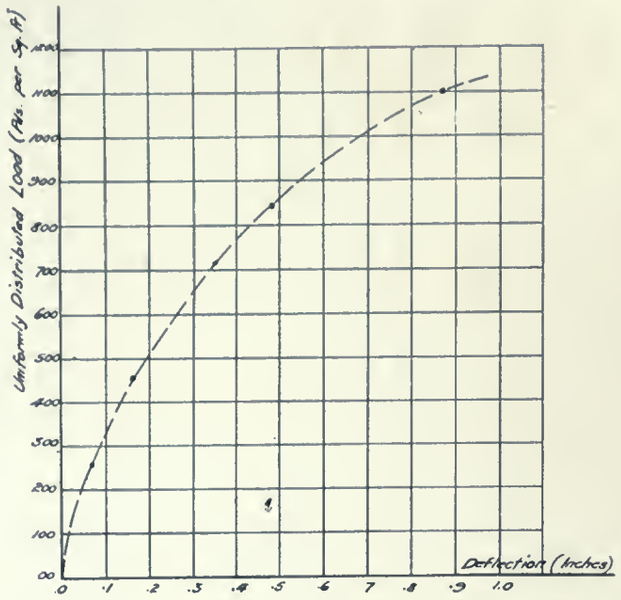


DIAGRAM SHOWING DEFLECTION OF SLAB REINFORCED WITH TRIANGULAR MESH.

more than double the guaranteed capacity of the floor slab and although the deflections above the 34,000 pounds total load mark are high this is accounted for to some extent by a slight turning over of one of the abutments I beams due to loose bolting. It is the writer's opinion that the triangular mesh is especially suited to floor reinforcement, on account of its natural tendency to distribute the load and the comparatively small amount of steel required.

W. G. SWAN, B.A. Sc.,
U. of T.

BUILDING STATISTICS FOR FEBRUARY.

Returns Show Universal Activity Throughout the Dominion.---Very Bright Outlook for Future Work.

WHILE THE BUILDING STATISTICS for the month of January were indicative of a record breaking year, those for the month of February are positively assertive of it. It is extremely doubtful if ever before in the building annals of the Dominion there has been recorded at this season of the year, anything quite like it for universal activity.

Returns for the months, as submitted to CONSTRUCTION from representative cities in every province of the Dominion show, conclusively, that building operations from coast to coast, have not only been fully revived, but that gains of such huge proportions are being made as was little anticipated even by the most optimistic at the beginning of the year.

Of the sixteen cities reporting for the month, twelve submit comparative figures, and of these only one shows a falling off from the corresponding month of 1908. This decrease is noted in the case of Edmonton, which after a series of successful months, experiences a slump of 91.22 per cent. However, it must be taken into consideration that last year's amount for February included the parliament building to cost $1,250,000, and apart from this, Edmonton is really far ahead on the total value of permits for the past month.

In fact the West in general shows every evidence of a flourishing condition and the immediate prospects are that the present pace in the building line will be maintained throughout the entire season.

Winnipeg follows strongly on the lead gained in January, by another tremendous advance of 1.425 per cent.; while Calgary eloquently attests to her prodigious growth by again coming to the front with a gain of 230.90 per cent. for the month. A material increase is also to be noted in the case of Regina, which turns up with 169.90 per cent. in her favor, and again in the amounts of Vancouver and Victoria, both of which overlap last year's figures for the month by 11.61 per cent. and 68.15 per cent. in order named. It is interesting to note the strong re-action on the part of Fort William, Toronto and Halifax the only three places which registered a decline for January.

Fort William has not only regained a large portion of what she lost, but tops the list for the month with the striking gain of over 2,925 per cent. the largest increase to be recorded during the month. Toronto has more than redeemed herself by an increase of 68.19 per cent. and is so far away ahead in the year's work; while the gain in Halifax of40.79 per cent. more than offset any loss in January and gives the city a total valuation of permits for the first two months slightly in excess of that for the corresponding period of last year.

There is also a strong forward movement in Montreal, where a splendid increase of 104.86 per cent. added to the gain made in January, gives the metropolis a very substantial margin in her favor which promises to be materially extended as the season advances.

Quebec city also shows a most healthful condition and has a gain for the month of 109.30 per cent.

Peterboro registers a gain of 22.30 per cent. while Windsor, Kingston and Berlin show much activity for so early in the season.

Reports as to the future are of a most sanguine nature. Edmonton sends in word that the "outlook is bright"; while others report as follows: Brandon, "fairly good"; Calgary, "looks bright"; Fort William, "very bright"; Kingston, "very good"; London, "splendid"; Regina, "many buildings in contemplation"; Winnipeg, "bright"; Berlin, Ont., "good".

	Permits issued for Feb. 1909.	Permits issued for Feb. 1908.	Increase per cent.	Decrease per cent.
Berlin	$ 9,000			....
Calgary, Alta.	78 0b0	$ 23,590	$ 230.86	....
Edmonton, Alta.	112 400	1,281,415		91.22
Fort William, Ont.	311,625	10,300	2,925.48	....
Halifax, N. S.	22,070	15,675	40.79	....
Kingston, Ont.	13,400			....
London, Ont		4,200		....
Montreal, Que.	235,330	114,380	104 86	....
Peterboro, Ont.	1,165	50	2,230 00	....
Quebec P. Q.	9,000	4,300	109.30	....
Regina, Sask.	5,965	2,210	169 90	....
Toronto, Ont.	1,233 060	733,093	68.19	....
Vancouver, B. C.	407 655	365,225	11.61	....
Victoria, B. C.	121,620	72,325	68.15	....
Windsor, Ont.	17,000			....
Winnipeg, Man.	157,900	10,350	1 425.60	

"THE BUILDING INSPECTION DEPARTMENTS of many cities have a great deal of difficulty in inducing owners and contractors to recognize the necessity of applying for building permits in advance of starting the work," says the IMPROVEMENT BULLETIN, Minneapolis, "The real object of building inspection is overlooked, if permits are granted without an inspection and an approval of plans ahead of starting the work. Inspectors at different cities from time to time, threaten and even take steps against dilatory and negligent owners, but the matter continues to recur at frequent intervals." The difficulty seems to exist in almost every large city in America. Both the Montreal and Toronto building departments are handicapped in their inspection by this unlawful, deplorable practice. Measures should be taken to make examples of a few dilatory builders.

Hartranft Cement Company (sole selling agents of the Vulcan Portland Cement Company), Bank of Ottawa Building, Montreal.

SOMERVILLE LTD. MAKES EXTENSION TO PLANT.

SOMERVILLE LIMITED, Toronto, who have recently completed one of the finest and most perfectly equipped brass plants on the continent, are already finding it too small to meet the requirements of their rapidly growing business, and have taken out a building permit for a large extension to their foundry. They are also extending and refitting their show rooms and offices on Richmond street, where the company will greatly add to their already extensive display of plumbing fixtures and appliances.

TORONTO IRON WORKS.

THE TORONTO IRON WORKS, while one of the most recent manufacturing concerns identified with industrial life of Toronto, has, nevertheless, successfully carried out several large contracts since its inception. Probably the most important of these is the large standpipe installed by the company, in connection with the new waterworks system at Guelph, Ont., which is said to be the largest reservoir of its kind in Canada, the capacity being 500,000 gallons and the dimensions 30 feet in diameter and 100 feet high. The workmanship and erection were carefully executed and have proved entirely satisfactory to the city and their engineers, Messrs. Davis & Johnston, of Berlin.

Prior to its incorporation, the principals in the company had built the plant of the British American Oil Company and had become satisfied with the future prospects of the steel business in Canada. The charter for the Toronto Iron Works was obtained in 1907 and the plant completed early in 1908. The operations of the concern embrace all details of the industry in which they are engaged, including tanks, water-towers, standpipes, blast furnaces, boilers, stacks and plate work in all its varieties; steel beams, channels, angles, building members such as columns, girders and trusses. The present equipment is amply sufficient, and additional machinery will shortly be installed to make possible the handling of the heaviest grades of work.

It is the intention to carry a complete stock of structural metal, beams, channels, angles and column sections, besides plates of certain dimensions. Ample yard room has been secured, and the improvements which the Toronto City Council have in hand will give good railway facilities in a short time.

Among other contracts that the Toronto Iron Works have on hand, is one for a 50,000 gallon water tower for the Village of Markdale, to be built according to the plans and specifications of C. H. Mitchell, consulting engineer.

The personnel of the company includes several influential business men, while those most closely connected with the management are men of extensive practical engineering experience and technical knowledge.

MESSRS. C. EDWARD WHITE and J. A. L. Foulds, architectural and structural designers and engineers, of Sherbrooke, Que., have formed a partnership and opened a suite of offices at the cor. Montcalm and Magog streets, in that city, at which address they will be pleased to receive manufacturers catalogues and samples.

HARVARD UNIVERSITY TO HOLD COMPETITION.---Will Award Three Scholarships to Students of the Architectural League of America and Associate Societies.

HARVARD UNIVERSTITY offers to members of the associate societies and to the individual members of the Architectural League of America, three scholarships in architecture for special students. The scholarships will be forwarded to those who stand highest in a competition in architectural design to be held in May.

The competition will be conducted in the various cities by the League through the organizations affiliated with it; on a program prepared by the Architectural Department of the Harvard University, and will be judged by the Professor of Architecture in the University and a Boston architect selected by the League.

These scholarships entitle their holders to free tuition in Harvard University for one year. The cost of such tuition otherwise being $150 per year.

If the number of candidates and the quality of the work done in the competition should warrant such action, the Department of Architecture of Harvard University will recommend to authorities the award of similar scholarships to the two competitors standing next highest on the list to the successful ones.

Candidates should notify Emil Lorch, chairman of the Committe on University Fellowships, Architectural League of America, Ann Arbor, Michigan; by April 10, of their intentions to take part.

The program will be given out at 9 a.m., May 1st, at a place in each city, designated by the officers of the local organization or by the chairman of the above committee on University Fellowship in the case of Individual members of the League.

Eight consecutive hours will be allowed for making a preliminary sketch, a tracing of which should be retained by the competitor, the original being handed to those supervising the preliminary competition.

Supervisor of examinations will endorse the original sketches and send them at once to the chairman of the Department of Architecture of Harvard University.

The essential features of this sketch are to be adhered to in preparing the final drawings.

The competitors will have until Monday May 10th, to complete the drawings called for by the program. The drawings are to be sent in a mailing tube, and must bear the post mark or express stamp of that date. They should be addressed to the chairman of the Department of Architecture, Harvard University, Cambridge, Mass. The drawings of the unsuccessful competitors will be returned.

The name of the designer should not appear on any of the drawings. The sketch and the final drawings should bear some device, a copy of which with the author's name and address should be sealed in an envelope and enclosed with the drawings. The competitor must not have any assistance whatever in preparing his drawings, and that they are by him alone should be stated on the identification sheet.

HIGH BUILDINGS, sir?" remarked an American, contemptuously. "Why, in England you don't know what height is! Last time I was in New York it was a blazing hot day, and I saw a man coming out of a lift wrapped from top to toe in bearskin, and I said to him: 'Why are you muffled up on a broiling day like this?' 'Waal,' he said, 'you see, I live at the top of the buildin' and it's so high that it's covered with snow all the year round!' "—Tit-Bits.

'HECLA'

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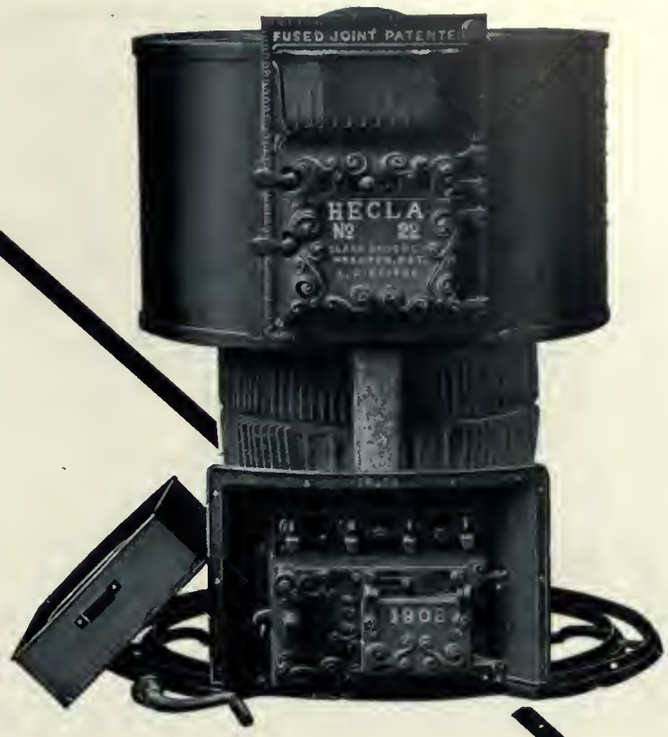

The requisite for a successful Warm Air Heating System is a good furnace ; one that will not only supply an abundant quantity of pure warm air, but will, in addition, be economical in the consumption of fuel, easy to operate, safe from dust and smoke, and that will give the greatest length of service. Some cheap furnaces fulfil one or more of these conditions, but the furnace you want must fulfil all. That is what the HECLA does.

"HECLA" Features

Damper Regulator enables you to operate the dampers without going to the basement.
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Double Feed Door for convenience when burning wood.
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Wolves in Sheep's Clothing

PROFESSIONAL DISHONESTY is the most vicious form of modern graft. There is no sphere of human endeavor that provides dishonestly inclined adventurers, with the cloak of immunity and deception that professionalism offers. Professionalism furnishes the most effective *purely white* sheep's pelt, for the wily wolves who aim to prey upon the weaknesses of society.

The man who undertakes to apply tricky methods and sharp practice in business, cannot successfully operate long. He deals in a tangible commodity and his own shaggy pelt is soon in open evidence, and society is enabled to deal with him for what he is.

The professional man on the other hand, does not deal in a tangible commodity. He sells his advice and his services to society and society accepts them and pays for them, not according to their intrinsic worth, but in accordance with the value, placed upon them by the professional man, upon whose honesty and integrity society is absolutely and entirely dependent, for a square deal.

In business, every commodity has a certain set market value, or a basis is established by which the value of any and every commodity may be determined. Not so with the services of the doctor, the dentist, the lawyer or the architect. A professional man may have an established code of charges, but there is no established standard of advice or service which he is obliged to render for any given charge.

If a man desires to buy a suit of clothes, he goes to his tailor, examines the cloth, asks the price, when suited gives his order and pays for same when it is completed and delivered according to his order. But when he gets a pain and consults a doctor, he depends upon the professional integrity of his physician, for his illness may be serious or trifling. It may take one bottle of medicine to effect a remedy, or it may take a long treatment and an apothecary shop of drugs to cure him. He cannot himself determine the extent of the medical service and advice his case requires. Here is where the unscrupulous operator finds the practice of medicine a profitable occupation.

When a man has trouble with his teeth, the dentist may find that long treatment is required before the job can be completed. But the dentist must always be the judge of the services required.

A lawyer is consulted when a man gets into legal difficulty. His case may be a complicated one that has to be appealed from one court to another, thus involving large sums for legal services. The legal adviser must, however, be judge as to the extent of the services required, and the charges to be made.

While in the case of the architect there is a little difference, in that the character of service required and the cost of same, are fairly well established before he is employed, the prospective builder, however, is obliged to depend absolutely upon the professional integrity of his architect in the selection of the contractor

to do the work, the selection of materials and the honest erection of the structure, according to the approved plans.

It is because of these great opportunities for dishonest practice in professions that the truly high-minded and honorable men, who have chosen professional careers, have safeguarded their professions by carefully and thoughtfully formulated codes of ethics to regulate the actions of professional men. These ethics have been designed to enable society to differentiate between honest and dishonest practitioners.

Society, on the other hand, realizing the necessity for high-mindedness and integrity among these men, who have been entrusted to serve society, has enshrouded these professions with a cloak of respect, confidence and dignity that serves to impress upon the clean minded, well meaning man the sacredness of his professional responsibilities.

It is this condition that renders dishonesty in professional practice, the most pernicious, despicable and vicious of all modern methods of graft, and for the preservation of the dignity and standing of his profession, every honorable professional man should do all in his power to discourage, expose and stamp out professional graft.

Graft in almost every conceivable form, has gradually, surely and stealthfully crept into the building industry, the evils of which are not one whit less than the most despicable practised in other professions.

When an owner employs an architect to prepare plans for a structure, he undertakes to buy his advice and his services. He employs him, because he has knowledge of building methods and materials, because he has ability to design and superintend. The architect becomes the agent of the owner, and, if, through any illegitimate method, procedure or condition, he permits his advice to be biased, or his services rendered less efficient through any pecuniary influence from any source, he becomes an enemy to society and a fester on his profession.

Some architects are charged with openly and flatly demanding a rake-off either in the form of a lump sum or a regular percentage on the amount of the contract. Others are timid recipients of tidy little sums from dealers or contractors. Others have been presented with or sold at a small nominal sum, blocks of stock in firms, manufacturing building appliances or materials, or engaged in contracting work. While it is considered non-professional by many practitioners for an architect to in any way, shape or form, be financially interested in any firm engaged in the manufacture or sale of building materials or appliances, or engaged in the contracting business, it cannot be said to be dishonest if the architect procured such interest in the ordinary course of legitimate business transactions, and has made his ownership of such interest, known to his clientele. It is when an interest in a business has been secretly transferred to him with the object of buying his influence or corrupting his professional advice, that the practice becomes perfidious.

Professional graft of this nature not only operates against the interests of the owner, but the clean contractor and the honest architect are placed in a false light and their legitimate interests and inherent rights are grossly encroached upon. It creates a condition that places a premium upon all work the contractor would aim to be successful in securing. When the architect has become so biased by monetary influence in favor of some contractor or some material that it is a foregone conclusion whom the successful tenderers shall be, every conscientious tender other contractors have taken the time and trouble to prepare, simply becomes a *dummy*. The owner in the meantime is the victim of the corrupted professional advice of his Architect.

Apart from honeycombing the whole building industry with bribery and graft and bringing discredit upon the profession at large, the professional grafter, by having an unseen, illegimate source of revenue, is in a position to give his services to a prospective client at a commission lower than it is possible for the honest practitioner to undertake the same work for, who has only his legitimate commission to reckon on.

If an architect who has been successful in corrupting a sufficient number of

contractors, dealers and manufacturers, realizes that in a certain job, $100,000 in contracts will be awarded, he can figure upon a goodly revenue beyond his commission from the owner. He can afford to accept the work on a commission of from one to two per cent. lower than the practitioner whose only revenue would be his commission from his client. It can therefore be seen that it is to the interest of every honest architect and contractor to aid in stamping out this ruinous practice of graft and rake-off in the building fraternity.

An architect has no right, professional or otherwise, to demand, accept, or look for revenue, profit, or commission, or gifts, in connection with the planning, erection or superintending the construction of a building, other than that which he receives as his legitimate commission from his client. Any consideration he receives from any other source, whether it be in the form of money or gifts of any nature, is designed to secure his favor, to the detriment of the interests of his client and at the expense of his personal honesty and professional integrity.

Any architect who uses or allows to be used, his professional influence, his professional connection, his power, as the purchaser of materials for private gain in any undertaking outside of the confines of his profession, is guilty of a gross breach of professional ethics, an enemy to the profession, and a leech upon the industry.

The architect who accepts a bribe from a contractor is guilty of professional graft just as much as the medical faker who prolongs the illness of his patient, in order to pile up a big account. The architect who allows his professional advice to be corrupted or biased by private interest, robs his client to as great an extent as the dentist who digs holes in his patients' teeth in order to create the job of filling them up.

The architect who uses or permits to be used, his professional prestige, his purchasing power, given him by virtue of his professional standing, for the promotion of a private business apart from his profession, is guilty of legalized blackmail just as much as the lawyer who creates a legal difficulty for his client and derives a revenue by getting him out of it.

Fortunately the majority of our architects are professionally honest and clean, and we do not want it understood that these comments are designed to serve as an indictment of the profession generally. Our aim has been to show the possibilities for graft, by unscrupulously inclined individuals through the use of the cloak of public confidence and professional dignity to cover up their wolfish pelts.

This condition does exist to an alarming extent, and it is to the interest of architects, contractors, manufacturers and dealers, alike, to purge the industry of the great, growing evil of graft.

The thief with the characteristics and appearance of a tough is much less dangerous than the thief with the manners and clothes of a gentleman.

A Pertinent Instance

A MOST GLARING INSTANCE of the many methods and means employed by some architects (or those who have been permitted to barter with their names) in using their professional influence and purchasing power for the promotion of private enterprise, was recently brought to our notice. In this case, the name of one of the largest architectural firms in Canada (if not the largest) has been carted about the country in the promotion of a scheme. Contractors, manufacturers and dealers have been approached in the interests of this undertaking, and have been *loosened up,* through the fact that the name of this architectural firm, that purchases annually vast

quantities of materials, is associated with the project, either with or without their consent.

Some of the stragglers, who were not so ready to pay their allotment, were whipped into line by a casual call from individuals who were associated with this architectural firm, and it has even been whispered, confidentially, that one of the members of the firm was financially interested in the enterprise. Few have dared to resist the solicitations of this PLUNDERBUND. Their demands were most persistent and if a man were so inconsiderate, discourteous and ungrateful as to refuse to *"loosen"* at least, a little bit, he would thoroughly understand that his business relations with this great architectural firm were seriously strained and in danger of being completely severed, forthwith.

The man, thus solicited, was not left free to be governed in his actions by his judgment as to the merits or demerits of the proposed investment. It remained simply for him to decide if he could afford to spend a certain sum to be *"in right."*

Some few have been brave enough to show their resentment of this new form of professional graft, by refusing to *"cough up"* and decided to attempt to weather the storm to follow. Others have *"given up"* under protest with a hope of sometime in the future getting a *"look in"* on a job that will let them get this money back.

This, it appears to us, is carrying professional influence a trifle too far. Such a wholesale attempt to use the purchasing power of an architect to whip into line unwilling prospective patrons of a purely commercial undertaking, never before came to our notice.

Why should any individual or firm that is engaged in any branch of the building industry, be forced to consent to patronize any undertaking, upon the penalty of losing his chances to secure a *"fair shake"* for the work of a certain architect, simply because that architect's name is flaunted in front of him, as being interested.

The architect is only the agent of the owner and he has no more right to permit private interest to influence him, for or against a certain contractor or a certain material or appliance, than has the purchasing agent of a business institution, to become biased because of personal friendship.

The architect, who so commits himself through any private interest or deal with firms or individuals, with whom he is obliged to deal in the interests of his client, is not in a position to give conscientious service to his client and cannot be looked upon as professionally honest.

Dozens of propositions are promoted every year and high pressure solicitors are sent out to gather in the money from contractors, material dealers and manufacturers. These solicitors always aim to get the consent to use certain architects' names, and nine times out of ten, these names are used in an entirely different manner from that intended or anticipated by the architect, when he gave his permission.

If the solicitor makes the representation strong enough, the contractor or dealer falls a victim. Architects should therefore be exceedingly careful as to how they permit their names to be used in connection with such schemes and should individually and collectively do everything in their power to discourage this system of petty graft.

It is almost unthinkable that one of Canada's largest architectural firms should allow their name, their professional dignity, their prestige and their reputation to be dragged in the mire of professional indecency by an organized system of hold-up.

There should be a limit to the tolerance of this character of practice and that limit may be determined by the architects throughout the Dominion, who should show in no unmistakable manner and express in the strongest terms, their disapproval of this gross breach of professional ethics.

MONTREAL'S NEW POLICE STATION—WHAT THE PLANS CALLED FOR—WHAT THE CITY WILL GET—ARCHITECT AND OFFICIAL IN COMPROMISING POSITION—STRONG INDICATION OF GRAFT.

THIRTEEN IS AN UNLUCKY NUMBER. There is every reason to believe that the evil powers ascribed to it, in the dark ages, still obtains. Nothing is more demonstrative of this than the sinister influences which have attended the erection of Montreal's new police station, so designated. Plans accepted by the city council, provided for a well-built, substantial structure, 45 by 90 feet ground dimensions, the supposed size of the lot purchased at a site. Instead, the city will get, if the structure is taken over, a building which is ten feet shorter in depth and three feet less in height; a building which in no way reconciles itself to the original plans; a building in which this unpropitious number, through human agency, has seemingly exerted its subtle force with all the potency it possesses; in short, an abortive mass of brick and stone reared under most suspicious circumstances.

Both the reports of Architect Browne and Architect Marchand, as submitted to the special committee investigating the charge preferred by Alderman Robinson, show that the building is about as complete a *"botch"* as can possibly be imagined. Throughout its entire construction are gross instances of *"skimping," "substitutions"* and *"omissions."* The basement and upper walls do not conform with the building by-law. They are six and three inches, respectively, less in thickness than the plans called for. In addition, certain pilasters of the main elevations are out of plumb; old stone was used in the masonry where new stone was specified; and artificial stone was substituted for the window trimmings in place of terra cotta. This simply relates to the exterior of the building.

Other discrepancies equally as glaring were also found in the interior. To quote Mr. Marchand's finding in part.

"The interior columns specified to have been built in steel and cast iron have been substituted by wooden columns. The two transverse walls on ground floor, specified and shown to be brick 1 foot 1 inch thick, are built in reinforced concrete four inches thick. The brick wall between cells shown 8 inches thick and 8 feet high, has been substituted by a 4 inch reinforced concrete wall 14 .eet 6 inches high, and the two columns shown on top of 8 inch brick wall to under side of first floor girder, are omitted.

"Plaster work in some places is only two coats, instead of three coats, as specified, and generally of poor asbestos plaster, and surface not very true. The plaster cornices are specified to have a development of 5 ft., but are shown to have only 2 ft. on drawings, the latter having been followed and badly executed."

From the evidence which has so far been adduced it looks very much as though a short lot, an architect with unusual powers, a well developed case of nepotism, official laxity, tricky tendering, and dishonest workmanship, have conspired to give the city decidedly the worst of it. At least enough has been established to warrant the opinion that the whole transaction was a cut and dried family affair, well understood by certain individuals in official circles. Nothing strengthens this theory more than the rather startling disclosure made before the enquiry by those who were directly connected with the erection of the building.

It has developed that Francis and J. Oscar Proulx, brothers of Alderman Proulx, Chairman of the Police Committee, were surreptitiously awarded the general contract, instead of F. X. Aube, who was ostensibly given the work. According to Mr. Aube's own testimony, he had never had in his possession the plans and specifications, nor were they explained to him by the architect. His tender was prepared by J. Oscar Proulx and he had simply acted as a *cover* for the Proulx brothers, in consideration for which he obtained the contract for the brick work at $16.00 per thousand. This procedure, Mr. Aube explained, was necessary in order to avert suspicion when one, who has a relative in office, wanted to secure public work. It was also brought out that Mr. L. J. Forget, who had been granted the sub-contract for the plumbing, heating and roofing, was also a relative of Alderman Proulx, a cousin, while the painting contractor proved to be a Mr. Ernest David, a former painting contractor, now engaged in the restaurant business, who deemed this a sufficient inducement to try his hand once more at the *brush*. Both of these parties were given a *"quiet tip"* to shade their tenders, which they did materially, the former from $5,000 to $3,300, the latter from $1,250 to $850.

That Alderman Proulx had full knowledge of the underhand methods which were employed, cannot be doubted. Notary Bouvier, Mr. Proulx's partner and confidential friend, drew up the papers transferring the contract of Mr. Aube over to Francis and J. Oscar Proulx. Does it seem likely to their close relationship, that this matter was not discussed by them? In fact, J. Oscar Proulx testified that he had tried to broach the matter of his intimate connection with Mr. Aube to his brother (Ald. Proulx), but that the latter had shut him up by the statement, "This is none of my business. I do not want to have anything to do with it." Why Alderman Proulx did not consider it any of his business, especially so in view of the fact that he was chairman of the Police Commission which had the erection of the building in hand, is rather strange. The question of his own reputation and a desire to have everything over and above board, should have made it of utmost concern to him. However, he apparently had faith that the deal would go through successfully. This much is to be inferred from the *carte blanche* given Architect Godin, or at least what appeared to be such in the rather free manner in which he was permitted to make changes so revolutionary in character as to result in a building that was anything but what it should be. Mr. Godin did not find it necessary or expedient when the shortage of the lot was discovered (which was after the work had been started), to call the matter to the attention of the Police Board or Aldermanic body. It was something purely of an escoteric nature and that he and Ald. Proulx had fully discussed it is quite probable. He at least discussed it with Chief Campeau, whom he told not to apprise the Board, as he was vested with full power to make any necessary alterations. With subtle skill he directed the erection of the building, pointing out what was to be done and what was not to be done. He had prepared 120 typewritten pages of specifications but these were obviously ignored, as Francis Proulx, who attended to the work himself, stated before the investigation committee that he had never read them. And probably it was just as well, as the reports of Mr. Browne and Mr. Marchand show that they did not agree with the plans, that they were involved and self contradictory, and that they were never *intended* to be understood. In fact, it is said that no translator has yet been able to intelligently interpret either the English or French version of them.

As to who granted Mr. Godin this unbounded latitude, or as to whether he assumed the responsibility himself, is still unknown. It would be unfair to attach the entire blame for this oblique deal to Ald. Proulx alone. Even though Chairman of the Police Board, we can hardly believe that he had an arbitrary power, unless vested with it by his colleagues. The other members of the Board are involved at least to the extent that they either had a guilty knowledge of what was going on, or were derelict in the performance of their official duties. It may have been a case of *"returning a favor,"* that the

Continued on page 82.

INTERIOR VIEW OF THE NEW KNOX CHURCH, TORONTO, LOOKING TOWARDS THE ENTRANCE.
MR. J. WILSON GRAY, ARCHITECT.

INTERIOR VIEW OF THE NEW KNOX CHURCH, TORONTO, LOOKING TOWARDS THE REAR.
MR. J. WILSON GRAY, ARCHITECT.

ECCLESIASTICAL ARCHITECTURE.---Gothic and Modern.---A Contrast and an Appeal for a Beautiful Church.---The Early Church Work of England and Scotland.---A Present Day Example.---Time and Care Necessary to Attain Satisfactory Results.

BY HERBERT M. CLARK
DRAWINGS BY LAURENCE DAVIS

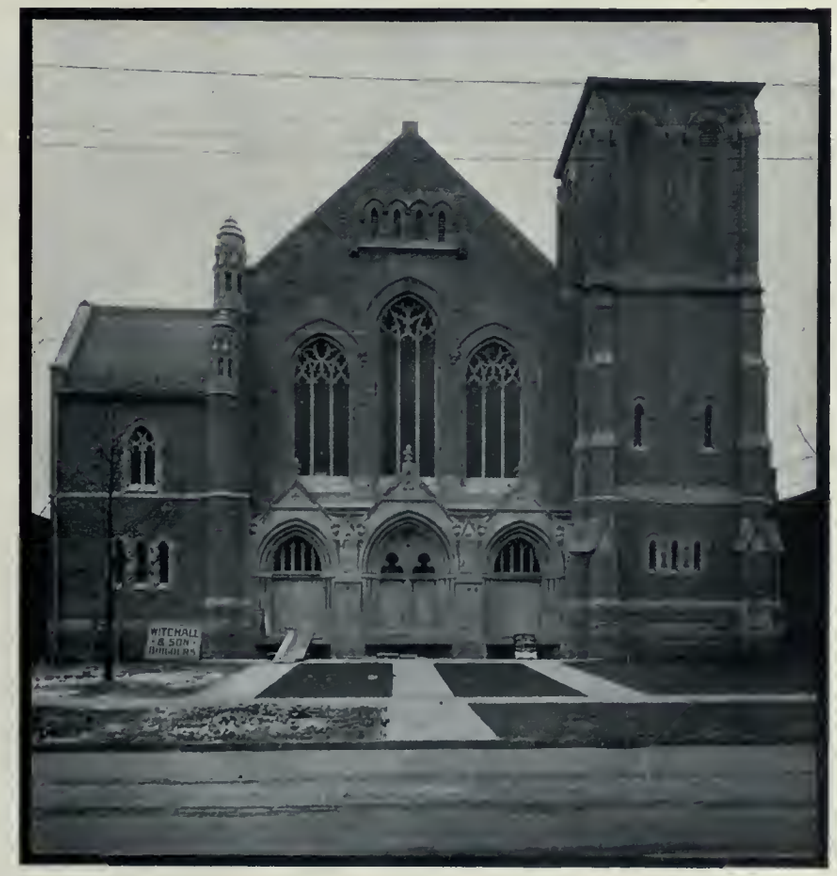
THIS IS AN UTILITARIAN AGE, even the church has not escaped it. One expects the building of a skyscraper to be rushed since it is a purely commercial undertaking, but less hurried measures are requisite in the building of a church. One would wish for careful consideration of plans, for a determination to have the most beautiful building possible, and for measures to secure an architect competent to create such a building and to equip it with a perfection of practical but subservient details, such as lighting, heating, ventilation.

The newspaper reports with regard to the new St. Paul's Church, Toronto, indicate "rush" methods. We are told that it is "to be ready within one year," also "that the congregation leaders go about the task with a lot of energy." It is to be hoped that they will exercise such care and taste as will preclude the rush methods of commerce which lack dignity when applied to an ecclesiastical work, and that they will realize that though theatres and freight sheds can be built in haste, the construction of a beautiful building, such as a church, should necessarily be, demands time and care. The architect should have an opportunity to profit by a study and comparison of some European examples in the maturing of his plans.

St. Paul's Anglican Parish is to have a $150,000 edifice, the "largest Anglican church in Canada." Furthermore, it is to be in some measure a testimonial to a popular minister. Here is an opportunity for broad minds to offer a worthy building, one in which beauty shall be the dominant feature, since Toronto already has numerous churches utterly lacking it. The need of more room is doubtless urgent, but the congregation would prefer a few months' delay knowing that time had been found for the consideration of every detail. A gift on which thoughtful care has been exercised is the more satisfactory to both donor and recipient.

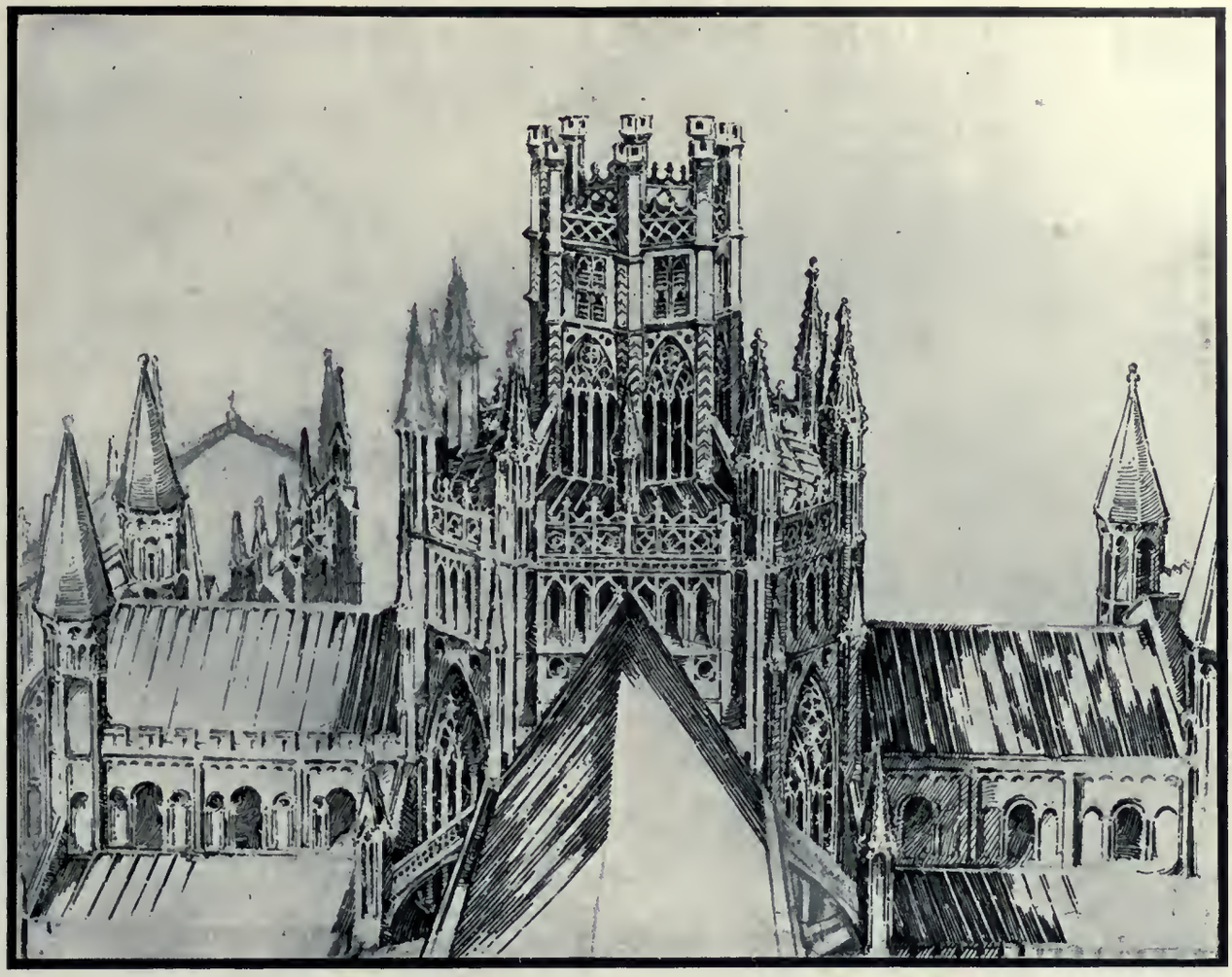
Such were the beautiful cathedrals, abbey and parish churches of the old country. No time was wasted in their construction, neither was there undue haste, for haste is not compatible with beauty, which was an essential feature of the church of those days. All the skill and craftsmanship of the community were lavished upon the church, and masons and wood carvers put their hearts into their work. Even a dripstone was carved and ornamented, as in the graceful recessed arch illustrated, whilst the photograph of detail at top of the Percy Shrine monument at Beverley shows another example of their handiwork for which "pressed out" imitation does not form a substitute. Nor was such decoration meaningless. Scriptural episodes and allegories, in which the symbolical grotesqueness of miserere seat and gargoyle have their part, are frequently related by the stones of the Gothic architect. "An art of peasants rather than of merchant princes or courtiers, and it must be a hard heart that does not love it." Can we wonder that such a building has an atmosphere which stirs us, and an added beauty, felt rather than seen, reflected through the centuries?

Goethe, admiring the beautiful lines and decoration of a Gothic church, described it as "frozen music." No poet of our own days will so apostrophize the modern church; not only is it usually without beauty, but frequently, is so lacking in architectural dignity that its effect is purely negative. I am aware that under modern conditions, the best results are difficult of attainment. In place of the Church, we must provide several churches in a community. Funds are thus split up. We have not the old time executive force of voluntary workers to draw on. Every mason of to-day expects and gets union scale wages. The days are gone when a craftsman gave his work freely, because he loved his church and his work, and too often, beyond subscribing to the building or decoration fund and serving perhaps on a committee to appoint an architect or approve plans, the modern worshippers' personal interest in the execution of the work ceases. Coupled with this is usually an urgent desire to have the church "completed" in all its ugliness of machine made carving and shiny



KNOX CHURCH, TORONTO, ONE OF THE RECENT EXAMPLES OF ECCLESIASTICAL ARCHITECTURE WHICH SHOW A STRONG MODERN OR UTILITARIAN INFLUENCE. WHEN COMPLETE THIS BUILDING, IT IS ESTIMATED, WILL COST $250,000. MR. J. WILSON GRAY, ARCHITECT.

ELY CATHEDRAL, ONE OF NOTABLE ECCLESIASTICAL EDIFICES OF ENGLAND. ITS WHOLE FABRIC, WITH THE SYMMETRICAL LANTERN TOWER, PRESENTS A UNIQUELY COMPOSED OUTLINE.

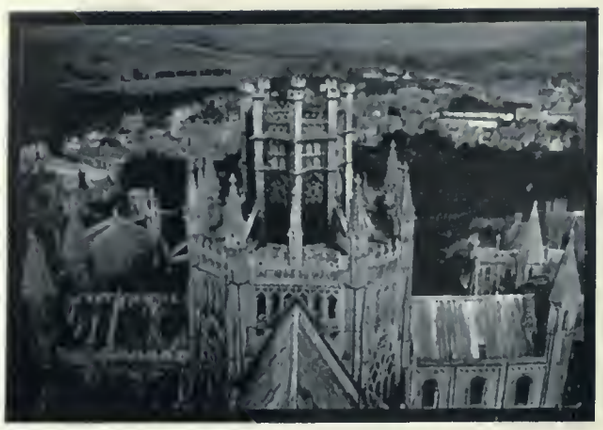


OCTAGONAL LANTERN OF ELY CATHEDRAL,—"ST. ANDREY'S CROWN,"— A PRODUCTION OF THE DECORATED PERIOD, EXECUTED IN STONE AND WOOD, WHICH IS THE MOST PERFECT EXAMPLE OF THIS TYPE OF WORK EXTANT. REPRODUCED FROM PEN DRAWING (UNFINISHED) MADE AT TOP OF WEST TOWER.

MELROSE ABBEY, A SPLENDID EXAMPLE OF THE LATE DECORATED PERIOD OF GOTHIC ARCHITECTURE. EVEN WITH LESS ORNAMENTATION, THE TREATMENT OF THE LINES AND SURFACES AND THE UNIFORMITY OF STYLE THROUGHOUT WOULD HAVE RESULTED IN A MOST SATISFACTORY APPEARANCE.

paint in record time.

In many cases this rapidity of execution causes errors of interior construction or arrangement, the rectification of which involves unnecessary expenditure later. It may



LANTERN TOWER OF ELY CATHEDRAL. NOTE HOW ACCURATELY THIS FEATURE HAS BEEN REPRODUCED IN PEN-DRAWING.

be pleaded that we are a young people in a new country so busily occupied that we have little time to devote to cultivation of the arts. Similar conditions prevailed in England in the year 700 A.D., yet the Saxons built several small churches of merit, an example being that at Bradford-on-Avon, whilst the beautiful St. Bartholomews, Smithfield, London, amongst others testifies to the artistic taste of the Normans. The early Gothic work, too, though massive in construction, as illustrated in the

TRANSEPT ARCH, NORTH AISLE, MELROSE ABBEY.

rounded arches of the nave of Malvern Abbey and the later, pointed, north aisle, displayed a perfect curve and proportion. From these early stages on to the best phase of Gothic architecture, ecclesiastical construction, while planned to fulfil practical requirements, combined an essential beauty of line and detail with distinctive characteristics throughout. To enter such a building was to have the aesthetic sense appealed to. With few exceptions, these two latter features become subordinate in the hands of the modern ecclesiastical architect, whether in this country or in England, a fact providing food for thought when the intimate relations of beauty and religion in all ages is considered. Salisbury, Amiens, St. Peter's, St. Sofia, the cedar wood and gold of Solomon's temple, and the rope of human hair suspending a bell in

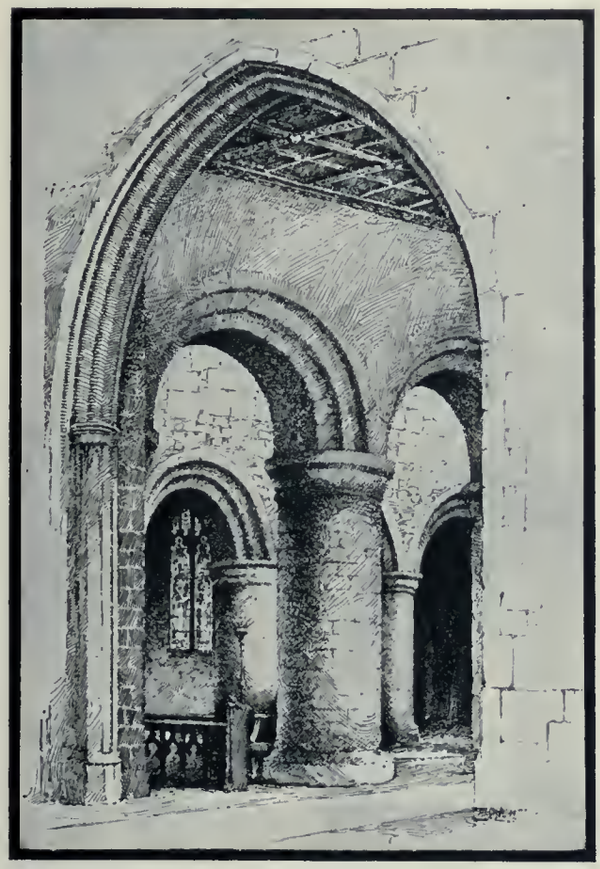
ST. ANNE'S CHAPEL, MALVERN ABBEY, SHOWING A WINDOW OF THE THIRTEENTH CENTURY IN WHICH THE LIGHTS ARE BEAUTIFULLY DESIGNED AND PROPORTIONED.

a Buddhist shrine all tell one story—the desire to beautify the place of worship.

Limited funds cannot be pleaded as justification for an ugly church, since it need cost no more to build a beautiful church than an ugly one. Indeed, in many cases money is not lacking. Consider, for example, the new Knox church, Spadina ave., Toronto. It is estimated to cost complete, $250,000, of which $200,000 has already been expended, so the writer is informed. The offices of this church comprise separate rooms for ministers, deacons, trustees, and treasurer, a kitchen, also a social room, a large lecture room and a very large Sunday school room, the latter surrounded by small class rooms

expensively fitted. To some this will seem a lavish equipment. In apportioning the ground space, the claims of the church have been subordinated to those of these offices, which have been placed at the east end, thus precluding any possibility of length to the church.

The plan expresses faintly the Roman basilica model



INTERIOR VIEW OF MALVERN ABBEY, SHOWING THE MASSIVELY CONSTRUCTED AND PERFECTLY PROPORTIONED ARCHES OF THE EARLY GOTHIC PERIOD.

(the semi-circular space corresponding to the apse, here containing the organ), though the interior is practically a square, a form very difficult to treat successfully. Standing at the west end, one sees a square hall of secular appearance, constructed for strictly utilitarian purposes, everything being sacrificed to giving an unobstructed view from all the seats, which are "raked." To ensure this, the pillars which support the roof are of metal and gilded. The walls are brown. In the east wall is the organ which, with a platform and reading desk before it, is contained within a marble arch flanked by gilt pillars. The effect suggests the proscenium arch of a theatre, while the general appearance is, at best, that of a concert hall. Yet, this is a Presbyterian church, a strange contrast to the dignified church in Edinburgh.

Better work would have been secured by following more or less closely, the lines of some Gothic model, if only to secure that "decency and beauty" which should be the essential characteristics of the House of God. We cannot reproduce a Salisbury or a Rheims, such dimensions alone surpass our requirements, but England is rich in beautiful examples both large and small, which our architects might well study, evolving the best from each. Most of these old churches lie east and west, the deviation from due east having been determined by the point in the horizon at which the sun rose on the day of the saint to whom the church was dedicated. Such was our ancestors' spirit of thoroughness.

Wherever possible stone was the material of construction, and when the state of the building fund prompted economy, a simple style was selected, for example, plain pointed Gothic. Simple but good lines in a well proportioned construction have a beautiful effect, and need little ornamentation. In Melrose Abbey, a fine example of the late decorated period, had the exterior received even less ornamentation it would still have presented a satisfying appearance, a result due to skillful treatment of lines and surfaces and a uniformity of style throughout. Supplementary buildings were avoided; indeed, in some cases where a tower was erected at the east end of one of the aisles, the lower part was used as a vestry. In those having only a central tower forming a lantern to the interior of the edifice, or when from want of funds the erection of the steeple had to be postponed, a place in which to suspend the bells was found in a perforated turret or gable. Incidentally, all church chimneys should be concealed in a turret or pinnacle. The most perfect example extant of the lantern tower, a production of the decorated period, is the exquisite octagonal lantern of Ely Cathedral, which is constructed of stone and wood. The unique pen-drawing, unfortunately unfinished, was made from the top of the west tower.

A timber roof is certainly cheaper than stone, and the open timber roof with braced arches, such as that of St. Michael's, Coventry, which dates from the perpendicular period, has a beautiful effect. It may be remarked that the chestnut wood ceiling in the nave of Winchester Cathedral is in a wonderful state of preservation. It is supposed that chestnut wood is too bitter for insects to

NORTH AISLE, MALVERN ABBEY, SHOWING THE SYMMETRICAL CONSTRUCTION OF THE ARCHES AND SIMPLE DECORATION.

attack. The high, steep roof, too, so essential to early Gothic, is well adapted to our climate and presents a fine exterior, while the side thrust is so inconsiderable as to require little abutment and beams may be safely dispensed with.

The lighting of a church requires much thought.

INTERIOR VIEW ST. MICHAEL'S COVENTRY, SHOWING THE OPEN TIMBER ROOF WITH BRACED ARCHES WHICH DATES FROM THE PERPENDICULAR PERIOD, AND THE BEAUTIFUL EFFECT IT HAS PRODUCED.

INTERIOR OF TRINITY CHURCH, COVENTRY. THE FONT AND PULPIT ARE GOOD EXAMPLES OF THE PERPENDICULAR DESIGN. NOTE THE EXQUISITE TRACERY OF THE WINDOW WITH ITS SIX LARGE LIGHTS, AND THE DECORATION OF TERMINAL PEWS.

Modern churches are generally too light, and many have badly disposed window space, whilst the lights in each window are usually too large. The drawing of St. Ann's Chapel, Malvern Abbey, illustrates a window (thirteenth century) in which the lights are beautifully designed and proportioned. A consideration of the glass to be employed is essential. If plain, it should be coarse and greenish in color, in small well-leaded panes, disposed diagonally, the interiors of the windows being well splayed. Windows spaced for colored glass have naturally greater dimensions. Uniformity of style in windows and doorways is very necessary to a good effect. Compare the beautiful arch of the N. aisle of Melrose with the windows.

Uniformity is necessary also in the furniture, which should harmonize with the general scheme. The altar should be of stone, with simple decoration or panels at front and sides sufficiently low, that no part is concealed by the altar-cloth. The pews disposed at right angles, should be open and straight backed seats of simple design rather than ornamental. The backs of the terminal pews may be carved or panelled, as in Trinity church, Coventry. The section of the bench ends of St. Michael's, Coventry, is simple and effective, without being costly. In the font and pulpit, a careful treatment of lines will produce a beautiful form in which little decoration is necessary. If any is attempted, panelling lends itself well. The font and pulpit of Trinity church, Coventry are good examples of perpendicular design and stonework. Perpendicular Gothic has many features which should be

THE PERCY SHRINE, BEVERLY MINSTER, SHOWING THE DETAIL OF TOP OVER MONUMENT, A SPLENDID EXAMPLE OF DECORATED CARVING.

studied, especially the panelling, a method of decoration which, in some measure, took the place of the intricate carving of preceding styles. It affords a particularly suitable medium for modern ornamentation, and lends itself well to modern methods of construction. We might also consider the plain wooden doors with metal scroll hinges. Most difficult to obtain in a city is an open space around the building permitting a view from a reasonable distance. The situation of Ely Cathedral permits of a magnificent view, on the south side, of the whole fabric

RECESSED DOORWAY, A GRACEFUL EXAMPLE IN EARLY WORK OF THE ROUNDED ARCH.

which, with the symmetrical lantern tower, presents a uniquely composed outline.

The writer does not offer these suggestions, nor the accompanying illustrations as being the best. Neither is it intended that the latter should serve as specimens to be reproduced. But their form and line contain ideas for a beautiful work at the hands of a skilful architect. One who realizes that "an absence of architectural feature" is totally incompatible with an ecclesiastical edifice, and who knows that, even if it be true that critical faculty or appreciation of beauty is less developed here than in Europe, it is still his duty, doubly so, to educate us to a keener sense of artistic appreciation by providing the most beautiful work in his power, impressing the importance of so doing, on those who retain his services.

It has been said that "art is life and can belong only to its own age." The spirit of this age is reflected in wonderful utilitarian structures, and such great strides has this branch made that one may now hope for some attention to be directed to the aesthetic. The opportunity is ripe for the man who, possessing that "union of genius with imitation" will produce ecclesiastical works worthy to be compared with some of the shrines of ancient faith.

MANCHURIAN CITIES, states a correspondent of the London and China Telegraph, are undergoing a radical change in the architectural character of their buildings. Many public offices, official residences and even private residences of the European style have sprung up following the erection of a handsome exhibition building at Mukden, and not a few modern double-storied shops are to be found in the business districts.

THE EVOLUTION OF ARCHITECTURE.---Address of President E. Bradbury at the Annual Inaugural Meeting of the Architectural Association of Ireland.---The Growth of Architecture with Civilization.

SO far the greatest difficulty I have had to face in the presidential capacity has been the selection of a suitable subject on which to address you in this, my inaugural address. My predecessors have left me very little to talk about. They seem to have dealt with architecture and architectural education in every possible aspect. However, it occurs to me that something might be said about the architect, and I have thought that it might be useful to try and express my thoughts as to the qualities and ambitions which should animate the architect in his work. And in order to do this I want first to endeavor to show how architecture grew with civilization, and to ascertain what were the motives animating the builders and architects during the stages of the world's history.

Let us look at Egypt—the land of mysteries!—and what do we see? A vast multitude of people, many of them ignorant slaves who struggle under the lash of men who have been placed in command over them by others who have gathered to themselves the lore and wisdom of many dim centuries. What are those multitudes of people laboring at? Some draw water to irrigate the land and produce food—the water soaks in the ground, the food is eaten. Some weave cloth and make clothing—the clothing is worn away and rots. Some make roads, some herd the cattle, some go out to fight; and of all these men and their work there is nothing remaining but tradition. But there are others who build houses and monuments. Some of the houses they are to live in, and knowing themselves to be short lived, they do not trouble to make their dwellings anything but perishable. But these people believe their gods to be immortal, and consequently the houses they build to worship in are built to last on into the future; and such was the skill and knowledge of those ancient Egyptians, and so fine their tools, that to this day people will journey from the uttermost parts of the world to gaze upon and marvel at the temples and pyramids which have stood through all these ages as monuments of a marvellous civilization, and of an enthusiasm which set upon the face of the earth the best and grandest structures that man could devise and hands could erect; and directing all this building of the temples and pyramids there must have been architects, and whether they drew their plans on papyrus or brick, or planned directly upon the ground, it is very certain that they must have been men of exceptional ability and of an intelligence acquired only by deep study and concentration.

Consider the men who built the Panthenon. They were wonderful artists! How did they learn all those little niceties of construction and design? How did they learn that a column, to look its best and truest, must be smaller at the top than at the bottom, and must have a slight curve in profile? How did they arrive at such perfect shapes and proportions for their mouldings so as to give exactly the correct amount and gradation of light and shade? Where did those builders learn to carve beautiful volutes on their capitals, and others again gorgeous conventional copies of foliage? We modern architects are content to accept and adopt and copy these niceties of refinement, but which of us has considered their evolution? In those past ages men must have labored and studied and devoted themselves absolutely to their art to have discovered the value of these refinements of perfection in design and construction. We pride ourselves when we occasionally apply successfully the methods of the ancient designers; let us humble ourselves before those great men who, by enthusiastic perseverance, evolved those methods.

Now let us go to Rome. Here we find a military nation, a vast and wealthy people who have acquired their vastness and their wealth by conquest, a people who live a life part of which is spent in the midst of warfare, the other part surrounded by immense, gorgeous luxury. They are a cruel race also, and as they have won their might by warfare they delight in the sight of combat, and build vast places of amusement to gratify their lust. They have a little contemptuous reverence for a variety of gods and goddesses, and they erect temples wherein to worship these deities. But it is in their theatres, their amphitheatres, their baths, their triumphal arches, their dwellings, that we find the greatest lavishment of wealth. Yet whilst we find great building and great engineering, we fail to find quite that artistic refinement which characterized the architecture of their predecessors. They erect their mansions and theatres in all quarters of their territory, but it is rather in their pride of strength and wealth than in the enthusiasm of artists. But still the Roman architect must have been enthusiastic, for they were the first real users of the arch and the dome, and during the period of Rome's pride there must have been men earnestly applying themselves to the originating and elaborating of new methods of construction and design and adapting the old and new methods one to another. And we all know how successful were the results of the labor and perseverance of the architects of ancient Rome.

What a change the Roman Conquest made upon the world's history and upon its architecture! Northern Europe had no architecture worthy the name until the advent of the Romans, and when under stress of circumstance the Romans were compelled to abandon their conquered territory, they left behind them the ground work of all succeeding periods of architecture.

The conquered nations, deserted by their conquerors, were weak, ignorant people, having at first but little ambition. And it is vastly interesting to study the people of this intermediary period. They were people almost childish in their ignorance—the ignorance which is the outcome of serfdom and poverty. But by degrees their wits became sharpened as they found they must think and originate for themselves. They sheltered themselves from the weather, as did their prehistoric ancestors, within dwellings of rough timber, and later in wooden houses of more elaborate construction. But it was in the designing and erecting of their places of worship that they put forth their greatest energies. Some, indeed the major part of the early Christian churches, were built of timber, perishable; but others were more pretentious and lasting, built of stone. Those builders had no models from which to copy, excepting such remains as had been left by the Romans, and the traditions of the Roman times, and they could but do their best in a childish effort to copy what had been done before. We can imagine these ignorant men striving their utmost with stubborn stone, having only the most primitive tools to work with, their minds dulled and inactive. But they persevered and built as best they could, and they even attempted in a vague manner to ornament their buildings. Their ideas were primitive, and their means were small; but we can believe that they had some enthusiasm, for their methods and their tools rapidly improved. Moreover, Christianity was spreading light and learning among the nations, and the exponents of the religion were converting and inciting the people to worship. And soon we see the beginning of that great church-building period when on all sides were being erected places of worship and of religious retreat, which are to be found on every side to this day. What a time of

enthusiasm must that have been! Through all the land we should see monks planning and contriving, masons cutting and building sturdy piers and walls, turning heavy round arches, carving capitals and corbels, and always and ever striving and straining to improve on their past work and the work of their neighbors, seeking to discover new methods, and always aspiring to perfection.

And as the years pass by we find the round arch giving place to the pointed, heavy, cylindrical-built piers changing to light, delicate shafts, with beautiful carved caps, plain, rough detail being superseded by fine mouldings. The stone roof is lightly poised on the walls and shafts, and the plain little window openings give place to beautifully traced lights.

Later, Gothic design has reached and passed its limit of perfection, and designers are ready to accept and adopt this revived Italian art and architecture. First comes a period when the two schools—Gothic and classic—struggle and intermingle, and then we see the final conquest and the adoption of classic methods of design. A new school is born, and eventually creates some of the most magnificent of structures, combining, as they do, the ancient classic forms and detail with improved methods of construction, and adapting both to the more modern requirements of mankind. This perfect adaptation was attained by the exercise of patience, severe application, and constant study. We nowadays see many faults in the designs of the Classic Revival period—dark, crypt-like basements, fearful waste of space, terrible incongruities, lavishment of expense on exteriors without compensating benefits to interiors—but in it all we cannot fail to see the results of intense enthusiasm—the desire to create buildings in emulation of the ancients, and to adorn them with carvings and decorations in perfect accord with classic ideas.

The Grecians and the Romans have left us more evidence of their skill. Who can fail to admire the delicacy and proportion of the Greek trabeated buildings, and the admirable skill displayed by the Romans in their use of the arch and in their adaptations of the orders in conjunction with arcuation? The Pantheon, the Triumphal Arches, the Colosseum, who has not heard of them? Do these structures not remain still as some of the sights of the world? Should it not inspire us when we think that in all ages notable events and great men have been commemorated by means of architectural monuments? And can we not admit that in practically every minute detail those ancients approached as nearly to perfection of design as was, and is, possible?

What wonderful changes were made in the scenery of Europe during the middle ages by man's additions! Castles, cathedrals, churches, palaces, sprang up on all hands and added that touch of humanity to the aspect which I fear we should, many of us, very quickly sigh for if we were translated to an absolutely natural country. Let us examine one of these glorious edifices. Lofty, buttressed walls, pierced with beautifully shaped and proportioned windows, filled with delicate tracery and with graceful pinnacles above; delicately poised flying buttresses; elaborately decorated, yet imposing doorways, thickly moulded and carved, lofty gables, and, above all, heaven-aspiring steeples; and inside are the lofty arcades, the wonderful groined vaults, and all those marvellous adjuncts which have made the Gothic cathedrals amongst the great sights and wonders which attract the sightseer in his thousands. And as it is with the cathedrals, so it is with the smaller churches and the castles. These buildings of the middle ages are not by any means always perfect specimens of design, although I am afraid that even among architects there are many who are ready to give unstinted praise and admiration to positively badly designed work, simply because it happens to be old. Why, if we were logical, we should surely see that the mediæval builders ought to have produced only a small proportion of perfect work. They had no text-books. They had not the work of many past generations to study and possibly improve on. They were inventors, originators, people struggling in the dark to find ways out of difficulties of construction, but yet so ambitious that they disdained to take any easy ways out of their difficulties, but rather preferred to invite trouble in order to be able to combat and conquer it. And I think that it is a perfectly marvelous thing that amongst the hundreds of thousands of buildings erected during the Gothic period there occurred such a startlingly small percentage of badly or even indifferently designed buildings. I can only assume that the people who were responsible for the designing of these buildings were absolute enthusiasts who devoted their whole energies to their work, and spared no efforts in endeavoring to attain perfection.

So far I have dealt entirely with past days and periods of architecture, and I have attempted to show how the keynote to success in design in the past has been enthusiasm and hard work. But, you will say, perhaps, that there can be no possible comparison between these past ages and the present day. The conditions are so utterly different. Those dead and gone predecessors of ours had a constant succession of new discoveries to deal with and to wax enthusiastic over. Imagine the ferment, the delighted surprise, when the arch was first used. And again when it was found possible to build it with a pointed apex. Again, what a delight it must have been to work out new patterns of window tracery! And yet more, those old architects had no worrying about building by-laws, minutely detailed specifications, competitive tendering and its attendant evils, bills of extras, and so forth; nor had he to run such a number of "sidelines" as we have to do. Then again, he had not to worry about how he should pay his gas-bill, his income tax, or his office rent, nor had he the incubus of poor rate and old age pensions. Small wonder, you will say, that a man could lose himself in his work and so devote himself to it that he was able to do his best.

Yes, the conditions of modern architectural practice are vastly different from those that have obtained in past ages. But though the conditions are different, I hold that the same motive must animate us now, as then, and that is the desire to do our best. And, as in the past the best was only obtained by earnest devotion, so we must be devotees to our work and enthusiasts if would carry on the traditions of our art. And when I say this I do not mean devotion during office hours and enthusiasm when we get a new client. I mean that our whole life and energies must be spent in the study of architecture and the kindred arts and sciences, and that our enthusiasm must be as real over the smallest trifle as it is about the biggest commission entrusted to us.

Let us first go through some of the accomplishments demanded of an architect to-day. He must be more or less of a constructionist, an engineer—both civil and mechanical—a chemist, geologist, surveyor, arithmetician, lawyer.

He should be a good man of business or he will very quickly get into trouble. He must be able to discuss ritual with a clerical client, acoustics with the theatre proprietor, the best ways of storing or displaying all and sundry sorts of goods with shopkeepers of all descriptions, the Public Health Act and building by-laws with the city architect, cubic space per patient with the hospital authorities. He must know the size of a billiard table and the length of a cue before he can plan a billiard room; he must be able to discuss the business room and smoke room with the master of a house, the kitchen and linen room with the lady, the drawing room with the grown-up daughters, the bicycle shed with the boys, the nursery with the children, the range with the cook—and he must please all of them or he'll hear about it; he must know more about bricks than a bricklayer, more about timber in all its

species and qualities than a carpenter, more about baths and sanitation than a plumber, more about plaster than a plasterer, and more about building than a builder. He must know the price of everything from a wire nail to a square of roofing, and he must be prepared to check and if necessary, fight every penny of a builder's account. He must know a little, at all events, about the law of ancient lights and other laws, and he must be able to define the mystic letters P.C. He must be able to advise as to the relative merits of luxfer, cats-eye, and scores of other glasses, frugal, perfection, and dozens of other ranges, opalite, britopal, and I don't know how many other opal wall coverings. He must understand something about O. H. M. S. and Watts, and the prices of a unit of electricity for light or power, to say nothing of such details as alternating and continuous currents. He must—but there, I'll leave the rest to you to fill in yourselves, with the passing remark that I rather fancy an architect needs to possess as general a knowledge as any man.

But there remains one other necessity for an architect, and that is that he must be an artist. And I come to this last, not because it is the least accomplishment of an architect, but because it is by far the greatest and most important of all. He must have an artist's eye for proportion, shape, light and shade, color. He may be less than an artist in that he need not necessarily reproduce nature on canvas, but he must be something more than an artist in that he must be able to picture in his mind and on paper what is to be afterwards constructed in solid materials.

Then again, building materials are really wonderfully interesting. We have to draw from minerals and from vegetable life for our supply of raw material; we have to use heat, water, and pressure in their manufacture, and there are generally from two to twenty methods of fixing the materials when made, to say nothing of the multitudes of different combinations which may be effected. And we have such a tremendous scope; there are dozens of ways of building a wall, and we can invent a new method if we need to. New building materials are being invented every day, and though many are useless, all are interesting. Yes, material is a vastly interesting part of our studies, and we can easily grow enthusiastic in selecting the proper materials for our building, provided we really are heart and soul in our profession.

Whilst I have pointed out that its human interest should make us enthusiastic in our profession, there is another aspect of the question, and that is that we must be enthusiastic if we want to make a living. Every profession and every trade is over-crowded, and nowadays those who have to work for their living are compelled to work in the midst of a crowd of keen competitors. And as with others, so it is with architects. Some plod along and make little or no headway; some go under and are heard of no more; but, as in all else, it is the best man who comes out on top, and the best men are those who take a lively interest in their work. So that, as I say, it is to our interest to be enthusiasts.

But after all, these are only paltry reasons for enthusiasm. They are mere nothings to the *real* reason, which is, that our profession is monumental in its records. True it is that we cannot all be John Thorpes, Christopher Wrens, or Aston Webbs. Cathedrals are not being built on every hand nowadays, and even parish churches do not often come our way. But we all have a chance of designing municipal buildings and libraries and other of the many structures which are the outcome of modern methods of government and of our advanced civilization, to say nothing of every-day dwelling-houses and places of business. Even the smallest and least important of our works is really monumental, because, under normal circumstances, it will last longer than we shall, and future generations will praise or condemn us. So that I think we should realize that we have a very serious trust reposed in us, and we should, nay, must, do all in our power to make ourselves worthy of that trust. It lies with us to gain praise or condemnation. *We* are able to look back upon the work of our long dead predecessors, and most of it is good, and we can applaud those who had the designing of it. Let us for our part do what we can to merit the praise of our successors. Let us strive our utmost to put in all our work our very best; let us sketch, measure, study, draw, calculate, and concentrate ourselves upon our life's calling that we may infuse into our work some, at all events, of that spirit of enthusiasm which in the past has raised so many monuments for the admiration of all who pass by. Let us try sometimes to forget that we work to live; let us rather live that we may work and work, and put all our heart into our work, that we may emulate those old masters and rear to ourselves monuments which shall do us credit and add still more to the glory of our noble profession.

REINFORCED CONCRETE IN CHURCH DESIGN.---Two Recent Examples of Its Use. ∴ ∴

THE ADOPTION of reinforced concrete for ecclesiastical work is coming more strongly into evidence. In Russia there has lately been completed a cathedral which is carried out entirely according to this method of construction. This remarkable building is at Poti, a city in the mountainous regions of the Caucasus.

The original idea was to construct the cathedral in masonry and bricks, but these materials are costly in Russia, and it was finally decided that reinforced concrete would best answer the purpose, and be the most practical form of construction, owing to the peculiarity of the soil and the difficult position which had been selected for the site of edifice; and also to the fact that the erection could be carried on more expeditiously than if masonry had been employed.

The style of architecture adopted was that of the Byzantine period. The architectural plans were prepared by Professor Marfeld, and the reinforced concrete work was carried out in accordance to the Hennebique system. The building is enclosed by a double wall, the external and internal sections being 10 cm. and 8 cm. respectively, with an air space of 18 cm. between the two.

For a good architectural rendering it was necessary to build the large pillars very massively, and so it was possible to make allowance for the ventilation and heating channels in these pillars. The cupolas are formed from a structure of 10 cm., reinforced by branches of 25 cm. in height, between which an isolating material was laid before laying on the large iron covering.

Another noteworthy example of this method of construction is to be found in Second Church of Christ Scientist at Los Angeles, Cal., which is now in process of construction. In this building all floors, beam columns and roof are of reinforced concrete.

The most important of the structural features are the four concrete trusses and the dome carried upon them. The trusses have a span of 68 feet each, carrying a total dead load of 350 tons; they have a depth of 20 feet at the supports and 10 feet at the center, and are 16 feet in width.

AT A MEETING of the creditors, bondholders and shareholders of the assigned Colonial Portland Cement Company, it was decided to bring about a reorganization and form a new company. A statement of the company's affairs showed assets of over $500,000, while the liabilities, outside of a bond issue, were comparatively small. These will be taken over by the new company, which will pay off all creditors, except the bondholders, who will accept new bonds which will be issued instead of those they now hold. The new company will be provided with ample working capital, and it is expected that the company's plant at Wiarton, Ont., will shortly resume operations.

AN ATTRACTIVE CLINKER BRICK RESIDENCE.---

Simplicity and Individuality Predominant Factors in Treatment of General Scheme.---Interior Splendidly Arranged and Pleasing in Appointments.---Cost Moderate.---Designed by Owner.

MODERATE IN COST, simple in character, yet with a dignity and distinctiveness of outline which bespeaks hospitality and internal comfort, the home of Architect J. Hartley Galloway, Toronto, offers a most interesting study of domestic architecture in the smaller type of residence construction.

This delightful little home is one of the most recent residential additions to Moore Park, a beautiful suburb

FRONT ELEVATION, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

contiguous to Toronto on the north. It fronts on St. Clair avenue, and at the rear overlooks a deep ravine together with a picturesque stretch of country which extends northward beyond the slope on the opposite side.

In dimensions, the house is 36 by 30 feet. The external walls are built of clinker brick varying in tones from dark greens and browns to brighter buffs and reds, which effect an agreeable contrast with the white finish of the woodwork, the green stain of the shingles, and the gray hammer faced stone of the foundations.

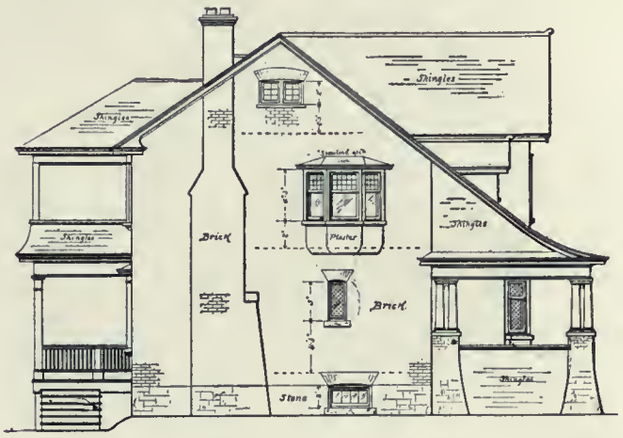
An especially pleasing feature is the porch, sheltered by the slate covered roof which sweeps in a continuous

REAR ELEVATION, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

line from the ridge to its outer edge, a treatment which imparts an air of privacy to the entrance, which is further accentuated by placing the porch steps at the inner side towards the centre of the house.

Above the second story, the base of which slightly flares over the bay window at the centre to the right of the porch, is a cement plastered gable pannelled with rough pine boards stained a dark brown, while at the right end of the structure the roof is carried out in a hip arrangement attractively set off with a dormer window.

Another dormer window serves to effectively relieve the long pitch of the roof over the porch, while at the east end of the structure a pleasingly designed oriel suc-



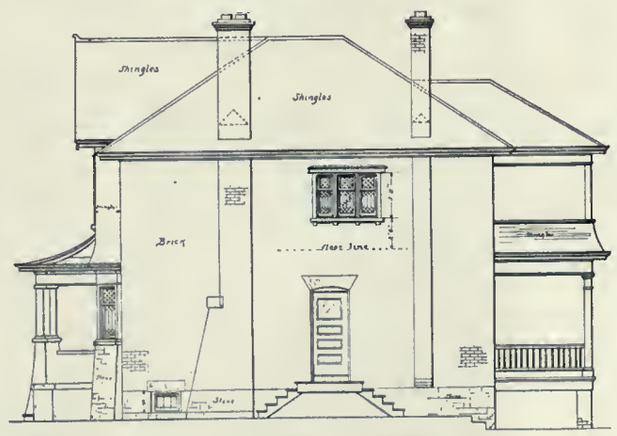
EAST ELEVATION, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

cessfully overcomes the monotony of the brick wall and adds to the home-like aspect of the general scheme.

On the interior the grouping of the various rooms has resulted in a compact and conveniently arranged plan which utilizes to the utmost advantage all available space.

From a roomy vestibule, one enters a spacious reception hall which, owing to its splendid location, provides direct communication between the various rooms, with the exception of the kitchen.

The hall is finished in mission style, with beamed ceil-



WEST ELEVATION, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

ing, a treatment which also lends itself in an admirable manner to the music alcove situated off the hall at the front of the house. Both of these rooms have black ash trimming with a dull wax finish, and floors of selected quartered-sawed oak, while in the alcove is a built-in bookcase and window seat, which heightens the effect and cosy appearance of this inviting retreat.

Opposite the entrance is the drawing-room, trimmed in white enamelled white pine, and having a tile mantel of delicate tint; while directly off the hall on coming in,

FRONT VIEW, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, LOCATED ON ST. CLAIR AVENUE, MOORE PARK, TORONTO.

RECEPTION HALL LOOKING TOWARD THE DRAWING ROOM AND SHOWING A CORNER OF THE MUSIC ALCOVE AT THE RIGHT. RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

VIEW OF SITTING ROOM, ON UPPER FLOOR, WHICH OPENS ONTO A LARGE VERANDAH AT THE REAR. RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

VIEW OF DINING ROOM, SHOWING BUILT-IN FIREPLACE OF ROMAN BRICK. RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

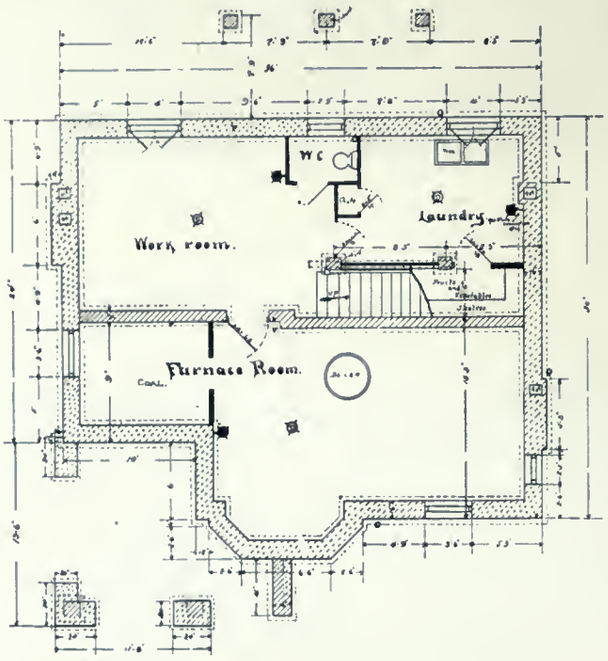
is the dining-room, where an air of comfort is suggested in the beamed ceiling and large Roman brick mantel. This room has large south windows, and opens onto a spacious verandah which overlooks the terraced lawn and garden at the rear.

Direct access to the kitchen from the dining-room is obtained by a service passage off of which is the pantry with built-in china closets and cupboards.

The kitchen, which is well removed from the other portion of the house, is well lighted and ventilated. Entrance to this department is obtained, in addition to that afforded by the service passage, from either the rear verandah or the entrance at the side, this latter entrance also giving convenient access from the kitchen to the basement.

The upper floor, which is reached by the staircase leading up from the reception hall, is exceedingly well arranged. To the front are three good sized sleeping chambers, equipped with built-in clothes closets, while at the rear is the sitting room opening onto a large balcony from which a splendid view of the surrounding country is obtained.

Off the stair-hall is the bathroom and water-closet (each of which is separate from the other), together with a large linen closet having a chute leading to the laundry in the basement.



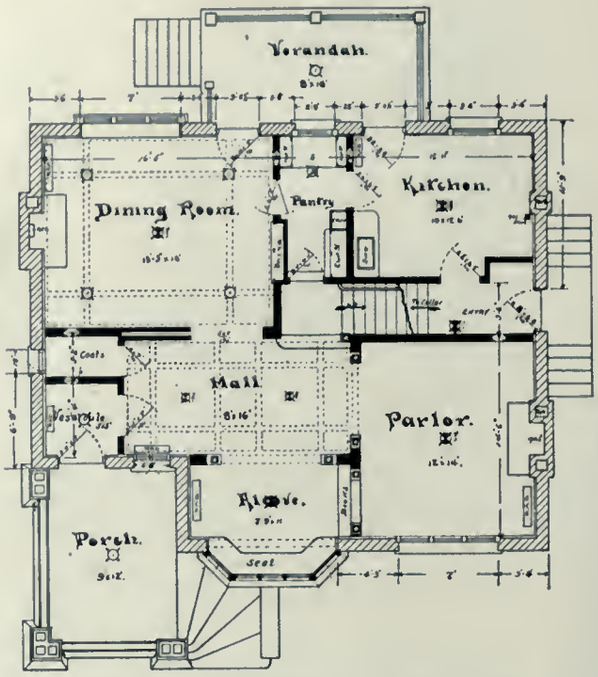
BASEMENT PLAN, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

All the woodwork on this floor is of pine with the exception of the sitting room, which is trimmed in black ash. The sleeping chambers are finished in ivory-white enamel, and all rooms throughout have outside exposures and are well lighted and cheerful in character. The attic is of ample dimensions to permit of two good sized additional rooms if desired.

The house is heated by the "Safford" hot water system, and the plumbing throughout is of the very best type, all exposed pipes and fixtures being nickel plated.

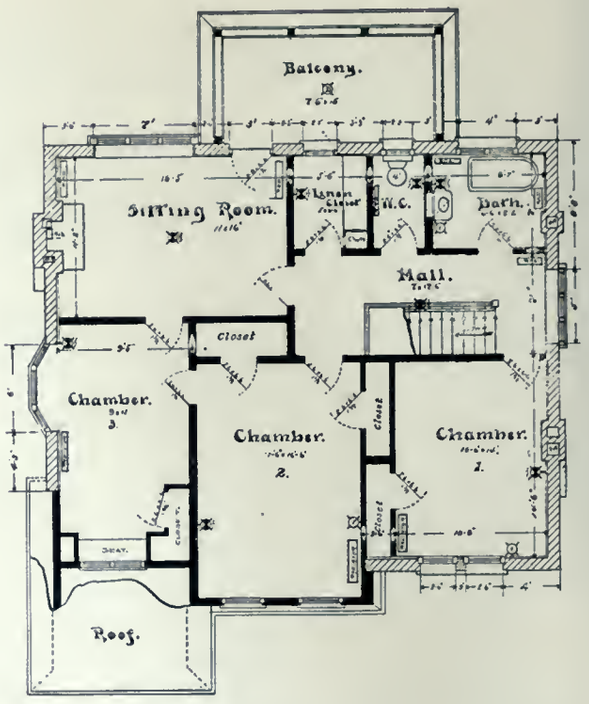
The building complete represented an expenditure of $5,430, the cost of each branch of the work being as follows:

Excavating	$ 30.00
Grading and sodding	80.00
Concrete floors and walks	100.00
Masonry	1,395.00
Carpentry	1,565.00
Plumbing and heating	825.00
Plastering and lathing	300.00
Slating and iron work	275.00
Hardware	75.00
Weather strips	85.00



FIRST-FLOOR PLAN, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

Mantels	160.00
Tiling	150.00
Electric wiring	125.00
Painting	180.00
Glazing	85.00
Total	$5,430.00



SECOND-FLOOR PLAN, RESIDENCE OF ARCHITECT J. HARTLEY GALLOWAY, TORONTO.

The heating system was installed by the Dominion Radiator Company, while the brick used in the exterior walls is the product of the Don Valley Brick Works, Toronto.

NEW BARTHELMES BUILDING.---An Interesting Example in Factory Construction.---Introduces the Mushroom System of Reinforced Concrete.---Elimination of All Interior Beams Between Columns a Unique Feature.

AN INTERESTING EXAMPLE of reinforced concrete construction erected during the past season is the new Barthelmes Building on Carlaw avenue, Toronto, which is to be used as a factory for the manufacture of piano-playing devices.

The main building consists of a three-storey structure of the skeleton type of reinforced concrete construction with windows extending from column to column. The elevator, stairways and lavatories are isolated in an adjoining pent house from which the main building is protected by automatic closing fire doors, while the boiler and engine house is situated several feet distant from the rest of the plant.

In the construction of the building the Turner Mushroom System of reinforcement was used, whereby all interior beams between columns are eliminated so that the ceiling has the appearance of a flat slab resting on columns with slightly flared heads.

The only reinforcement employed are the plain round rods, both for the columns and floors. The eight rods generally used in the reinforcement of each of the columns are about four feet longer than the required height. This additional length is bent at a little more than a right angle, and thus extended out into the floor slab which is about 7 1-2 inches thick. A hoop of riveted or welded steel is placed around the steel of the columns just below the point where the bend is made and securely wired in position; while two rings of 4 1-2 and 8 feet diameter, respectively, constructed of round steel rods, are laid on top of the bent column rods to which they are securely fastened by wire tyings. This combination forms the mushroom head, on which is laid the main floor reinforcement bars.

As will be seen from the floor plan these bars run in equal numbers from each column to the eight surrounding columns, thus forming a complete net work of reinforcement carrying the loads direct to the columns. The side columns and heads are simple modifications of the scheme for interior columns.

In plan the main building is 45 by 128 feet inside measurement, divided into panels 15 ft. 5 1-4 in. wide by 16 ft. 1 1-4 in. long. The floors are designed for live loads of 150 pounds per square foot, and a roof load of 40 pounds per square foot. The footings are designed for an earth pressure of three tons per square foot, those for the interior columns being 5 ft. 7 in. square and reinforced in bottom course in 2 directions with 1-2 in. rods, spaced about 3 1-2 in. centres, while the outside footings are 4 ft. 7 in. square and reinforced with 1-2 in. rods, spaced 4 1-2 in. centres each way.

COLUMNS.

The interior columns are octagonal in shape and are of 18 in. diameter on the first and second floors, and 14 in. on third floor. The reinforcement in first storey consists of eight 1 1-8 in. diameter rods, while on the other two floors the steel is reduced to four 1 in. diameter rods. The exterior columns are of rectangular cross-section 16 x 20 in., and reinforced with four 1 in. diameter rods throughout their length. At the two extreme points and in the centre, all the columns on each floor have flat rivetted hoops of 3-16 x 1 1-2 in. material surrounding the vertical reinforcement, in addition to the ties of No. 10 wire spaced 15 in. apart. The load from both centre and side columns is transferred to the footings by steel plates 23 x 23 x 5-8 in., and 17 x 21 x 1-2 in. respectively, as required by the city by-laws.

MUSHROOM HEADS.

As previously stated, the column head is formed by bending about 4 feet of each rod of the column steel through a little more than a right angle so that the outer

THREE-STOREY FACTORY BUILDING RECENTLY BUILT ON CARLAW AVENUE, TORONTO, FOR A. A. BARTHELMES, IN ACCORDANCE TO THE MUSHROOM SYSTEM OF REINFORCED CONCRETE. CLARKE & MONDS, DESIGNING AND ERECTING ENGINEERS.

end of the rod is farther from the top of the floor than the portion close to the column, and on top of these bent rods are placed two hoops of round steel rods, the inner being 5-8 in. and the outer one 3-4 in. diameter rods. In case where there are only four rods in the columns the extra four points for the support of the rings are supplied by laying across the column head two continuous rods of the same diameter as those in the column. But in the case of the side columns these extra supports are secured by knee rods which extend down into the column about 2 ft. 6 in.

BEAMS.

The only beams employed in the structure are those on the sides required to carry the weight of windows, curtain walls, etc., and these were also designed to carry the load from one-quarter of a complete floor panel. The beams are 14 x 26 in. and reinforced with 2 in. diameter rods which run along the bottom and one rod of 7-8 in. diameter, which is bent up to provide for shearing stresses in the beam.

for two different sizes of columns filler pieces of the correct size were lightly tacked to the edges of the forms used on the lower floors and removed for use in the upper floor. To provide against the pressure of the wet concrete the column forms were hooped with round iron bands similar to those used for tank work, a special slotted lug being used where the two ends of the band met. So that these bands should not bear at the corners of the forms only, circular blocks of wood were provided and nailed to the forms beneath the bands to give an even bearing all around the column. This system gave good satisfaction throughout, and was even applied to the rectangular side columns.

Owing to the difficulty of constructing wooden forms for the flared column heads cast iron forms were substituted, eight sections being required for each head and held together with 5-8 in. bolts. These castings are made adjustable for different sized heads by the use of wooden filler pieces of the proper thickness, the one pattern being used, if necessary for a considerable range in the size of columns.

INTERIOR VIEW OF A. A. BARTHELMES' NEW FACTORY, TORONTO, SHOWING THE OCTAGONAL COLUMNS WITH SLIGHTLY FLARED HEAD, TOGETHER WITH WINDOW ARRANGEMENT. NOTE THE ABSENCE OF BEAMS BETWEEN INTERIOR COLUMNS AND THE UNBROKEN SURFACE OF THE CEILING.

FLOOR REINFORCEMENT.

The floor reinforcement consisted of 3-8 in. diameter rods laid about 7 in. apart, the ends in all cases resting on a column head, and extending about two feet beyond its centre. In the middle of the span these rods are kept about 1 in. clear of the under side of the floor, while toward the supports they rise up to a point near the top of the floor slab. During construction this steel is kept in place by being lightly tied to the column heads.

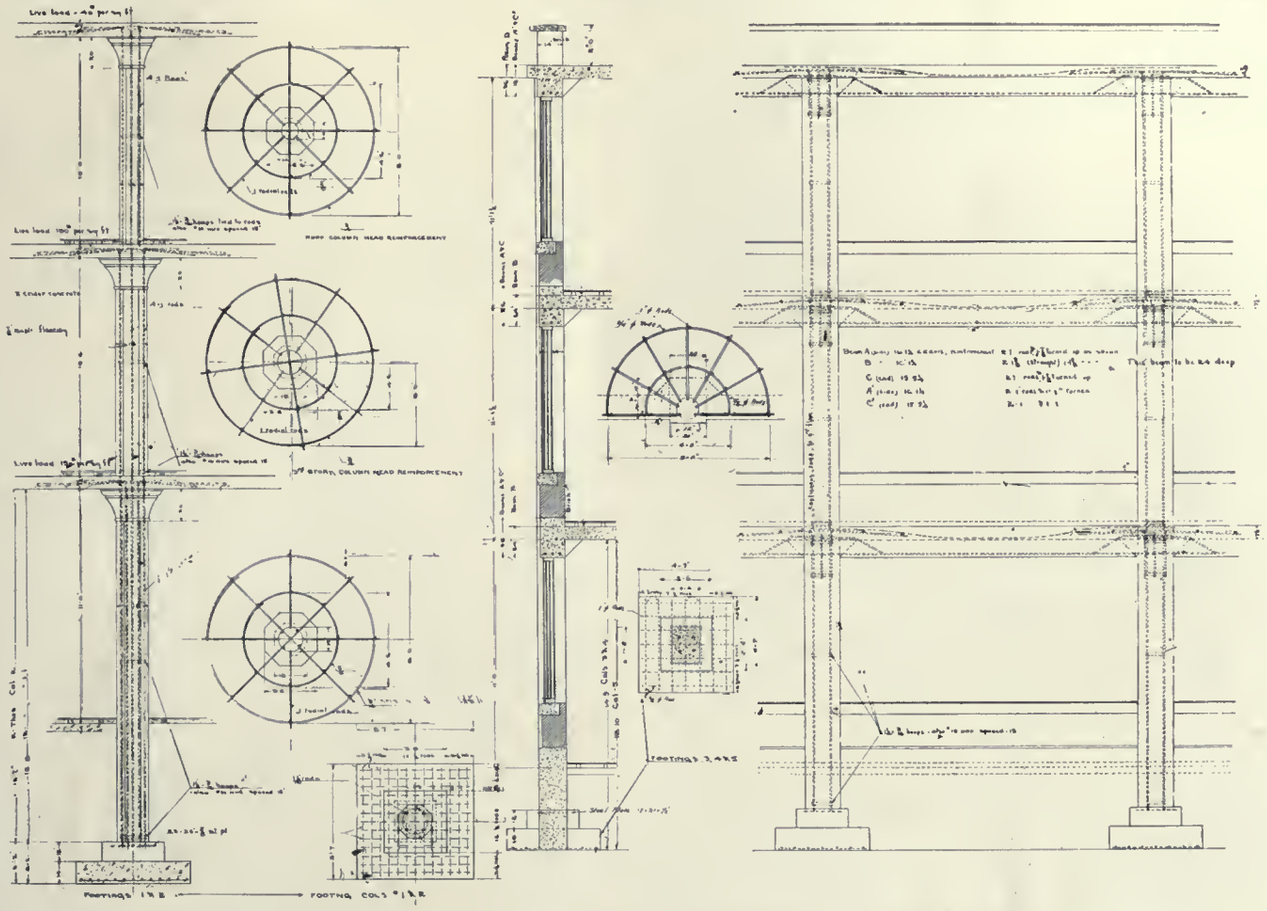
Throughout the system very little bending or fabricating is required and the placing of the steel is very simple and of such a character that there is practically no liability of important members being left out.

FORMS.

The material used in the column forms was 1 3-4 in. dressed spruce, bevelled for the octagonal shape of central columns. To provide for using the same material

The forms for the floors were very simple as there were no beams to limit the lay-out and the most economical design for the centreing was adopted. One inch spruce lumber dressed on one side and both edges was used throughout, it being laid on 2 ft. 6 in. joists, spaced 24 in. on centres. The joists in turn were supported on 4 x 8 in. timbers spaced about 7 ft. 6 in. centres and resting on 4 x 8 in. posts about 5 1-2 ft. centres. The lower end of the posts rested on small mud sills. To provide for adjustment of the post or slight settlement of the mud sill hardwood wedges were inserted between post and sill so that it was possible at all times to keep the forms under control.

Sufficient material was provided to make the forms for one-half the total floor space, and the supports were not removed under any panel for at least twelve days after pouring. This does not apply to the cast iron col-



DETAILS OF CONSTRUCTION, CONCRETE FACTORY BUILDING OF A. A. BARTHELMES, TORONTO.

umn-head forms, which were taken down and moved forward on the third or fourth day.

REINFORCEMENT.

Plain round rods of medium steel were used throughout the work. This steel was rolled by the Hamilton Steel and Iron Company and was shipped to specified lengths.

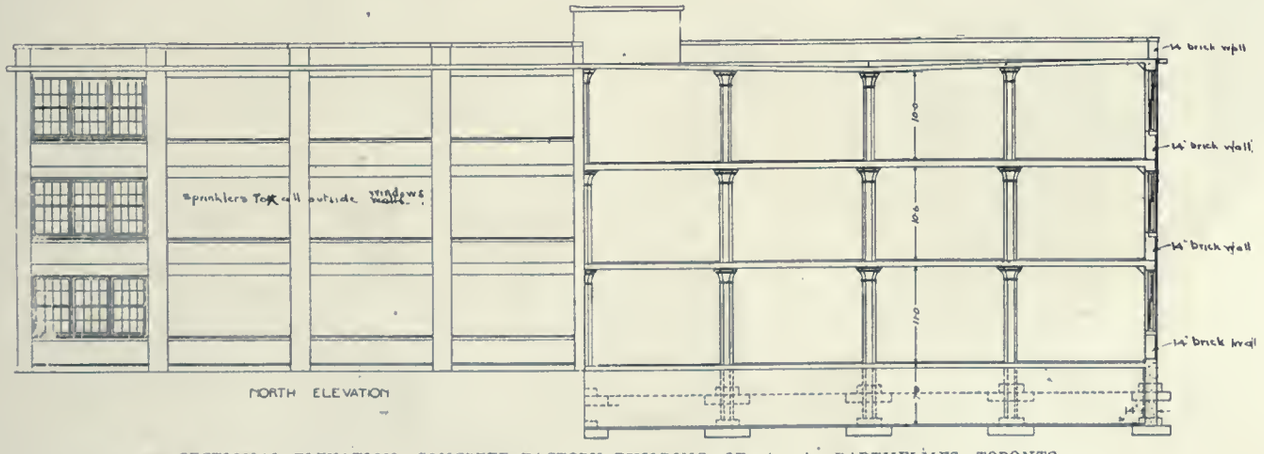
The column rods and rods for the exterior beams were bent by a very simple bending machine of the lever type, while the mushroom heads were bent by hand to templates formed by driving wooden posts into the ground along the lines of the required circle. The hooping and tying of column rods was all done after being placed in position in the work. The floor reinforcement required no further attention than a light tie with annealed wire at two points on the head, and little trouble was experienced in keeping all the reinforcement in its proper position.

CONCRETE.

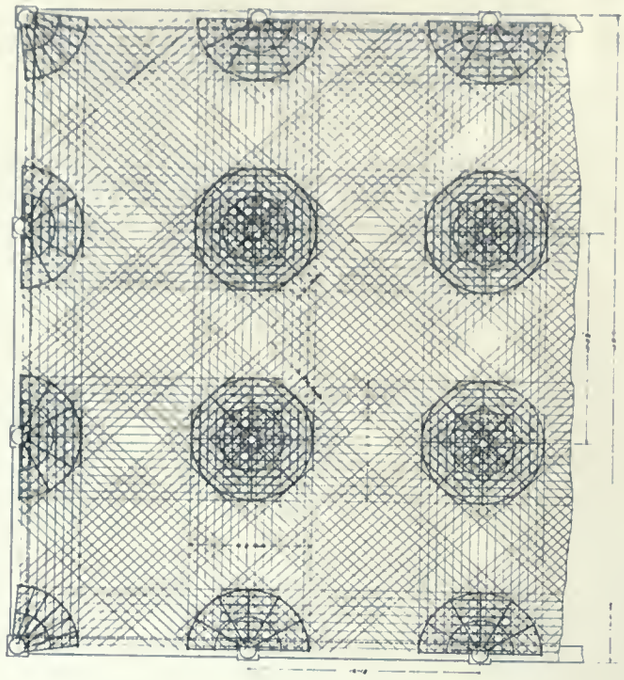
For all slabs, beams, columns and footings a 1:2:4 mixture was used, and for foundation and curtain walls, the mix was 1:3:5.

The sand was supplied by the York Sand & Gravel Co. The crushed limestone by the Rogers Supply Co., and the cement by the Hanover Portland Cement Co.

Two mixers were used on the work, one of the Ransome type, steam driven, and a tilting mixer driven by gasoline engine. For hoisting the materials a single cage, two barrow elevator was used. This latter proved rather unsatisfactory, as the speed was too low to take the concrete away from the mixer. However, the whole frame work of the building, including columns and slabs was poured in a little less than six weeks. The curtain walls, which were originally intended to be of brick were later changed to concrete, and the wooden window frames and sash were set and fitted after the completion of the



SECTIONAL ELEVATION, CONCRETE FACTORY BUILDING OF A. A. BARTHELMES, TORONTO.



DETAIL OF FLOOR REINFORCEMENT, CONCRETE FACTORY BUILDING OF A. A. BARTHELMES, TORONTO.

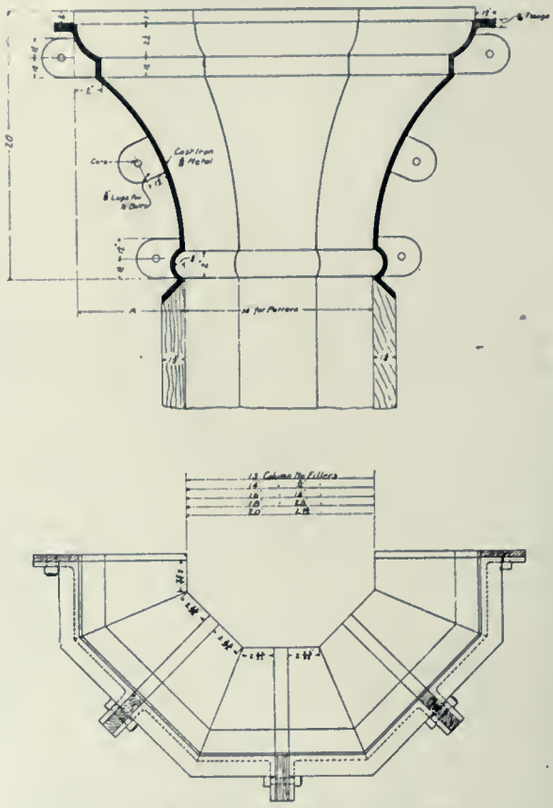
masonry, provision having been made for same by means of spiking strips left in the columns and beams. The hardwood super-floor on each flat is railed to 2 x 3 in. spruce sleepers embedded in a three-inch cinder concrete laid on top of slab concrete.

The brick pent house contains the elevator, reinforced concrete stairways, and two lavatories on each floor. Automatic closing fire doors guard the entrances to the elevator and stairways. Provision is made in the design for the support of an 8,000 gallon tank on top of the elevator tower, this tank to supply the sprinkler system, when installed.

The boiler and engine house is constructed with brick walls and a reinforced concrete roof of the ordinary slab and beam construction with one supporting column in the centre. Round rods of medium steel are used for both slab and beam construction. An underground tunnel between engine house and main building provides a passage for the main drive belt connecting with the main shaft which runs in a pit seven feet deep and twelve feet wide below the ground floor of the main building. The walls of this pit are 13 1-2 inch concrete, and the covering of 3 x 6 in. Georgia pine, laid on 8 x 10 in. beams.

TESTS.

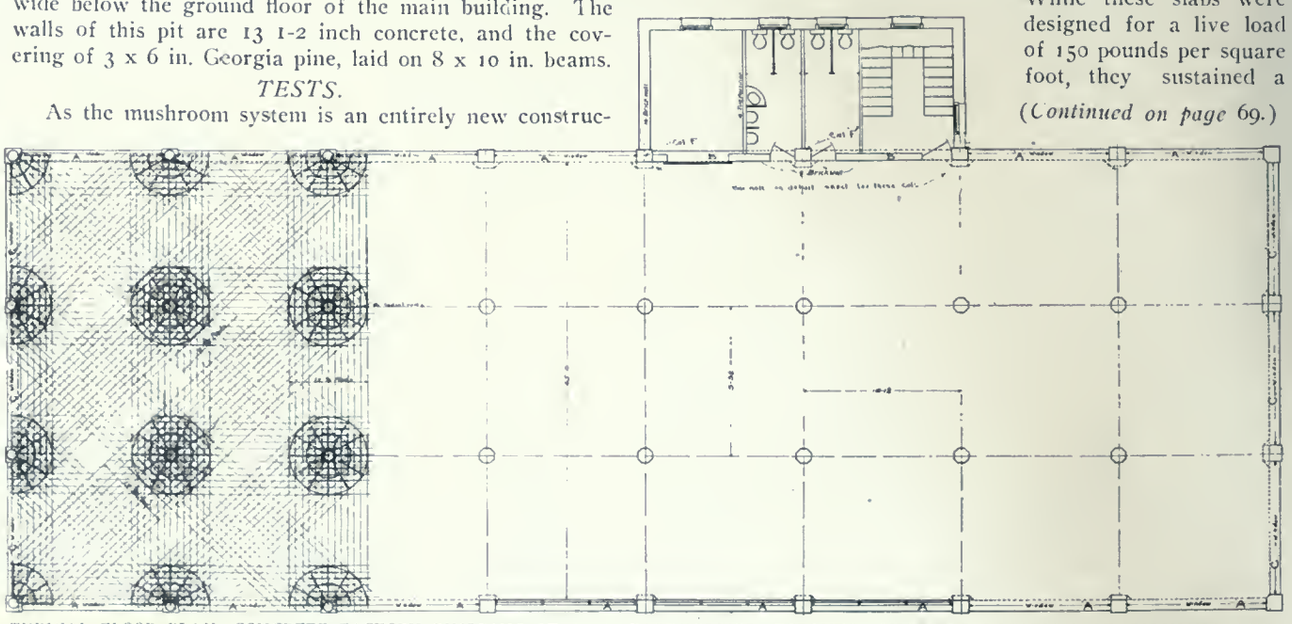
As the mushroom system is an entirely new construction in Toronto it was agreed that the contractors were to test same for the satisfaction of the City Architect and the owner. The slab to be tested was selected by one of the city officials and measurements before loading were



DETAIL OF COLUMN HEADS, CONCRETE FACTORY BUILDING OF A. A. BARTHELMES, TORONTO.

taken at the centre of the panel. The space between the four columns was then walled up with bags of cement and filled in with wet sand and gravel to a depth of four feet, thus obtaining a distributed load of at least 450 pounds per square foot over the entire surface of the panel or a total load of 110,000 pounds deflection under this loading was slightly less than 5-16 in. This load remained on the slab for about a day and one-half after which it was gradually removed. While there was still a load of 20,000 pounds on the slab the floor had regained its original position. While these slabs were designed for a live load of 150 pounds per square foot, they sustained a

(*Continued on page 69.*)



TYPICAL FLOOR PLAN, CONCRETE FACTORY BUILDING OF A. A. BARTHELMES, TORONTO, SHOWING LOCATION OF COLUMNS AND METHOD OF FLOOR REINFORCING.

CONSTRUCTION

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 Toronto, April, 1909 No. 6

Current Topics

THERE ARE AT PRESENT 530.764 square yards of bitulithic pavement in Ontario as compared with 1903, when the first bitulithic pavement was constructed in Toronto. Efforts are now being made in several places in the province where street improvements are in contemplation, to have this style of roadway adopted.

* * *

THE LARGEST ROOM IN THE WORLD under one roof, and unbroken by pillars, is at St. Petersburg. It is 620 feet long and 150 feet in breadth. By daylight it is used for military displays, and a battalion can completely manoeuvre in it. Twenty thousand wax tapers are required to light it. The roof of this structure is a single arch of iron, and it exhibits remarkable engineering skill in architecture.

* * *

A REPORT OF THE PRELIMINARY SURVEY of the projected route to Hudson Bay, as recently submitted to the Dominion Government, states that the railway could easily be built either to Fort Churchill or Port Nelson at a cost, including the construction of terminals and harbor work, of about $17,000,000 The report also adds that a canal could be built along the Nelson River, which would enable ocean going vessels to enter Lake Winnipeg from Hudson Bay.

* * *

IT IS REPORTED that the transference of the interests of one of the largest lumber companies in Nova Scotia to an English Syndicate, (which deal it is said is about to be consummated) will insure the building of the long projected Nova Scotia Eastern Railway which will open up all the properties of the company. These various tracts are located at eight different points, seven east of Halifax Harbor and one west, near Yarmouth. It is also understood that the new company proposes to erect a large pulp mill, probably on Halifax Harbor.

LABOR TROUBLES in Winnipeg this year will in all probability be averted. The differences between the Builders' Exchange and the various building trades have been adjusted and all friction removed. While no agreements have been signed it is understood that an arrangement satisfactory to all has been reached. The scale of wages that will prevail this season, on the hour basis, is: Bricklayers and masons, 60c.; stone cutters, 60c.; plasterers, 50c.; plumbers, 35 to 50c.; carpenters, 35 to 40c.; electricians, 30 to 40c.; painters, 30 to 35c.; building laborers, 20 to 25c.; laborers, 17½c.

* * *

A COMPARTMENT MAUSOLEUM to contain 500 crypts is something which a newly formed company in Hamilton has in project at the present time. The company proposes to put up a structure, having a frontage of 150 feet and a depth of 75 feet, at a cost of $40,000. The exterior will be of reinforced concrete and the interior lined with marble or granite. Family compartments with as high as twelve crypts will be provided and there will also be a chapel in the place. If the matter of a site can be arranged for with the cemetery board, Hamilton, will have the first mausoleum of its kind ever erected in Canada.

* * *

A SYSTEM OF MOVING SIDEWALKS to be placed beneath the most crowded parts of the city, is one of the proposed improvements included in a big scheme which the public service commission of New York City has under contemplation, in an effort to cope with the transportation problem resulting from the fast increasing population. The various projects, some of which are already under way, will, it is estimated, necessitate an expenditure of $500,000,000. Of this, $400,000,000 will be used for tunnels and subways, and a fourth of the entire work will be in process of construction at the end of the year. The amount which will be required for the moving sidewalks is placed at $80,000,000.

* * *

HARBOR FACILITIES AT KINGSTON, ONT., are to be greatly increased, according to plans which are at the present time in contemplation. In order to bring this about, it is proposed to remove the wooden bridge now crossing the Rideau River opposite Tete de Pont Barracks, and to erect a modern steel structure about one-third of a mile in length across the river at Belle Island, lying a half mile farther up the stream. This improvement will allow for additional dockage capable of accommodating some 200 more vessels. As it is estimated that each vessel harboring at this port means an average of $1,000 for the city, Kingston will be directly benefited to the extent of perhaps a quarter of a million dollars per year.

* * *

AN UNUSUALLY ACTIVE BUILDING YEAR will be witnessed in Kingston, Jamaica, as the result of a settlement arrived at by representatives of British insurance companies and the agent of the Jamaica Policy Holders' Association, regarding the losses sustained in the fire which accompanied the earthquake of January 14, 1907. By terms of the adjustment, the companies will pay each member of the association 85 per cent. of the face value of his policy, and defray the cost of litigation. The claims of the policy holders outside of the association will also be settled on this basis, but without the payment of costs. The number of claimants is about 800, and the total amount to be paid by the companies is upward of $3,000,000, exclusive of costs. While some creditable appearing business houses have been put up in the past year or two, the general rebuilding of the city has been delayed, awaiting the result of the litigation, the issue of which has been so satisfactory to the policy holders.

HYGIENIC HOUSE ACCOMMODATIONS for the poorer classes is a problem with which the municipal government of Buenos Ayres, the capital of Argentine, is grappling in a most effectual manner. Thirty houses have just been completed, and one hundred and seventy more are now in process of construction. These are designed and built as model dwellings for the more respectable and industrious of the working element, and each structure is equipped with the best sanitary appliances known to modern building science.

* * *

IN ALL PROBABILITY the city of Messina, recently devastated by earth-quake, will be reconstructed, the sentiment of the people being entirely in favor of such a course. Large sums have been spent on the harbor, which is excellent and too valuable in its situation to abandon. No definite plans have been made by the Government as yet, but it is generally understood that rebuilding will begin as soon as the bodies which are still among the fallen masonry have disintegrated sufficiently to allow of removing the rubbish. Work will not begin for several months. This will offer an excellent opportunity for fireproof and earthquake method of construction, and from present indication, the popular demand will be for steel frame and reinforced concrete types of buildings.

* * *

AN INGENIOUS DEVICE, by means of which switches on electric street car lines can be shifted without stopping the car, has lately been invented by Dante Bechi and Galileo Seranfi, two mechanics of Florence, Italy. This electric mechanical switch consists of a box containing an electrical apparatus hermetically closed, from which two wires project and connected with an upper contact. Inside the trolley there are two invisible contacts, which, through two wires, lead to two communicators placed on the platform. The switch needle under the manipulation of the motorman is brought in contact with the trolley wire some 10 or 15 yards before reaching the switch, and the course of the car is turned to the right or the left, as desired, without stopping the car. The apparatus is said to greatly improve the service by doing away with the time and trouble necessarily required at switching points. It is simple and practical, easily constructed, and can be readily attached without making any changes to the car. The first experiment recently made at Florence gave very satisfactory results.

* * *

THE OUTLOOK FOR THE CEMENT INDUSTRY in Japan at the present time is anything but encouraging according to one of the leading dailies of the country, published in Osaka, which, in reviewing the conditions under which the Japanese have tried to build up its cement business, observes that their greatest obstacles have not yet been overcome, and that the leading cement-manufacturing companies are going through fire and water in consequence of the depression of trade, and are doing everything possible to keep up the market. The demand for cement has become very inactive since May or June last, when the railway works were completed, and the market, which ruled at one time at $2.50 to $3 per barrel, has gone down to $2, or even $1.75, at which price contracts are accepted for shipment at Moji f.o.b. The circumstances of the companies, however, do not allow them to reduce the output precipitately, and they are continuing full operations. The stock in the go-downs of the companies is increasing day by day, with little demand, and the market is going down rapidly. The depression in business is expected to be worse in April or May. The South Manchurian Railway Company is known to hold a stock of 100,000 barrels.

THE ITALIAN GOVERNMENT, says a late report, has ordered 300,000 reinforced railway sleepers of a new design, in which the feature is an increase in the number of reinforcing bars and a reduced diameter of the sleepers. The cost is estimated at 5s. ($1.20) each. The materials are Portland cement, sand in grains of two sizes, round iron bars, and braces of wood, the latter soaked with tar oil. The durability of these ties is of course still a matter of conjecture, but it is estimated that they should last from three to four times as long as those made of wood.

* * *

IN DISCUSSING the recently proposed plan to license architects and builders in the District of Columbia, Frank P. Milburn, a local architect, is reported by the Washington Post to have expressed the following views on the subject:

Architects should be practical builders and should have an exact and thorough knowledge of building. If a man who undertakes to erect a building, big or little, has not practical knowledge of building, there is a large chance that another such catastrophe as that which recently appalled Washington will occur. How is an architect to supervise the construction of a building he has designed with any justice to himself or to the owner if he is not thoroughly informed in regard to building?

There are too many so-called architects who are merely draftsmen, who can make a pretty picture, but who have not the practical knowledge of the building trade which makes them sure of themselves when it comes to erecting the building they have designed on paper. In my opinion, all architects should have practical training as builders, either before they take the course in the architectural schools or after they have finished that course. If the law required an architect to be a practical builder as well as a draftsman, there would be no falling down of buildings.

* * *

CEMENT MANUFACTURED IN CANADA in 1908 amounted to 3,495,961 barrels, or over 40 per cent. more than was produced in 1907, when the total quantity represented an output of 2,491,573 barrels. The total number of sales for the year also show an increase of over 7 per cent., the number of barrels marketed being 2,665,289, as compared with 2,436,093 barrels in 1907. At the present time there are twenty-three operating plants in the Dominion, fifteen of which are located in Ontario, three in Quebec, two in Alberta, and one each in Nova Scotia, British Columbia, and Manitoba. Twelve of these plants use marl and clay, ten use limestone and clay, and one blast furnace slag. Their total daily capacity in 1908 was 27,500 barrels, as compared with 14,300 barrels in the previous year, while the number of hands employed was 3,029, which exceeded the number engaged in 1907 (that of 1,786) by 1,243. Statistics of the amount of Portland cement consumed in Canada during the past five years are as follows:

Year.	Can. Barrels.	Imp. Barrels.	Total. Barrels.
1904.....	910,358	784,630	1,694,988
1905.....	1,346,548	917,558	2,264,106
1906.....	2,119,764	694,503	2,814,267
1907.....	2,436,093	672,630	3,108,720
1908.....	2,665,289	457,408	3,122,697

This table is of more than ordinary interest, as it not only reflects the steady growth of the cement making industry in Canada and the increasing use of this material in construction work, but of still more importance, it shows how the broadening popularity of the home product is gradually crowding out the foreign brands. In 1904 there was very little difference between the amounts of domestic and foreign cement used in Canada, while in the past year the figures show a vast disparity.

THE OLD ARCHITECT AND THE NEW.---With Few Exceptions Practitioners of To-Day Essentially of a Business Turn of Mind.---Age of Centralization and What It Portends.---Skilled Designer Becoming "Hireling" of Commercially Imbued Individuals.---Result of Wide Open Profession.---A Prophecy.

By F. W. FITZPATRICK

THE CONCEPTION of the average layman regarding the profession of architecture, its high standing in the community, the great erudition of its practitioners, and the remuneration received in the way of fees, is at the best a vaguely formed and misshapen one. Nothing is more corroborative of this than the number of recent magazine and newspaper articles, written by well-meaning but wrongly-informed, lay individuals, which aided and abetted by lectures and technical school prospectuses, tend to create an entirely erroneous idea of the profession, its emoluments, its duties and its status.

Now, dear reader, do you wish to come behind the scenes and peek at architecture as she really is, without the glare of calciums and blare of the bass-drum? A glimpse behind the scenes, you know, often disillusionizes the glimpser, but it makes him more critical, he expects more thereafter, and, perhaps, that in turn may lead up to better acting on the part of the actors, who, after all, gauge their work up or down to the standard established by that criticism.

In the first place, who are the architects, anyway? Who or what gives us that title, and when and where did we get it?

What follows will indirectly but fully answer the query. It makes a good opening or text to begin with, so we will let it stand.

THE ARCHITECT OF THE PAST.

When I was a boy, an architect was a somebody—a superior person. There was much mystery about his work; his word was law; the client was a small part of the performance. The architect designed his building and made a set of plans; his students, or "clarks," made a couple of copies, wonderfully and painfully rendered. He wrote a treatise called a specification, and other "clarks" wrote off a couple of copies therefrom. Then he visited the building in solemn state once a week or so and collected his five per cent. fee. He bothered not his head about the plumbing, the heating or any of the other few and primitive accessories that were then. Those things were attended to by specialists with whom he had nothing to do. He ranked with the judge, the leading lawyer, the eminent physician—several pegs higher in the social rack than the merely successful merchant or broker, and there was a bottomless chasm between him and the lowly builder or contractor.

He had studied and worked in the successive stages of apprentice, student, "clark" and assistant in some office for a dozen or more years, and had probably travelled some, perhaps even to the Far East. There were no more preliminary fastings and prayers for him to go through in those times than there are now before his "admission" to the full honors of the craft. Ours has ever been an open profession—wide open. When he got ready he went in, and that is all there was about it. And so it is to-day, only more so, for then few men entered the ranks or received many commissions who were not pretty well trained. It was not so popular a profession as it has grown to be of late. Yes, sometimes he competed for his work—it has always been the fashion—but he did so in a dignified way. But of competitions more anon.

Later his duties became more complex. He took in the plumbing and other frills, his plans comprehended all there was about a building. Competition among builders grew more keen. He had to have more plans and specifications. Inventions of copying processes and the typewriter came to his aid, and he turned out copies of his work by the dozen—yes, by the hundred. He became more of an executive and less of an artist. The era of steel construction came in. At first he worked with an engineer; then he absorbed the latter and employed him. So many things were involved in architecture that he had to be satisfied with looking after the merest generalities, leaving all the details to his "subs." Later he actually forgot all about detail. Many even of our leading architects to-day could not design a cowbarn half decently, and as for the art of drawing, many could not earn a dollar a day at it.

THE ARCHITECT OF THE PRESENT.

Your architect has become a business man, pure and simple. Competition in his line has become, as in all else not yet in the trust, so very keen that there is no fun in it. He has to belong to boards of trade, coax the ward and other bosses, run with the machine, promote enterprises that need the construction of big buildings, be diplomatic and politic, work his friends and his wife's relatives and pull the social strings for all they are worth, and get his commissions by any means that a rather elastic, really business conscience may deem legitimate other than upon his merit as a designer, a skilled worker in the mistress, the grandest of all the fine arts.

He is and perforce, essentially a business man. I repeat, architecture is not any longer an art or even a profession; it is a business and is handled upon strictly commercial lines.

Of course, there are still master minds, comparatively great artists in our ranks, and some of them are leading architects. A very few are the "whole thing" in their offices and practice under their own names and alone, but they are so few as not to affect the proposition in the least that the really successful architect is a business man. There are many happy combinations of an artist and a commercial-social-expert, strong firms and able, but you will find, in nine cases out of ten, that the business end is the strong one, the senior partner the leading man—the "whole thing," indeed; the other is little better than a chief technical assistant or office man.

But by far the greater number of successful architects employ all their talent. These architects are attracted to the profession from other lines; they were contractors, material men, etc. Some were draftsmen, true, but unfit for the work, incapable of earning a decent living by it, so they "opened an office" of their own.

This, perhaps, seemingly acrid—whatever you may call it—was inspired by an article which, in naming two prominent societies of architects, says "that they have done much to make the position of an architect to-day higher than it ever was." It goes on to state that we are actuated by loftier motives and a nobler spirit to place our calling in an unassailable position. As a matter of fact, the societies referred to have done much to bring the architects a bit nearer each other, to impart to them so *esprit de corps* and to make the practice of the profession somewhat more uniform in appearance, at least; but I fear it is too late in the game. Perhaps am I a false

prophet, and perhaps am I only a kawing, croaking bird, "shrilly squeaking false alarums"; still, methinks there is the handwriting upon the wall! It seems very plain to me. Heaven grant I may not be a Daniel. I am well content to be only one of Belshazzar's Chaldean interpreters reading it not aright. But to me it spells in big letters that architecture as an independent profession is doomed!

COMMERCIALISM AND ITS INFLUENCE.

That spirit of commercialism that we have done so little to check, that we are powerless to check, and that so many of us have actually fostered, will be our undoing. Centralization is the order of the day. The carpenter and the stone mason of old have made way for the "general contractor," and the latter, passing through his chrysalid state, has been merged into the colossal "building company," with millions of capital, splendid executive talent and unequaled influence. When a big building is contemplated it is getting to be fashionable, policy and economy to give it to such a company to execute. The architect is a very secondary consideration, and though he gets a fat fee he is a very small fry about that building. The company uses his design—that is a matter of form—and builds it well, but to suit itself, for it deals directly with the owner. The architect is no longer the arbiter and supreme judge of all about that building. There have been cases where such a company actually named the architect, who was then appointed by the client. It is only a step more to his being employed directly by such a company. That has not been done outright simply because it would antagonize all the other architects, and they still have some strength.

But, mark my word, some day, and perhaps one not so very far off, the next step will be boldly taken. The architect will be relegated to the past. Those companies will be relegated to the past. Those companies will employ their own designers, the architect will be lost in the shuffle. You will state how much money you wish to invest, and those different companies—if they are still uncombined—will tell you how much building they will give you. They will submit designs made by their own employees, and the resulting structures will be just as artistic and well built as those of to-day. There will be as high a premium upon talent and skill as now, perhaps higher, but the possessors thereof will have changed hands; they will bow unto the company as their chief where they salaamed before to the architects. The latter, as middlemen, will pass away, or, at best, will be but memories—battered specimens of a once proud race.

Could anything have been done, or can anything be done now to prevent this impending dissolution? Is it not simply the steady march of evolution, progress? Have not other professions and trades passed away to make place for newer, better means of accomplishing certain ends? In how much or what is the profession to blame, if blame there be, for bringing about this condition? Go ask the American Institute, wiser men, social doctors; they may answer these and all other queries you may propound. I am but the young assistant come before you to diagnose the case, not to cure the disease nor to prepare the death certificate. I have told you what stage the malady had reached, describing it clearly, without the embroidery of technical terms or seeking to minimize its seriousness.

Go, get it cured, or let it run its course. *Vale!*

ARTISTIC TALENT AND BUSINESS ACUMEN.

You see, the two qualifications—that of being artistic and that of being a shrewd business man—are seldom if ever found in the same man. If they are at all, one or the other is bound to be the more developed and finally extinguish the other. In an office, among a lot of draftsmen, you will find one who is enthusiastic over art; he studies a lot, applies himself, is pushed ahead, for he is valuable and gets as high as $10 a day. Another realizes he has not the talents of the first but is shrewd enough to keep his eye on the main chance. He wastes no time studying, not he; he gets out among the people, hob-nobs with the contractors, is particularly attentive to the clients of his employer and impresses upon them how very important his services are upon their work. He figures out that with his meagre talents he can not become more than a "tracer" or "detail man" or a superintendent in that office, but he realizes that if he gets a good "job" to start in on he can become his own master and hire just as good talent as that of his confrere or that very same artistic man. So he wiggles around some clients of the office where he is at work, or, if over-conscientious, gets his prey on the outside, makes a lot of plans with the assistance of his talented office-mates during their spare time, pays the latter or not, as the case may be, and launches out into practice, the embryo of a successful architect!

Some States have some form or other of license for architects. With us it is not as in law or medicine, or even with dentists, drug clerks or parsons. All these go through some form of examination or receive some sort of permission from some one in authority to ply their "calling." With us, as soon as a man can afford $3 or more for a sign with the magic word "Architect" upon it, he is thenceforth and forever an architect in fact; he has "called" himself, as it were, and is as much entitled to that honored title as was a Richardson, a Hunt, or an Atwood—in the eyes of the law and of the dear, discriminating public. Any one of you, my readers, male or female, regardless of color or previous conditions of servitude, may put up such a sign, and no one, in most places may say him "nay."

FATE OF SKILLED DESIGNER.

You may ask "What becomes of the skilled designer, the artistic one? Is he not bound to come out on top finally?" No, gentle reader, he will not come out on top. He early realizes the futility of bucking against his shrewd brother, so he works for him. He becomes a sort of machine. Disgusted with what he thinks the injustice of the world and, blessed with a highly strung, nervous temperament, some drink themselves into early graves or—smoke cigarettes. Others drift into other and perhaps better-paid lines of design—decorators, furniture, etc., and still others drift into heaven only knows what. I have met good, high-class draftsmen herding cattle, stoking engines and collecting bills. Every twenty years or so, when our periodical hard times come upon us, they scatter, do these clever fellows, to the four corners of the globe, and you can never gather them all back into the fold after the storm.

So, then, the average successful practitioner is, let us call him, an employer of skilled labor, a sort of middleman. Now, for a professional man, is that not a strangely anomalous condition? What would you think of the eminent physician and of the learned legal luminary if they were introduced to you and stayed with you and "jollied" you to the point of your employing them as your professional advisers, only to find, when you were sick, that the former sent around an assistant to diagnose your case, another perhaps verdant youth to practice upon you, and a third adolescent to get the data necessary for the death certificate; or of the legal luminary, should you get into trouble, if he sent you a young assistant to put the facts in the case together ready for a second to prepare a brief for a third youth to plead before the jury in the name of and for the great man who was, meanwhile, chasing other prospective clients and growling at the aforementioned assistants for putting so very much time on your case?

Is it an overdrawn picture? Well, there is your average architect. It may indeed fit some of the pre-eminently successful ones. I grant you it is not flattering or attractive.

A RELIABLE CONTRACT.---The True Basis Upon Which Every Building Contract Should be Framed.---Uniform Method of Extracting and Calculating Quantities Essential.---By W. M. Brown, C.E.

TO THE MINDS of many contractors the question often arises, "Why are so many tenders rejected?" To answer this query by indicating some points that may discover the cause, and suggesting others that may be helpful to contractors in making out their tenders, so as to minimize the chances of rejection, is the aim of this article.

The general ground for the rejection of tenders is because that they are all too high. Yet the judgment given is sometimes very erroneous, because of no proper basis to arrive at this conclusion. Owners expect to have a certain amount of work done for a limited amount of expenditure, and if the tenders returned exceed the limit (notwithstanding that the tenders, according to plans and specifications, have been carefully and reasonably prepared), they are nevertheless rejected upon the ground of being too high. The fault in such cases does not rest upon the contractors when they have returned carefully calculated and prepared tenders. But discrepancies may arise on the part of the contractor being incapable of forming a proper estimate.

This leads us to formulate what may be termed "a reliable contract." The first element to be considered is an uniform method of extracting the quantities from the plans and calculating the same, also priceing each item at current rates. When this procedure is adopted a reliable tender may be formed. But when each contractor adopts a method of his own, different from the others competing, it is natural to expect that there will be a disparity in the amounts (often very great in extensive contracts) that is very conflicting to the owner.

The great necessity, in the first place, is to have an uniform and well-wrought-out system of measurement, with well-defined rules for each class of work, and having thoroughly trained professional men to measure the plans and prepare accurate schedules of quantities, which are supplied to each contractor tendering. When each item in the schedules is priced at current rates, and correctly calculated, then there should be very little difference between the amounts given in the tenders sent in. At any rate, there will be the least chance of all the tenders being rejected, which sometimes occurs. When such an accurate and reliable method is not at hand, then the contractor has to do his best in extracting the quantities from the plans in order to arrive at the amount.

The methods of "cubing" and "squaring" are not reliable in every case, so that a better plan is to take off as much detail as possible, which shall give him a basis upon which to price the time and materials, labor to be expended, and percentage of profit required for each item. When this is intelligently and correctly done, then he may come very close to his competitors. But whenever "guesswork" is resorted to, then financial disaster may follow in its train. The cost of materials, the time and labor expended on same, and the percentage of profit required, are the most important factors which compose the true basis of every well-constructed contract. But in cases where it is impossible to execute the work at any prescribed amount, then no true basis can be established for the carrying out of the contract, except at a loss to the contractor. Many contractors, however, compete under such circumstances, which is not only prejudicial to their own interests and that of the owner, but also to the others competing, and to the trade in general.

A contract may be drawn up that seemingly has all the elements of a true basis, and yet either of the parties to the contract may agree to certain alterations which may not produce what may be termed "a first-class" job. Thus an architect may allow a certain material to be used that is inferior in quality to that specified for the purpose required, and yet no apparent breach is made, so long as the substitution is sanctioned by the owner. But whenever this is done unknown to the owner, and against his wishes, it constitutes a breach in the carrying out of the terms of contract, which might lead to litigation.

A contract founded on a true basis is one in which there exists between the contractor and owner no ambiguity as to the meaning of the written terms of the specification and general contract, and to the details contained therein regarding the materials, their quality and durability, and to the time and labor expended in the execution and finish of the completed work. This means that the element of conformity to terms must have an important place in the basis of every thoroughly constructed schedule of contract. Without this the whole fabric of contract building would fall and leave nothing but disastrous results to many victims.

The contract terms must be so stated and minutely described that only one meaning can be placed upon them. The question of expenditure does not necessarily enter into the "true basis" of a contract. Thus the error occurs frequently of rejecting all offers, because they are seemingly too high. This in many cases is the result of the standard put upon the amount of work expected by the owner, because of the limited capital at his disposal. But if the owner is content to accept inferior material and workmanship in the construction of his building, and specifies this accurately in his specification and contract, then he may legitimately carry out his ideas upon a true basis of contract. Another reason why so many tenders are rejected, is because no details of prices are given for the different items required in the building, but only a lump sum offer, however large the amount. This is a greatly mistaken method to adopt, especially in extensive contracts.

The chief characteristic feature, therefore, of a "reliable contract," consists more of a "moral" nature than of a "materialistic" one, and if this were attended to and thoroughly performed, then there would be fewer disputes and less cause for litigation.

AN AUTOMATIC TRAIN STOP, designed to shut off steam and apply the vacuum brake without the assistance of the engineer or driver, has been adopted, it is said, by the Lancashire and Yorkshire Railway, England. The stop is worked by the signalman, or by means of an inclined plane between the rails. So long as the signal remains at "danger" the inclined plane is raised so as to come in contact with a device beneath the engine, connecting with the steam regulator, which it closes, and applies the brakes throughout the train.

NEW ZEALAND SHOULD BE A NATURAL MARKET for the surplus production of British Columbia cement mills, according to a communication recently received by the Department of Trade and Commerce from Trade Commissioner Larke, in which he comments upon a Canadian newspaper statement that the output of the cement plants in that province would exceed the demand if operated throughout the entire year. There is a preferential duty of 2s. per barrel in favor of cement made in Canada, as well as in Great Britain. At the present time, nearly the whole of New Zealand's importation come from the United Kingdom, the importation in 1907 amounting to 223,037 barrels. The difficulty confronting the trade from Canada is the higher cost of production and the higher freight charged. It is possible, adds Mr. Larke, that the facilities of the British Columbia mills may offset the cheaper labor conditions of other countries. The geographical location, too, ought to facilitate a low rate of freight, and it may be possible that, under the new arrangement of the steamship lines, freight sufficiently low can be had, to advantageously ship to the New Zealand market and keep the mills operating all the year round.

ATTRACTIVE TWO FAMILY DWELLING, BALMY BEACH, TORONTO. OWNED BY DR. J. W. ROWAN. MR. CHAS. F. WAGNER, ARCHITECT.

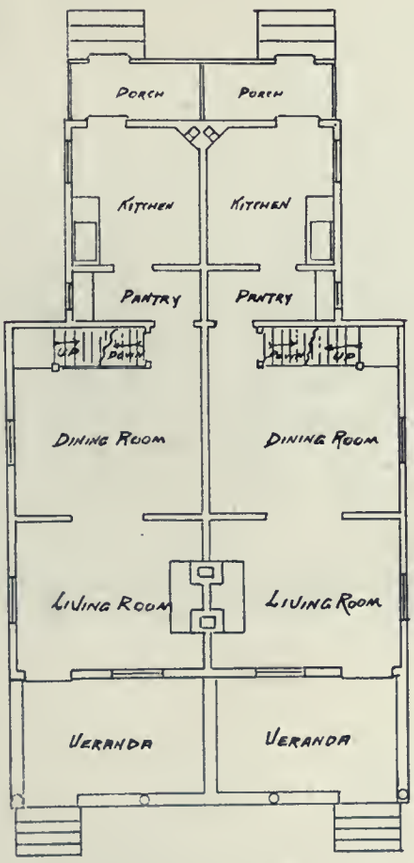
VIEW SHOWING SIMPLE AND EFFECTIVE TREATMENT OF END WALLS. TWO FAMILY DWELLING, BALMY BEACH, TORONTO. MR. CHAS. F. WAGNER, ARCHITECT.

A MODERN TWO-FAMILY DWELLING.---Exterior Treatment Simple but Effective.---Interior Direct in Arrangement.---Planned for Families of Three or Four Persons.---Design Could be Reproduced in Brick or Cement Stucco as a Residence of the Detached Type.

THERE IS AN ELEMENT of the nondescript in the domestic architecture of to-day, and there is also an element which consists of the combining of styles which has resulted in some radical departures in the matter of house design. Here and there one sees a home so decidedly modern as to not admit of any association with the more accepted styles, and again a combination of the English domestic and gambrel roof or some similar adaptation, that is as unique in treatment and it is satisfactory in general appearance.

The former has perhaps been too recently evolved to be known as a particular type, while the latter, owing to its mixed character, has not as yet been given a place in architectural nomenclature. In one is an evidence of a desire to originate or create, in the other an effort to attain a greater degree of individuality by giving a new expression to borrowed ideas.

While both perhaps leave room in certain respects, for criticism, they have nevertheless made progress in the architectural development of residential work, and in the homes built within the past few years there is a welcome

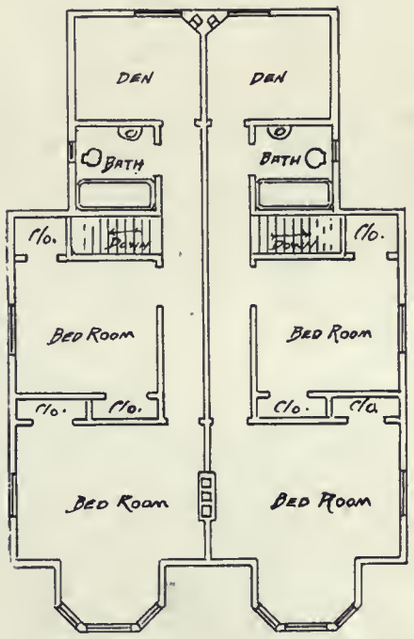


GROUND FLOOR PLAN, TWO FAMILY DWELLING, BALMY BEACH, TORONTO. MR. CHAS. F. WAGNER, ARCHITECT.

change from the row upon row of narrow, grille bedecked, poorly arranged gabled houses (productions of the builder more than the architect) which so characterized certain sections of our residential districts a decade or so back.

As to cost, despite the advance in the price of building materials, the expense of the erection of a house at the present time, cannot be said to be proportionately greater than it was some twelve or fifteen years ago.

Nowadays, the basement is excavated the full length of the house, instead of only the portion under the kitchen, and the cellar floor is laid in cement. Then there is the plumbing, which is more extensive and better in character, and the heating apparatus, which has come to be regarded as an essential part of the necessary equipment. Again, we find the brick of a better quality, finer texture, and in a greater variety, the lumber more select, the mill work of a higher grade, the interior finish with more tone, the fireplace and mantelpiece a customary thing, the windows moving by weight and better fitted



UPPER FLOOR PLAN, TWO FAMILY DWELLING, BALMY BEACH, TORONTO. MR. CHAS. F. WAGNER, ARCHITECT.

to their frames, and numberless other considerations, all of which contribute to make a home what it should be, attractive, comfortable, and liveable.

In fact, considering the general treatment, the quality of materials, the better character of workmanship, the general arrangement and improved sanitation, perhaps a better equivalent for the investment in house building is now shown than at any time ever before.

Illustrated herewith is something in the way of a dwelling structure that is particularly interesting in that, while it is of frame construction and planned for two families, the exterior design would readily permit of its being reproduced in brick and stone or cement stucco, as a residence of the detached type.

Its characteristic exterior features are a low projecting roof with corbelled eaves, effectively designed dormers, and an inviting veranda of spacious dimensions. The treatment in general shows a strong modern influence and a pleasing deviation from the ordinary run of semi-detached or two family dwellings.

The clapboards are of rough sawed pine, laid on matched hemlock, and stained brown, a color which, with the white painted doors and windows and the mottled

(*Continued on page 69.*)

THE EARL GREY SCHOOL, MONTREAL.---One of the Two New Structures Erected for the Protestant School Board.---Exterior Lines Simple and Dignified.---Contains Nine Class Rooms, with Wide Corridors and Five Entrances.---Fire-proof in Construction. ∴ ∴

THE DEMAND for greater class room facilities and more modernly constructed school buildings in Montreal, has recently resulted in the erection of two handsome substantial structures for the Protestant Board of School Commissioners of that city. One of these is the Earl Grey School, Amherst street, St. Denis Ward, and the other is the Sarah Maxwell School, Prefontaine street, Hochelaga Ward. Both buildings are identical in plan and design, and both are representative of Canadian architectural ability. These buildings have a frontage of 100 feet, by a depth of 70 feet, and are two storeys and basement in height, each containing nine class rooms, with play rooms and assembly halls in the basement.

In construction, they are fireproof throughout, being built of stone, brick and steel, with terra cotta and cement partitions and floors.

As regards plumbing, the lavatories are fitted with the latest improved porcelain urinals and "Naturo" self-flushing closet.

From the exterior view and floor plans of the Earl Grey School shown in the accompanying illustration, a comprehensive idea as to the general character and lay-out of both buildings is obtained.

The architectural treatment, worked out in an agreeable color scheme of red brick and light grey stone, has produced a building which fittingly bespeaks its purpose in simple lines and dignified proportions. Its breadth of character is accentuated by a simple dentiled cornice at the base of the low running parapet, and the whole tone is strengthened by the judiciously detailed stone work at the top of the pilasters. The centre of the building is recessed at both the front and the rear, while in the parapet over the main entrance is a vigorously sculptured

THE EARL GREY SCHOOL, MONTREAL, SHOWING THE DETAIL OF CORNICE AND STONE WORK. DESIGNED BY ARCHITECT A. F. DUNLOP, R.C.A., I.A.C.

Every care has been taken to have the interior arranged along the most hygienic and safe lines. The corridors are wide and well lighted and ventilated, the stairways are fireproof and have been advantageously placed, only one turn is necessary in either going to or coming from the second floor, and there are five well located entrances or exits on the ground floor, with all doors opening outward.

The heating and ventilation is along the most modern and approved lines. Twin hot water boilers furnish direct heat to all parts of the building, while a steam boiler entirely separate from the heating apparatus, is used for ventilating purposes. The fresh air is tempered by a steam coil and distributed throughout the building by fans driven by electric motors, the foul air being expelled at regular intervals by the same means.

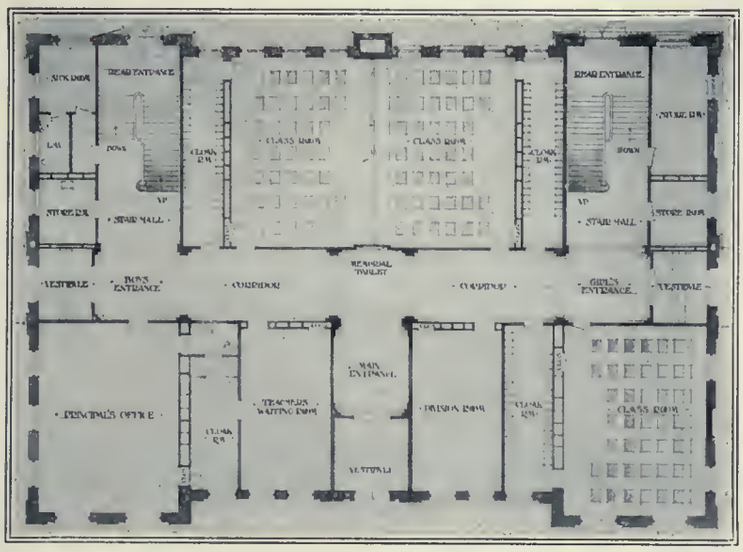
piece of stone work having a plain centre on which is carved the name of the school.

The interior lay-out has been particularly well worked out, especially so in the corridor and stair hall arrangement. The stairways have been advantageously placed on either side of the class rooms at the centre in the rear, in juxtaposition with the two side and rear entrances which permits of the emptying of the class rooms in case of emergency, in an expeditious and satisfactory manner.

Three class roms are located on the ground floor, while the balance of the space is taken up with the principal's office, teachers' accommodations, sick-room and storage facilities. The principal's office is in the left-hand wing, to the front of the building, and the teachers waiting room and division room, are on either side of the main entrance.

The rear portion of the building at the outer extremes of the stair halls on both floors is utilized advantageously for store-rooms, sick-rooms and lavatory purposes, while the intervening space between the main rooms is well employed for use as wardrobes.

The second floor is similar in layout to that of the first, with the exception of three additional class rooms which occupy the front portion, and a map room which



GROUND FLOOR PLAN, EARL GREY SCHOOL, MONTREAL, SHOWING THE LOCATION OF THE FIVE ENTRANCES, PRINCIPAL ROOM, AND TEACHERS' QUARTERS. A. F. DUNLOP, R.C.A., I.A.C., ARCHITECT.

takes up the narrow space between the centre class room at the front and the cloak room to its right.

All seats in the different class rooms are arranged so that light is diffused from windows placed on left-hand side of the scholars. At the rear, in the centre of the building, and opening off both class rooms is an iron balcony and stairway for use in event of an emergency.

Both the Earl Grey School and the Sarah Maxwell School were erected after plans by, and under the supervision of Architect A. F. Dunlop, R.C.A., I.A.C. They stand on spacious grounds, and have been so planned as to permit of future extension without detracting from their design or arrangement.

A MODERN TWO-FAMILY DWELLING ---Continued from Page 67.

green stain of the shingle roof, combines to make the exterior exceedingly striking and pleasing in appearance.

At each end of the house, above the clapboards which extend up to a line on a level with the roof of the porch, the wall is finished with stucco panels of a buff tone and timber work stained a dark green, in harmony with the shingle ends of the gables. This treatment is further enhanced by small but effective windows which have been well placed.

The interior of the house is laid out in a simple and direct manner, both parts of the house being identical in plan. On the first floor the living room, dining room, pantry and kitchen, take up in the most available manner, the limited floor space. All walls and ceilings are of two coat plaster smoothly surfaced, and the woodwork is painted white with an enamelled finish. In the living room is a large red brick fireplace, which affords a nook for a cosy corner on either side, while connecting this room with the dining room is a large square arch opening.

At the back of the dining room is the stairway leading to the second floor, and immediately underneath are the steps by which the basement is reached. A short passage connects the dining room with the pantry, directly off which is the kitchen with a back porch opening onto the garden at the rear.

Upstairs the arrangement of the rooms is also economically worked out. There are two good sized bedrooms with built-in closets (the room to the front having an alcove formed by the dormer projection), a bathroom, and a den. The two last rooms are situated at the rear of the stairway, immediately over the kitchen.

This house, which is the property of Dr. J. W. Rowan, Toronto, cost complete, with the exception of the furnaces, which were $148 extra, $2,650. It was designed by Architect Chas. F. Wagner, Toronto, and is located at Balmy Beach, near the foot of Balsam Ave. The cost as apportioned according to each branch of the work, was as follows:

Brick work	$ 350
Carpenter work	1,458
Galvanized iron and plumbing	432
Plastering	310
Painting	100

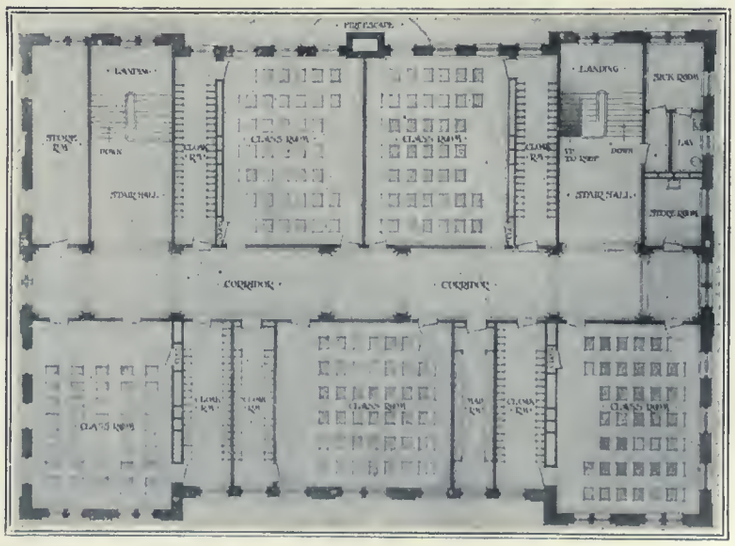
NEW BARTHELMES BUILDING.---Continued from Page 60.

load equivalent to three times the maximum live load, which they will at any time be called upon to carry without the slightest signs of injury in any shape.

It is claimed that the advantages of this type of construction are increased head room, a maximum degree of interior lighting and economy in construction.

The Barthelmes building was designed by and erected under the supervision of Clarke & Monds, engineers and contractors, 36 Toronto Street, Toronto.

ARCHITECT JOSEPH VENNE, Montreal, will remove May 1st from his present address, 402 Plessis, to



SECOND FLOOR PLAN, EARL GREY SCHOOL, MONTREAL, SHOWING THE LOCATION OF THE UPPER CLASS ROOMS, CLOAK ROOMS AND STORE ROOMS. A. F. DUNLOP, R.C.A., I.A.C., ARCHITECT.

No. 5 Beaver Hall Square, where he has engaged a suite of offices. Mr. Venne will be pleased to receive manufacturer's catalogues and samples at his new address.

DESIGN AND TESTING OF REINFORCED CONCRETE BEAMS.---Relation of Theory and Practice in Reinforced Concrete Construction.---Simple Method of Calculation Most Practicable.---Interesting Paper Delivered Before C.C.C.A. Convention by Mr. E. Brown, Associate Professor of Applied Mechanics, McGill University.

THE REMARKABLE and rapid development in the applications of reinforced concrete construction in recent years has, I venture to say, been the most striking feature of the ever widening field of operations of the engineer. There is scarcely any branch of construction work in which the use of concrete in one form or another does not play an important part; and to realize the enormous developments which have taken place we have only to look around as we pass through the business streets of our cities, visit our factory districts, our harbours and the places where the commerce of the country is carried on. Buildings and bridges of all sizes, and concrete arches of considerable span have been erected, and much attention has been devoted to the question of producing an attractive form and finish to the exterior of building surfaces. Our water power resources are developed by the use of reinforced concrete dams, our water supplies are brought to our cities in concrete conduits, and possibly the only field of engineering activity into which this form of construction has not yet entered is that of the navigation of the air.

This convention of cement and concrete users, and the excellent exhibition of appliances and materials used in concrete construction, form in themselves a remarkable testimony to the rapidity with which work of this class has established itself as a marked feature in the development of the trade and commerce of this Dominion; and it would be a very difficult task, and one quite beyond my powers, to attempt to estimate the extent of the financial interests which in one form or another are bound up with the trades represented in your exhibition. So rapid has been the development both in the magnitude of actual undertakings and in the variety in their utility, that at the present time reinforced concrete constructors can point to an amazingly large accumulation of evidence of progress of a character which cannot be gainsaid; and the former attitude of criticism, or perhaps I should say of very qualified approbation of many engineers, eminently successful in older forms of construction, has given place to one of admiration and congratulation on what has been done. Personally I am a staunch believer in the adaptability of reinforced concrete construction to the engineering problems of the day; but I hold just as strongly the belief that having passed through an era of unparalleled development in the use of this form of construction, it is desirable to take stock of our position, and to try to realize what is the situation in which we find ourselves as the outcome of our varied construction experiences in actual work, and our experimental tests of a more or less refined character. Hence it is that I am speaking to-day on the design and testing of reinforced concrete beams.

A correct understanding of the theory of the strength of beams should form the most important part of any course of study which is intended to place a student in possession of sound fundamental ideas with which he may attack problems on the strength of materials arising in the every day experience of the engineer. It was not very surprising, therefore, that as reinforced concrete construction came to be an increasingly important factor in engineering work, our knowledge of its properties should have been developed from the results of tests on reinforced beams. The enthusiasm of the actual constructor was only equalled by the zeal of the experimentalist, and the output of formulæ dealing with the question was of dimensions quite in keeping with that of actual construction work achieved. The formulæ so supplied were promptly incorporated in the handbooks issued by the numerous business firms engaged in construction work, and I feel confident that in speaking before a convention of business men I shall have support in the assertion that these formulæ were of a length and complexity which had a dampening effect upon the zeal of many a man engaged in design, who, possessing only a knowledge of the elements of the strength of materials, essayed to fathom their meaning.

In the paper which I submitted to the Canadian Society of Civil Engineers in October last I expressed the strong conviction that such elaboration was both unnecessary and unjustifiable, and calculated to convey the impression that the science of reinforced concrete construction is an extremely exact one. It is certainly not more exact if as exact as, let us say, the science of bridge building, and in the latter a little reflection will show that in many instances we deliberately adopt simple methods of calculation which, while they depart a little from the more complex methods indicated by pure theoretical reasoning, represent so closely the results of practical tests *wherein the precise conditions of theory do not exist,* that their existence is doubly justified (1) on account of agreement with experimental fact, (2) on account of simplicity. For example, we are all familiar with the fact that the safe unit stresses in steel columns in general riveted work can be represented very closely by a straight line law, and that we may be able to take the safe load per square inch as say

$$\left(16000 - 70\,\frac{l}{r}\right) \text{ where } \frac{l}{r} = \frac{\text{length}}{\text{radius of gyration}}$$

of column. This is a great convenience in design, and the results of actual tests agree as closely with this simple formula as with the more elaborate formulæ representing more exactly the ideal theoretical conditions.

Again, in bridge design, the substitution of an equivalent uniform load for the regularly spaced wheel loads due to a line of freight or passenger cars, simplifies calculation enormously and gives a satisfactory design, although it does not represent actual loads. Bridge engineers are conscious of these and of other differences between the assumed and the actual conditions, but the simple and direct method of calculation is not discarded. It is in proper realization of these differences, and in the capacity of the designer to appreciate the extent of their influence, that reliance must be placed. A survey of the development of our professional work generally will show that whenever, and in so far as, it has been possible to exalt any branch of that work to the rank of a science, the progress has been due to the gradual but certain development of a few simple fundamental ideas. No better instance of this can be found than that the growth of the science of electrical engineering has been sure and steady from the day when Faraday discovered that a closed coil of wire passed across a magnetic field so as to cut the lines of force, generated an electric current which deflected a magnetic needle.

When a theory for the strength of reinforced beams was required, there was ready to hand an established theory for beams of homogeneous materials, such as steel, and this was taken as the natural starting point for the theory of reinforced beams, such modifications being made as the physical properties of the materials demanded. It was assumed that in the reinforced beam

the elongation or compression of the various layers is proportional to their distance from a neutral plane, where there is no change of length. Modification is necessary to allow for the fact that the modulus of elasticity for steel is much higher than for concrete, the values being 30 x 10.6 lbs. p. sq. in. for steel and say 3 x 10.6 lbs. p. sq. in. for good rock concrete—a ratio of 10 to 1. This means that at a layer of concrete in compression at the same distance from the neutral plane as the steel on the tension side, the compression stress intensity in the concrete would only be one-tenth of that of the tension in the steel. Actually the steel is further from neutral plane than the furthest concrete layer, but the lineer proportion holds. From this fact, along with the equality of total tension and compression, the neutral plane can be located theoretically. Sufficient steel may be put into the beam to carry all the tension, and the bending moment is then easily computed. This is the simplest and most direct analysis of the problem. It assumes a constant modulus of elasticity for concrete; it is a method which agrees closely with experimental results, and had it been pursued with undivided attention from the outset, supported as it can be by careful experiments of a suitable character, the criticisms I am about to make on the development of the elaborate formulæ with which all concrete users are familiar would have been unnecessary. It was, however, known that the modulus of elasticity of concrete in compression is a variable quantity—that the modulus for a rock concrete, for example, might be 3 x 10.6 lbs. p. sq. in. initially, diminishing to 1.5 or 2 x 10.6 lbs. p. sq. in., as the concrete reached its ultimate compressive strength. The law of variation of modulus was approximately parabolic. The engineer dearly loves a parabola. It is the one curve a college graduate remembers throughout his life. Here, then, was a factor which is absent from calculations on homogeneous beams, in which the modulus is constant through the whole range of elastic stress. Such modulus variations, amounting to perhaps 100 per cent. in a test carried to destruction were held by many (not by all) to necessitate a modification of the simple beam theory. Hence it came about that the results of many laboratory experiments were worked out by a method which, while praiseworthy in the sense that it took account of certain variations in the properties of concrete in compression, was in my judgment unwarrantable, except as a theoretical exercise in the beam theory, and unnecessary when viewed as an essential part of the computation of the safe moment of resistance of a reinforced beam.

I feel confident that many users of reinforced concrete must have turned gladly from the pages of elaborate formulæ which are incorporated both in text-books, and in the handbooks issued by the makers of patent steel bars, to the tabulated data which was added to show at a glance reasonable proportions for design. Frequently, indeed, were these tables the results, not of exact and refined calculations based on the formulæ preceding them, but rather the results of a common-sense appreciation of the utter inability of such formulæ, or indeed of any other formulæ, to express with any assigned and precise degree of accuracy the actual conditions, in a form of construction liable to variation from many sources, and into which the uncertain, but positive, effects of continuity enter to so great a degree. To illustrate this I quote from such a handbook from the paragraph preceding tables for the design of floor panels, which follows several pages of elaborate formulæ:—

FLOOR PANELS.

"The foregoing discussion applies to beams on knife edge supports. Rectangular beams when incorporated in floor panels will have just about twice the capacity given by the formula, and the following tables, I. to VI., are made on this basis.

"To give a scientific discussion of this is almost impossible. It is a matter of actual practical experience. We can, however, see that it is reasonable to expect about such an increase. The haunches built down upon the lower flange of the supporting beams give a continuous girder action such as reduces the external bending moment one-third. Also the floor in adjacent panels produces an interior arching action, increasing the area of this compressive stress diagram about one-third, the effect of the two being to double the moment of resistance."

Similar remarks are applicable in some degree to reinforced work generally. Speaking broadly, this is an attitude towards the question to be commended, although I do not for a moment suggest that in this, or indeed in any other branch of engineering science, we ought to allow ourselves to remain in ignorance of effects which can be investigated. Such effects as were in the mind of the writer of the paragraph quoted are always present, and their influence can only be estimated in a general way, sufficiently closely, perhaps, but in no case exactly. Hence, on such grounds alone, I would discard any elaboration of theory or design, which results in very slight changes in essential matters, from proportions given by the simpler methods. We may theorise as much as we like, make allowance for this little variation and for that, but in the end we are face to face with a problem which admits of no such refinement either in design or in construction, and that being so, much so-called theory is paper theory. Its character is out of agreement with the realities of the problem, the extent to which the conditions assumed in the design are realised in the actual structure is uncertain, and in many ways, analysis, whether complex, or of the simplest character, is incapable of paying due regard to many of the conditions of practice or of work prepared for laboratory test.

Considering briefly the extent of the differences, without going into details of calculation here, I may say that assuming a beam 10 in. deep and with 1 per cent. reinforcement, the modulus of elasticity of concrete being taken as 3 x 10.6 lb. sq. in., the neutral surface would be 3 ft. 6 in. from the outermost compression layer if the constant modulus theory is used. If the usual allowance is made for variations in the value of the modulus of elasticity for concrete, the neutral surface would be about 3 ft. 9 in. from the outermost compression layer under normal working conditions assumed in design. The point of action of the resultant compressive force would be

$$\frac{3.6 = 1.2''}{3}$$

from the outermost compression layer in the former case, and 0.34 x 3.9 = 1.32″ from that layer in the latter case. The resultant compression force is therefore (10-1.2) = 8.8″ above the centre line of the steel if a constant modulus be assumed, and (10-1.32) = 8.68″ above the centre line when the modulus is taken to be variable. The product of the force in the steel and 8.8″ or 8.68″ as the case may be gives the bending moment which the beam can resist. The two theories therefore show results in the ratio of $\frac{8.68}{8.8}$, i.e. they differ in the really essential feature of a design by about 1.4 per cent. The difference is variable for varying conditions, but in no case is it of a different order of magnitude from that given above. I have two main criticisms to offer on the refinement of calculation to which I have alluded:—

(1) That while it is an undoubted fact that the modulus of elasticity for concrete in compression does diminish as the intensity of compression is increased, neither the initial or final value of the modulus, nor the law of its variation, are definite for a given mixture of concrete, and that in any case the effects of its variations are small.

(2) That the conditions under which a beam is made and tested, whether in a laboratory or in the field, are

such that it is useless to attempt to prove the existence of such a small divergence between theories as is indicated (a) on the constant modulus theory, (b) on the variable modulus theory.

In support of these criticisms, I do not believe that careful experiment will establish any great uniformity of results either in the value of the modulus or in its variations, and that even if such values could be established for concrete made under ideally uniform conditions, it is doubtful whether they could be applied with confidence to concrete made in the field. Fig. I. shows the variations in the amounts of compression recorded by extensometers on the faces of rock concrete cubes, 1-2-4 mix. All these cubes showed uniform failures, and if judged by compressive strength alone would be classed as sound and consistent. The ultimate strengths ranged from 2080 to 2486 lbs. p. sq. in. (ages 28 to 56 days). The values of E range from 6 x 10.6 downwards, according to which cube is taken, and which face of that cube, for the yielding shown in opposite faces of the same cube is very different. Comparison of cubes 2 and 3 is interesting. The compressive strength was the same in each—2250 lbs. per sq. inch. The modulus for cube 2 ranged from 0.632 x 10.6 lbs. per sq. inch down and modulus for cube 3 ranged from 4.33 to 10.6 lbs. per sq. inch down. Similar differences of yielding on the compression side of similar beams attaining nearly the same ultimate strengths have been noted, and later experiments made in the McGill laboratories upon cylindrical specimens very carefully prepared, have amply confirmed such variations—four extensometers placed in different positions round the cylinder giving markedly different yielding. I believe firmly that a good rock concrete will certainly attain a compressive strength of 2000 to 2500 lbs. per sq. inch at 30 days, and that it may be used confidently at a working stress of 600 to 700 lbs. per sq. inch. But I do not believe that it is in the power of anyone to mix a concrete, and be able to say beforehand that its initial modulus will be 3 x 10.6 lbs. per

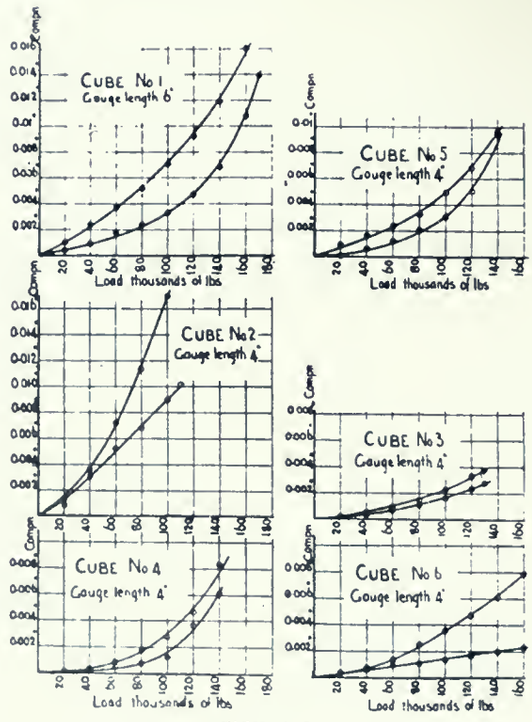


FIGURE 1.

sq. inch or any other figure, the law of variation parabolic, and the modulus at failure a predetermined value. That is to say, I do not believe that the theoretical values assigned in a variable modulus formula can even be known to exist in a beam which is being tested to prove the truth of deductions based on minute calculations, using those assigned values. The constant modulus formula likewise, does not express fully all the variable conditions of the problem, but if it is found sufficient, in expressing the results of careful experiment, and as a means of practical design, its use is in my opinion amply justified in view of all the conditions of the problem.

But granting that the concrete modulus may be variable as assumed, most experimenters have used only two extensometer measurements, one on the extreme compression side, and one on the steel centre line, and have arbitrarily drawn a straight line between the recorded strains, thus assuming the truth of the linear law of straining.

In my own experiments five extensometers were used, and the deformation curve was sometimes linear and

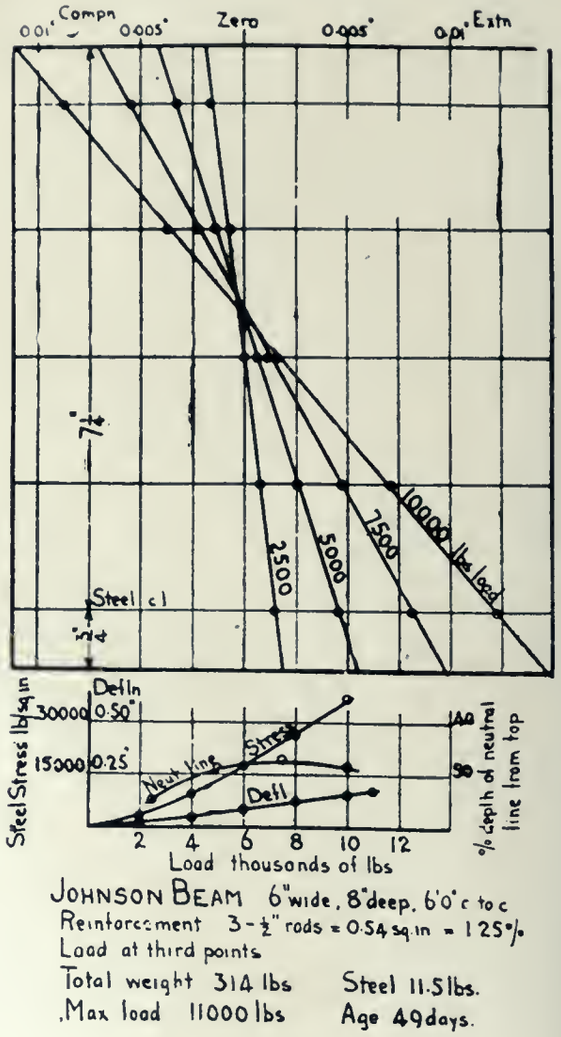


FIGURE 2.

sometimes slightly curved. Figures 2 and 3 show typical results of tests using five extensometers. In one case the strain curves are straight lines, in the other they are curved. These results show clearly that the fundamental assumption of either the constant or variable modulus theory, is not rigidly true. A straight line arbitrarily drawn between extreme points would frequently give a false location of the neutral plane differing considerably from the true one, the difference being far greater than that between the two theories we are considering. Hence the deductions from the variable modulus theory have generally been tested in an unsatisfactory manner. Quite apart from these criticisms on the minuteness of the points really involved in the elaborate formulae which have come into use, I do not think anyone familiar with reinforced concrete work would contend that it is possible to place rods in a beam to a degree of accuracy at all comparable with the small percentage

changes in design which we have considered. There are always present other conditions, whose influence on the ultimate strength is far more potent than that of variations in modulus. In fact any actual reinforced structure contains a number of elements liable to variation to a greater or lesser extent, some due to labor employed, others inherent in the materials used. The finished product, the result of the blending of these elements, is the only thing which can be tested finally. The exact posi-

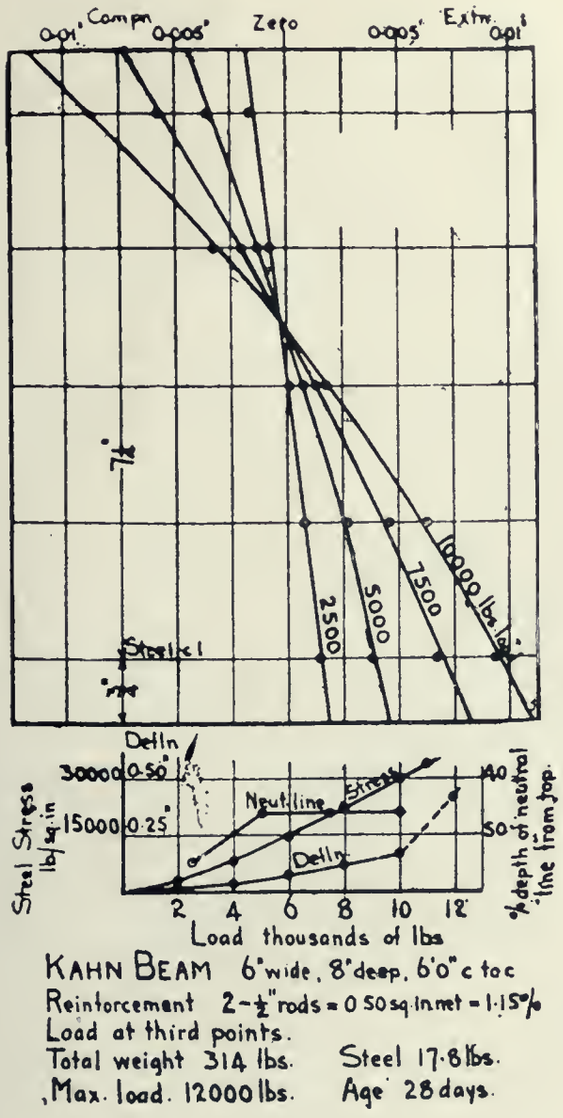


FIGURE 3.

tion of the rods, so vital to the design, cannot be known unless the beam is broken up for examination after test. Happily, concrete construction failures are few and far between in practice, and there is absolutely no means of knowing to what precise degree of accuracy the conditions of the finished work approach those of design. We can, however, feel confident that with good supervision, and by the use of sound materials, the work will be capable of performing satisfactorily the duties for which it is designed; but, in the design, simplicity of method should be the guiding principle. All attempts to introduce trivial modifications of the essential features of design as determined by simple theories which have proved satisfactory in the case of homogeneous materials, and are also capable of expressing very closely the results of actual experiments on reinforced beams, should be discouraged.

Figure 4 shows the behavior of a beam through all the stages of loading up to its ultimate capacity, and is typical of the results obtained in many other cases. Its important features may be summarized briefly:—

(1) *Percentage of load moment carried on concrete.*—Owing to the existence of tension on the concrete at the earlier stages of loading, a considerable proportion of the total load moment is carried by the concrete. At small loads this amounts to 75 per cent. of the total, while at loads of 4,000 to 8,000 lbs. i.e., over the range of possible working loads, the percentage varies from 60 to 40. As the concrete is destroyed in tension its load moment is transferred to the steel, but unless the concrete is cracked it carries a very considerable moment, and one of the main assumptions in design (a very necessary one, since concrete cannot be relied upon in tension) may be far from being actually realized.

(2) *Stress in the steel.*—If the steel is designed to carry all the tension at a stress of say 16,000 lbs. sq. in., it follows that if the concrete relieves it to the extent shown above, the steel stress will be far removed from 16,000 lbs. sq. in. For the range of load from 4,000 to 8,000 lbs. the actual steel stress varied from 4,000 to 12,000 lbs. sq. in., its value increasing rapidly as the concrete began to crack.

(3) *Position of Neutral Plane.*—If in calculating the position of the neutral plane by any theory, the existence of tension is ignored, the position obtained should correspond to that of a test at a stage of loading at which the concrete is cracked on the tension side ie., to the upper part of the curve in the figure. These conditions, however, do not exist at working loads. The curve shows that the neutral plane is very much lower at small loads than at loads which crack the beam; and over the range of working loads, the initial and final positions of the neutral plane are connected by a sloping curve. The load moment on the concrete for very small loads has

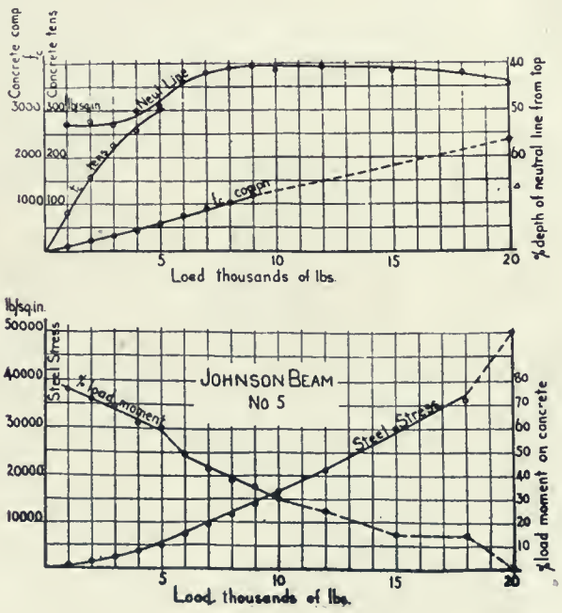


FIGURE 4.

been shown to be a large percentage of the total moment, but when the concrete is cracked the percentage is small. For the small loads the position of the neutral plane is determined largely by the tension on the concrete, while for large loads it is determined by the tension on the steel. Under working loads it would be impossible to say precisely what is the exact influence of each of these tensions. All we can know is that the neutral plane will probably be *somewhere* between the extreme positions as indicated above. These extreme values agree well with calculations which allow for or neglect concrete tension. In view of the uncertainty as to the precise proportion of load moment carried by the

concrete under actual conditions, which proportion would determine the location of the neutral plane, I do not see any justification for elaboration of circulation which results in changing the theoretical position of the neutral plane by perhaps 2 per cent. from its location as determined by simple theory.

It is interesting to note a gradually increasing tensile stress in the concrete up to 300 lbs. sq. in. at 5,000 lb. load. The first observed crack was at 6,000 lbs. and it will be seen that between these loads there is a decided break in the curve showing the percentage of load moment actually carried by the concrete, this break indicating a transference of tension from concrete to steel.

I may add that the results check in a remarkable way. The conditions at 5,000 lbs. load, for example, can be taken, when concrete tension exists to a great extent, and this tension can be regarded as being transferred entirely to the steel by the time the load reaches 20,000 lbs. The neutral line has moved meanwhile, but allowance is easily made for that, and for the increased steel stress due to the increased load. Adding these steel forces to that present at 5,000 lb. load, there results a steel stress of 47,400 lbs. per sq. inch. Extensometer readings on the steel line gave 50,000 lbs. per sq. in., a value rather higher than the yield point of the bars, which was about 45,500 lbs. per sq. inch. (Average of several tests.)

I will only say in conclusion, that in every calculation into which the modulus of elasticity of the concrete enters, very little change will be introduced into a design whether its value be taken to be 4x10.6 lbs. per sq. inch or 2 x 10.6 lbs. per sq. inch. There are always present other conditions such as I have shown in the last figure, none of which impair the safety of design, but which waste completely the small effects of modulus change. We may design for 16,000 lbs. per sq. inch on the steel, neglect concrete tension, and figure that the neutral line is 40 per cent. of the depth of the beam from the top. In reality the steel stress may be 8,000 or 10,000 lbs. per sq. inch, the concrete tension sufficient to carry 40 per cent. of the load, and the neutral line anywhere at all between 40 per cent. and 50 per cent. of the depth of the beam from the top. Let us recognize these hard facts, rid our text books and our design tables of formulae which in their apparent minute accuracy bear every mark of being applicable to predictions of the motion of a solar system or to some other branch of exact physics, rather than to such a problem as the design of reinforced concrete.

IDEAL SCHOOL CONSTRUCTION.---Provides for Future Additions.---Methods Followed in Chicago.

DWIGHT PERKINS, a prominent Chicago architect, recently addressed the Woman's Club of Minneapolis, on the all-important topic of school building construction, outlining the methods followed in Chicago. In all of the new buildings in Chicago the original plans contemplate the addition of more rooms, and the preservation of symmetry even though the building becomes eventually twice its original size, is thus attained.

No new buildings are going up that do not contain provision for an assembly room, gymnasium, domestic science and manual training rooms. Mr. Perkins stated that the Chicago board is no longer building basement rooms. A four-story building is regarded as preferable.

The assembly rooms of the newest buildings are on the ground floor and have an entrance through which the public can gain admission without any interference with school routine, and this feature makes them valuable for neighborhood meetings. Manual training rooms and domestic science rooms are provided for on the top floor in each of the newer buildings and toilet rooms are located on every floor instead of in the basement. Public library reading stations are the latest feature in the schools of Chicago, and they have come to represent a most important adjunct to scholastic work.

The ideal classroom as described by Mr. Perkins, according to the IMPROVEMENT BULLETIN, measures 26½ feet by 33 feet, and there should not be more than 40 pupils in it. There should be one-fourth as many square feet of glass for lighting the room as there are square feet in the floor, and there should be never less than 1,500 cubic feet of fresh air per pupil. The ideal school room floor had not yet been discovered in experiments made in Chicago, but it should be such that a hose could be turned on it to clean it and should be otherwise utilitarian.

The unilateral system of lighting is in use in all the new schools. It provides for the source of light coming either from the west or the east except in rooms specially equipped for drawing purposes, where the light is brought into the room from the north side. As the buildings are now being constructed, they stand the city of Chicago a cost of $11,000 per room on the contract for 20-room schools, and about $4,000 per room for equipment and completion. The cloak rooms in the new buildings are all located in the rear of the school rooms and are separated from the classroom by partitions, sliding vertically and provided with blackboards on the inner side. The cloaks of the children are not hung against the wall, but about 12 inches from the wall and from one another. Ventilation is maintained in the cloak rooms, the air being completely changed every ten minutes by the system in use, thereby lessening the chance of contagion by the circulation of the air and facilitating the drying of wet garments.

AN "ABSOLUTELY" FIRE-PROOF BUILDING.

NEW YORK CITY is now attempting the construction of an absolutely fireproof building, the work being in charge of the George A. Fuller Company, the structure having been designed by Architects Goldwin, Starrett & Van Vleck. One of the features of the new building, which will be a 17-story mercantile and office structure, now in course of construction at the corner of Fourth avenue and Seventeenth street, is the fire-resisting qualities of the particular type of construction employed. The idea is to reduce the fire risk to a minimum and meet to the fullest extent the requirements of the New York Board of Fire Underwriters and the New York Fire Insurance Exchange. This has been secured through the adoption of the skeleton steel frame type; that is, making use of steel columns, beams and girders, protected for all basement and outside columns in Portland cement mortar and for all interior columns by at least three inches of hollow terra cotta blocks laid in Portland cement mortar. The floor arches throughout are of hollow terra cotta blocks in Portland cement mortar, extending 10 inches below the soffit of the beams and all floors cement finished on a concrete filling.

The window sashes in the court walls and party walls will be of standard hollow metal type, glazed with wire plate glass, and the windows on the street fronts will be of Kalameined metal covered frames and sash. The stairways are to be constructed with extra heavy cast iron stringers and risers with sheet iron treads. All doors leading into stairways will be of the standard type with hinges, locks, etc., approved by the New York Fire Insurance Exchange.

The elevator shafts will be of standard construction inclosed in 6-inch terra cotta block partitions. A complete 50 per cent. sprinkler equipment with all necessary apparatus will be installed, the sprinkler pipes throughout the building being concealed. An automatic fire alarm service, a special building signal service and the watchman's clock system in each stair landing on every floor of the building are other features to be incorporated, looking to the protection of the structure against destruction by fire.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—The T. Eaton Company, Limited, will build a twelve-storey factory on Trinity Square, near Louisa street, at a cost of a quarter of a million dollars. Application has been made for a building permit.

Toronto.—Architect F. H. Herbert, 65 Adelaide street east, has prepared plans for a three-storey 32 by 120 foot factory to be erected on Clifford street for the Kindel Bed Co., Church street. It will be of mill construction, with brick walls and concrete foundation. An electric freight elevator and a sprinkler system will be installed.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for a two-storey planing mill to be erected on Osler avenue, near Royce avenue, for the Watt Milling Company. The building will be of brick construction, with concrete foundation, felt and gravel roof, pine floors, open plumbing, steam heating, combination lighting, skylights, electric bells, power and equipment. The structure will cost $20,000.

Toronto.—The building and contents of William Keating, at the rear of 237 Lansdowne avenue, have been damaged by fire to the extent of approximately $17,000. The machinery, which was valued at about $8,000, has been practically destroyed. Insurance carried, $11,000. The damages will be repaired at once.

Berlin, Ont.—Plans have been prepared for the new Ahrens Shoe Factory to be erected on Michael street within a short time. The building will be 114 feet in depth, exclusive of boiler room, which will be about 30 by 20 feet. Additional machinery will be installed.

Berlin, Ont.—Witte Bros & Co., 50-58 Columbia street, Newark, N.J., will erect a 30 by 70 foot concrete factory here at the corner of Shoemaker avenue and Mill street. The work of construction will not be commenced until March, 1910.

Hamilton, Ont.—Architect Herbert H. New, 600 Spectator Building, has prepared plans for a canning factory and office building to be erected in East Hamilton for Messrs. Wagstaffe, Limited. The building will be of mill construction, 137 by 97 feet, with tar and gravel roof, pine interior finish. A freight elevator will be installed. Estimated cost of structure, $15,000.

Welland, Ont.—Mr. A. E. Fultz, of Lancaster, Ohio, is contemplating the erection of a window glass plant at this place. The factory would employ one hundred men.

Welland, Ont.—A Company to be known as the Welland Stove Works has been incorporated, with authorized capital of $40,000, for the purpose of locating a plant on the G.T.R. and Wabash tracks, south of the Billings-Spencer tool works. The Company has been organized by Mr. Telford; the provisional directors are: E. A. Playfair, Buffalo; W. S. Davis, Ann Arbor, Mich.; B. J. McCormick, H. A. Rose, Sr., and Hugh Rose.

Welland, Ont.—The Page-Hershey Company, Limited, has awarded to the Berlin Construction Company, of Berlin, Conn., the contract for the erection of large mills to be used in the manufacture of water and gas pipe.

Sarnia, Ont.—The Williams Organ Company, Chicago, proposes to establish a plant at this place.

Campbellford, Ont.—The Trent Valley Woollen Mills, of which Mr. S. J. Moore is manager, have asked the town council for a fixed assessment of $50,000 for twenty years on their mill and property. The company proposes to erect a 78 by 178 foot addition to their plant, to employ 70 additional men.

London, Ont.—The Dennis Wire and Iron Works, London, have taken out a permit for the erection of a two-storey brick building on Dundas street.

Orillia, Ont.—The E. Long Manufacturing Company have made application to the Town Council for a free site and other concessions, in return for which they agree to build a new foundry, increase their present capacity fifty per cent., and make provision for boiler shop, steel foundry, etc., at a cost of $30,000.

Shedden, Ont.—Mr. J. G. Stormes has purchased a site on the Union Road, on which he will erect a carriage factory. The work of construction will be commenced at once.

Montreal.—The plants of the Consolidated Lithographing and Manufacturing Company and the Union Card and Paper Company have been badly damaged by fire. Loss to building, machinery and stock about $30,000.

Montreal.—Mr. J. H. Hutchison, contractor, Bourget and Ambroise streets, has been awarded the contract for the additions to the Molson's Brewery, Notre Dame street east.

Montreal.—Architect W. E. Doran, 180 St. James street, has awarded to Shearer, Brown & Wills, 225 St. Patrick street, the contract for the additions to the Montreal Stock Yards.

Winnipeg, Man.—The premises of the Stuart Machinery Company have been damaged to the extent of $25,000. President of the Company, R. MacGregor, Galt. Loss fully covered by insurance.

Winnipeg, Man.—Mr. W. R. Milton will erect a large addition to his bakery on Nena street.

Winnipeg, Man.—The Manitoba Iron Works will erect an addition to their plant to cost approximately $50,000.

Winnipeg, Man.—The Dominion Bridge Company, with headquarters at Montreal, will erect a large addition to their plant on Notre Dame west, Winnipeg, and install a plant to treble the present output. Estimated expenditure in increased equipment to plant and stock, approximately $100,000. Mr. E. E. Sheppard is local manager for the company.

Minnedosa, Man.—The flour and grist mill, owned by Mr. P. J. McDermott, and leased by Mr. J. A. McIntyre, has been practically destroyed by fire. Loss $10,000, partly covered by insurance.

Vancouver, B.C.—It is understood that Mr. Jas. A. Moore, of the Moore Iron Works, near Port Townsend, Wash., is negotiating for a site in Vancouver, on which to locate iron works and possibly a steel plant. The investment planned calls for an initial expenditure of at least half a million dollars.

Vancouver, B.C.—The Vancouver Engineering Works will erect a $7,000 steel frame foundry on the C.P.R. reserve at the foot of Ash street.

Vancouver, B.C.—The Saskatchewan Flour Mills Co., Ltd., plan the erection of a large mill in Vancouver. The company has a mill at Moose Jaw, and will establish mills at various points in Alberta and Saskatchewan. Mr. F. A. Bean, of New Prague, Minn., is President of the Company.

Vancouver, B.C.—A Company of local capitalists have secured a site near Hoggan's wharf, Nanaimo, on which they will construct a plant for the manufacture of briquette. Mr. A. C. Flumerfelt, Vancouver, is one of the parties interested.

New Westminster, B.C.—Mr. C. W. Beach and associates have purchased a tract of land on Lulu Island for the purpose of erecting a shingle mill.

Saskatoon, Sask.—Messrs. Currie Bros. will erect a two-storey addition to their plant at this place.

Gas Plants, Elevators and Warehouses

Hamilton, Ont.—The Crescent Oil Company will erect a 100 by 60 foot storehouse in the north-west section of the city.

Ottawa, Ont.—The property at 300-306 Sparks street has been purchased by Graham Bros., florists, who will erect on this property a large seed storehouse.

Montreal.—Architect Joseph Perreault, 17 Place d'Armes Hill, has awarded the following contracts for the Campbell Manufacturing Company's new warehouse in Ville St. Louis: Carpentry, cast iron, wrought iron and hardware, Carriere & Frere Co., Ltd., 479 Laurier avenue; painting and glazing, Lynch & Sharpe, Ville St. Louis.

Halifax, N.S.—The Acadia Cold Storage Company has been organized for the purpose of building a $500,000 cold storage plant at Halifax. The Company will install its own electrical equipment, and the best modern appliances will be provided for every part of the plant.

Winnipeg, Man.—The Williams Machinery Company, Notre Dame east, have had plans prepared for a four-storey warehouse to be erected on Princess street, near Logan avenue, at a cost of $40,000. It will be of brick and reinforced construction, and the foundations will be built to sustain six stories. John D. Atchison is the architect.

Winnipeg, Man.—The T. Eaton Company have taken out a permit for a new warehouse to be erected at the corner of Hargrav and Graham. It will be four storeys in height, of brick construction, and will cost $60,000. Mr. Geo. Thompson, of Toronto, is the contractor.

Winnipeg, Man.—The Atlas Elevator Company will erect ten large elevators along the line of the Grand Trunk Pacific this summer.

Willow Range, Man.—The Ogilvie grain elevator at this place has been totally destroyed by fire. Loss estimated at approximately $20,000.

Vancouver, B.C.—It is stated that Sir Thomas Shaughnessy, of the C.P.R., is negotiating with Mr. Thomas Henshaw, Vancouver, for a site on which to erect a large grain elevator.

Eburne, B.C.—Mr. J. C. White, of Duluth, has purchased a cite of 400 feet on the water frontage here, on which he purposes erecting a large elevator in the near future.

Saskatoon, Sask.—The City Council has granted the request of the International Harvester Company for spur tracks to their proposed new warehouse. Manager Potter states that contract will be let at once for the building, which will be 90 by 135 feet, four storeys and basement in height, of either brick or concrete construction.

Moose Jaw, Sask.—Messrs. Mitetrell, Hembroff and Maybee will erect a warehouse in the immediate future.

Toronto.—Architects Gordon & Helliwell, Confederation Life Building, have prepared plans for a warehouse to be built at 55 Bay street for A. A. Allen & Co. at a cost of $40,000. The building will be of brick and concrete construction, with open plumbing, electric lighting, steam heating, fire escapes, passenger and freight elevators, skylights, fireproof doors and windows and metal cornices.

Toronto.—Henry Needham, 335 Crawford street, has the contract for a $40,000 three-storey brick warehouse to be built at 94-100 Richmond street west. Owner, C. S. Hoane, 57 Bloor street east. Chadwick & Heckett, 20 Toronto street, are the architects.

Toronto.—The Crown Coal Company's elevator at the foot of West Market street, has been damaged by fire to the extent of approximately $20,000.

Bridges, Wharves and Subways

Toronto.—Messrs. Farrell & McCarthy, 28 Olive avenue, have been awarded the general contract for a $5,000 trestle bridge to be erected on Yonge street, Glen Grove, near Toronto, for the Dovercourt Land Company, 24 Adelaide street east. The bridge will be of wood, on concrete. Engineer, W. S. Brooks, 24 Adelaide street east.

Toronto.—On May 8th a by-law will be submitted to the ratepayers for the purpose of authorizing the expenditure of $700,000 for the proposed sea wall.

McGillivray, Ont.—Tenders, addressed to the undersigned, will be received up to noon, May 15th, for: (1) Construction of two concrete abutments on site of the Beaudette bridge, and two reinforced concrete abutments on the site of the Island bridge, including also the complete removal of th old bridges and foundations, all necessary excavations, piling and cofferdaming, if any requisite and supply of all material; (2) All work and material necessary for erection and completion upon above mentioned abutments, of steel rivets, Warren Truss bridge spans, having clear roadway of 14 feet, concrete flooring and pine railing, etc. Geo. H. MacGillivray, MacGillivray's Bridge, Ont., Township Clerk.

St. Andrew's, Ont.—The Canadian Pacific Railway will build a new wharf at this place, construction to be commenced at once. The wharf will be 200 feet in length, and will cost $20,000. William Downie, General Superintendent.

Peterboro, Ont.—A by-law has been passed by the ratepayers providing for the expenditure of $120,000 for the construction of a waterworks concrete dam.

Montreal.—Plans have been completed for the new wharf to be built by the Harbor Commissioners at Longue Pointe, and have been forwarded to Ottawa for the consideration of the Department of Marine and Fisheries, and approval of the Governor-in-Council. The wharf will be built of concrete and will be 450 feet in length.

Vancouver, B.C.—A by-law will be submitted to the ratepayers for the purpose of deciding on a high level or a high and low level bridge, to replace the Cambie street bridge.

Vancouver, B.C.—The C. P. R. officials have under consideration plans for the construction of another jetty wharf, to be built out into the inlet from the eastern end of No. 2 shed.

Prince Rupert, B.C.—Tenders, addressed to the Minister of Public Works, Victoria, B.C., will be received up to noon, April 27th, for the erection and completion of a reinforced concrete wharf, with timber superstructure, at Prince Rupert, B.C. (1) For wharf complete inclusive of slips; (2) For wharf complete exclusive of slips. Plans and specifications may be seen at the offices of the Government Agent, Prince Rupert; the Government Agent, New Westminster; the Provincial Timber Inspector, Vancouver, and at the Public Works Department, Victoria. Edward Mohun, Assistant Engineer, Public Works Department, Victoria, B.C.

Prince Rupert, B.C.—The Provincial Government will in all probability construct a public wharf here, to be located on Section F of the waterfront, held by the Government. It is proposed to build a wharf on cement piles, at an estimated expenditure of $60,000.

Strathcona, Alta.—Plans have been prepared by City Architect McLean for the proposed bridge over Mill Creek, at the end of Whyte avenue. Estimated cost of structure, $5,000.

Edmonton, Alta.—The city of Edmonton has been negotiating with the C.P.R. in regard to the construction of a traffic deck in connection with their proposed high level bridge, but as nothing has been done with reference to this, the cities of Strathcona and Edmonton propose to erect a bridge costing from $258,000 to $500,000, according to whether the structure is of steel or wood.

Waterworks, Sewers and Canals

Toronto.—The Board of ontrol has awarded to the Godson Contracting Co., Manning Chambers, the contract for the construction of the first section of the trunk sewer at a contract price of $138,528, this sum including $10,000 for the cost of the vitrified brick invert.

Ottawa.—The Dominion Government has awarded to the Wm. Hamilton Co., Peterboro, the contract for supplying the operation machinery, pivots and anchorages for twenty-four locks on the Trent Canal. Contract price, $80,000.

Ottawa.—Messrs. Kirby and Stewart, of Ottawa, have been awarded contract by the Public Works Department for the construction of the dam at the foot of Lake Temiskaming. Contract price approximately $108,000.

Stratford, Ont.—Engineer Ferguson will submit to the City Council a detailed plan of the proposed sewage disposal works, with estimate of cost of same.

Winnipeg, Man.—The City of Winnipeg and the Grand Trunk Pacific will contruct a joint sewer along Kairn avenue to the Red River at a cost of $20,000.

Vancouver, B.C.—The Board of Works has passed the report of the engineer, recommending the construction of a 24-inch storm sewer on Burrard street, from Georgia to the lane south of Alberni and a 20-inch sewer from the lane south of Alberni to the south side of Robson. Established cost $4,800. Also an extension of the sewer on Napier street to Lakewood drive, at cost of $2,150.

Estevan, Sask.—The following by-laws have been passed by the local ratepayers: $30,000 for new waterworks system; $10,000 for the building of a town hall; and $10,000 for a trunk sewer.

Medicine Hat, Alta.—The town council will expend the sum of $55,000 on the construction of sewers, and a similar amount on gas and water mains.

Edmonton, Alta.—The City Council has awarded to the Edmonton Heating and Plumbing Company the contract for the supply of 77,000 feet ot sewer pipe. Contract price, $32,161.

Edmonton, Alta.—The Council proposes constructing sewers on sections of the following streets, viz.: Lane between 6th and 7th streets; lane between 7th and 8th streets; lane between 8th and 9th streets; lane between 15th and 16th streets; Mackenzie avenue; Stoney Plain road; lane between St. James and Edward streets; lane between York and Sinclair streets; lane between Sinclair and Kirkness streets; lane between Kirkness and Carey streets; lane between Carey and Kennedy streets; Pine avenue; Kirkness street; lane between Notre Dame and St. James street.

Railway Construction

Toronto, Ont.—The Temiskaming and Northern Ontario Railway Commission has awarded the following contracts, viz.; Roundhouse, machine shop, locomotive foreman's office, coal chute and trestle and reinforced concrete arch culverts, at mile-posts 218, 221 and 222 to the Forest City Paving and Construction Company, London. Installation of heating system in roundhouse and machine shop to Sheldons, Limited, of Galt.

Ottawa, Ont.—The Government has accepted the tender of Haney, Quinlan & Robertson, 10 King street west, Toronto, for the construction of the National Transcontinental terminal shops at St. Boniface, Man. Contract price, $869,000.

Guelph, Ont.—The Railway Commission has issued an order that the G. T. R. erect a new station at this place.

St. Thomas, Ont.—The Michigan Central Railway Company has had plans prepared for improvements and extensions to its local yards, depot, shop and other facilities.

Quebec, Que.—A commission composed of Hon. S. H. Parent, president; Messrs. McIsaac, Young and Reid, members of the Transcontinental Railway Commission, and Mr. Lumsden, chief engineer, is negotiating with the city for the purchase of the Champlain Market property, on which to erect the Union Station, to accommodate all railways coming to Quebec, after the completion of the Quebec bridge. Providing the site is secured the work of construction may be commenced immediately.

Winnipeg, Man.—The Aikenhead Hardware, Limited, have been awarded the contract for hardware for the new Union Depot of the Canadian Northern Railway Company, at this place.

Westminster Junction, B.C.—It is reported that the Canadian Pacific Railway will in the immediate future erect large and modernly equipped car-building shops at Westminster Junction, about twenty miles from Vancouver.

Port Haney, B.C.—The C. P. R. has made an appropriation for a new station building to be erected at this place.

Frank, Alta.—It is announced by the C. P. R. that it will build a large freight house here in the near future. Plans for the building have been prepared.

Indian Head, Sask.—The Canadian Pacific Railway will erect a new $10,000 station on the site opposite the Bishop's Court. The building will be of stone and brick construction.

Saskatoon, Sask.—Mr. M. H. McLeod, general manager of the Canadian Northern Railway, states that the company will erect a station here at once.

Public Buildings

Toronto.—The plans and specifications of the Transportation Building, to be erected at the Exhibition grounds, have been submitted to the City Architect by Mr. Geo. Gouinlock, the architect. Estimated cost of building, $89,000.

Toronto—The City Council has decided on a site at the corner of Broadview avenue and Gerrard street, for the erection of the new branch library building.

Windsor, Ont.—The Property Committee has awarded the following contracts for the addition to the market building. Carpentry, John Thornton & Son; plumbing, Henry Meadows; painting, W. Laosser; iron and roofing, and concrete piers and walks, John Thornton & Son.

Hamilton, Ont.—Plans for a County Registry Office, to be used jointly by the County of Wentworth and City of Hamilton, and also plans for remodelling the present building, have been prepared. J. W. Jardine, County Clerk, Hamilton.

Hamilton, Ont.—Mr. Andrew Carnegie has offered to make a grant of $75,000 for the erection of a new library at this place.

Ridgetown, Ont.—Mr. W. E. Best, of Thamesville, Ont., has been awarded the contract for the erection of the new township hall at this plahe. The building will be two stories in height and of cement block construction, and cost $3,467.

Collingwood, Ont.—Architect P. C. Palin, has prepared plans for the proposed new Agricultural Buildings, to be erected in the town park, at a cost of $10,000. The buildings will be of steel, brick and cement construction.

Montreal.—The Dominion Government has taken out a permit for a new post office to be erected in Point St. Charles, at a cost of $32,000.

Montreal.—New public bath houses will be erected in St. Denis and Papineau wards this year.

Montreal.—It is stated that the Government will expropriate the entire block adjoining the Court House for the purpose of enlarging the latter.

Woodstock, N.B.—Architect F. Neil Brodie, St. John, N.B., will receive tenders after April 15th, for a $30,000 Court House to be erected at Woodstock, N.B. The building will be two stories in height, with brick and stone construction, with concrete foundation, hot water heating, electric lighting, slate roof, plaster interior finish, open plumbing.

New Westminster, B.C.—Tenders will be received by the Minister of Public Works, at Victoria, up to and including April 26th, for the erection and completion of a Land Registry Office at New Westminster, B. C. Specifications and forms of contract may be seen at the office of the Public Works Engineer, Victoria, B.C.; at the office of the Government Agent, New Westminster; and at the office of the Provincial Timber Inspector, Vancouver. F. C. Gamble, Public Works Engineer, Department of Public Works, Victoria, B.C.

Vermilion, Alta.—The Provincial estimates provide for the purchase of a site at this place, for the erection of a new court house. The building will in all probability be erected in the year 1910.

Asquith, Sask.—Architect W. W. LaChance, Saskatoon, has prepared plans for a two-storey Town Hall to be erected here at a cost of $6,000. The building will be of frame construction, with stone foundation, hot air heating.

Business Buildings

Toronto.—The Mason and Risch Piano Company has purchased from Mr. Albert Britnell, the property at 241 Yonge street, on which they will erect a new building.

Toronto.—The Bell Telephone Company has taken out a permit for a five-storey, brick, steel and concrete office and exchange building, to be erected on Adelaide street near Bay street. It will cost $320,000. W. J. Carmichael, Montreal, is the architect.

Toronto.—Architect F. J. Bird has prepared plans for a pair of two-storey stores and dwellings to be erected at 885-7 Queen street east, for Mr. H. McCarten, at a cost of $5,000. The buildings will be of brick construction, with brick foundation, felt and gravel roof, maple and pine floors, pine interior finish, open plumbing, hot air heating, combination lighting, metal ceilings.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for a pair of two-storey stores and dwellings on Bathurst street, near Dupont street, for Mr. T. Harman, Euclid avenue. The building will be of brick construction, with hot air heating, combination lighting, two mantels and electric bells. Cost of building, $6,000.

Toronto.—Architect P. H. Finney has prepared plans for a pair of stores and dwellings to be erected at the corner of Danforth and Logan avenues, for Mr. T. McNea. The buildings will be of brick construction, modernly equipped, and will cost $4,000.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for a store and dwelling to be erected on Roncesvalles avenue, near Geoffrey street, for Mr. J. S. Sharp, 584 College street. The structure will be of brick and will cost $2,500.

Toronto.—Architect J. Hunt Stanford, 34 Yonge street arcade, has prepared plans for a two-storey store and dwelling to be erected on College street, near Bathurst street, for Mr. J. Jamieson, McCaul street. The building will be of brick construction, with hot water heating and combination lighting. Cost $3,500.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a three-storey store and apartment building to be erected on Bloor street, near Bathurst street, for Mr. E. J. Jackson, 117 Bedford road. The building will be of brick construction, with Georgia pine interior finish, open plumbing, steam heating, combination lighting, fireproof doors and windows and four mantels.

Toronto.—Architect Wm. Thompson has prepared plans for a pair of stores and dwellings to be erected at the corner of Pendrith and Christie streets, for Mr. Henry Carter, 716 Bloor street west. The building will be of brick construction and cost $3,000.

Toronto.—Architect Wm. Thompson has prepared plans for a pair of stores and dwellings to be erected at the corner of Ossington and Hallam avenues, for Messrs. Tait Angus Co., 164 MacPherson avenue. The building will be of brick construction and will cost $5,500.

Toronto.—Architect W. H. Martin, 126 Riverdale avenue, has prepared plans for three three-storey brick stores and dwellings, to be erected at 955-7 Pape avenue, near Gerrard street, for Mr. J. B. Vick, 98 Riverdale avenue, at a cost of $6,000.

Hamilton, Ont.—The Mills Hardware Company will erect five stores, a central heating plant, and a stable a block in length, at a cost of $100,000. Contractors for the main portions of the work are; Howard & Webbor, masonry; McKellar & Poag, carpentering; Hamilton Steel and Iron Company, structural steel. Mr. Chas. Mills is the architect.

Hamilton, Ont.—Messrs. Hawkins & Holt will build a pair of brick stores at the corner of Emerald and Barton streets.

Collingwood, Ont.—Architect Philip C. Palin has prepared plans for a two-storey brick store, with stone foundation, to be erected for Mr. McKay, at a cost of $4,000.

St. Thomas, Ont.—Tenders have been taken by the Bell Telephone Company, St. Thomas, for their proposed new exchange building on Talbot street. The plans call for a building two stories in height, 70 by 30 feet. The work of construction will be commenced before May 1st.

Chesterville, Ont.—The departmental store of Saunders, Soule and Casselman, Chesterville, which was recently destroyed by fire, will be rebuilt. Proprietors of the business; Mr. O. D. Casselman and F. M. Saunders.

Toronto.—The Cawthra Estate will erect a large building at the corner of Yonge and Richmond streets, on the expiration of the leases on the property, which are held by the Whaley Royce Company and Ambrose Kent, jeweler.

Peterborough, Ont.—Mr. J. J. Lundy will erect a three-storey building on his property on George street. It will be of brick construction, 90 by 60 ft., the first floor to be used for store purposes, the second floor for living apartment, and the third for public hall.

Toronto.—Messrs. Phippen Bros., 944 Pape avenue, Toronto, will erect a pair of two-storey brick stores and dwellings at the corner of Pape and Withrow avenue, at a cost of $5,000.

Montreal.—Mr. C. E. Deakin, 11 St. Sacrament street, has taken out a permit for offices for the U. S. Emigration Agency, at a cost of $25,000.

Montreal, P.Q.—Architects Mitchell and Creighton, Inglis Building, have prepared plans for a five-storey building to be erected at the corner of St. Catherine and Alexander streets, for Mr. J. A. Jacobs, 171 St. James street. It will be of steel or concrete construction, with concrete foundation, terra cotta partitions, gravel roof, concrete floors, fireproof interior finish, steam heating, passenger elevators and freight elevator (hydraulic), sidewalk lifts and sprinkler system.

Montreal, P.Q.—Architects Mitchell & Crighton have awarded to Messrs. D. G. Loomis & Sons the contract for the masonry and concrete for a new block of stores to be erected at the corner of St. Catherine and Alexander streets.

Montreal, P.Q.—A syndicate is said to have obtained an option on the Carsley property, St. James and Notre Dame streets, on which they may erect a ten-storey building. Architect F. H. Kimbol of New York is reported to have prepared plans for the building. The syndicate has taken offices in the Inglis Building, St. Catherine street west, Montreal.

Montreal, P.Q.—Southam, Limited, will erect a large office and store building at the corner of Guy and St. Catherine streets. The building will be of brick construction, and will be equipped with steam heating and electric lighting. The lower portion of the building will be used for store purposes, while the upper floors will be divided into offices.

Winnipeg.—It is reported that Mr. H. M. Millman is making arrangements for the erection of a large block on the corner of River avenue and Osborne street, the ground floor to be used for banking and store purposes.

Winnipeg, Man.—Architect Fingland has prepared plans for a local syndicate, for the erection of a large steel block at the corner of Portage avenue and Hargrave street. Mr. John Girvin, the general contractor, will commence at once the work of razing the building at present on this site. It is expected that the new building will be ready for occupation early next fall. Messrs. C. H. Enderton & Co. are agents for the syndicate.

Winnipeg.—Architect John D. Atchison has prepared plans for a four-storey building to be erected at the corner of Lombard and Rorie streets, for the Great West Life Assurance Co. The building will be 97 by 106 feet, will be fireproof, of steel frame and reinforced concrete construction, and will cost approximately $200,000.

Winnipeg.—The contract for the structural steel and cast iron columns for the new storey to be built on the J. Robinson & Co.'s departmental store has been awarded to the Vulcan Iron Works.

Winnipeg.—Mr. J. A. Girvin has been awarded the contract for a new fireproof block to be erected at Portage and Hargrave streets for Mr. C. H. Enderton.

Brandon, Man.—Messrs. Geo. White & Sons, London, Ont., will erect a large office and storage building here.

Victoria, B.C.—The block of property on the N.W. corner of Broad and Johnson streets has been purchased by a syndicate of local Chinese merchants, the principal shareholders in which are Lee Woy, Lee Chung and Lee Yan Yew, all of whom are identified with the firm of Tai Yuen & Co.. Plans have been prepared for a three storey brick store and office building, costing approximately $20,000, to be erected on this site.

Victoria, B.C.—Messrs. Lim Bang & Company will erect a three-storey concrete and brick building on the east side of Government street, covering the entire length of the block from the corner of Herald to Chatham. Estimated cost, $50,000. The structure will include twelve stores; the two upper floors will be used as offices, and rooming apartments. Hooper & Watkins are the architects.

Victoria, B.C.—Messrs. W. S. Fraser & Co., hardware merchants, corner Wharf and Bastion Square, will erect a three-storey addition to their premises at a cost of $9,000.

Victoria, B.C.—Architect D. C. Frame, Five Sisters' block, has awarded to the Westholme Lumber Company the contract for the erection of a brick store and creamery, on concrete foundation, on Broad street, for the Creamery Company. Cost of building, $13,000.

Victoria, B.C.—Messrs. Pemberton & Sons, whose building was recently destroyed by fire, will rebuild at once. Plans have been prepared for a four-storey building, with a depth of 87 feet on Fort street, 160 feet on Broad street, and 80 feet on Broughton street; it will be of brick (Clayburn), concrete and steel construction, as nearly fireproof as possible. Two electric elevators, electric lighting, steam heating, telephone system, will be installed. Estimated cost $150,000. G. Meske & Company are the contractors.

Vancouver, B.C.—Architect A. C. Hope, 336 Hastings street west, has awarded to Messrs. Baynes & Horie, Davis Chambers, Hastings street, the contract for the erection of a three-storey brick store and apartment house for Mr. Joseph Reade. Cost approximately $27,000.

Vancouver, B.C.—General Manager Sperling, of the British Columbia Electric Railway, has invited plans for the erection of a new four-storey office building at the corner of Carrall and Hastings streets, the plans to be in the hands of the Company's management by April 26th.

Vancouver, B.C.—Messrs. C. S. Douglas and A. E. Thorley will erect a three-storey block on Granville street, next to the Tourise Hotel. The contractors are Messrs. Purdy & Lonergan. The building will be of brick, with a glazed brick facade, and will cost $50,000. Parr & Fee are the architects.

Vancouver, B.C.—Plans have been filed with the Building Inspectors, Vancouver, by John J. Holyor, architect, Vancouver, for a $75,000 office building to be erected on Hastings street, opposite the Astor Hotel, for a syndicate. The building will be eight storeys in height of fireproof construction, with concrete floors, fireproof stairways, iron window frames and wire window glass. An elevator will be installed.

Vancouver, B.C.—Plans have been prepared by Architect Wilkie Allen, 614 Hastings street west, for a two-storey brick building to be erected at the corner of Park Drive and William street, Grandview, for Mr. Harry Evans. Estimated cost, $10,000. The building will be of brick and concrete construction, and will have a frontage of 66 feet on Park

Drive, by about 70 feet on William street. The ground floor will be fitted up for three large stores, while the upper floor will be used for public hall.

Vancouver, B.C.—Messrs. Crowe & Wilson have had plans prepared for a four-storey business block to be built on Hastings street.

Vancouver, B.C.—Architects Parr & Fee have prepared plans for a four-storey office building to be erected on Granville street, at the corner of Robson, for Mr. J. M. Cameron. It will be of brick construction, with foundation and basement walls of concrete, basement floor of cement, galvanized iron cornices, tar and gravel roof, wrought iron fire escapes, galvanized iron skylights, electric lighting.

Vancouver, B.C.—Mr. William Frederick Gardiner will erect a six-storey brick block on Pender street, near Richards, for Mr. H. D. Hutchinson.

Kamloops, B.C.—The city will in all probability erect a new city hall, at estimated cost of $40,000. It is proposed to erect the building just west of the site of the old Court House.

Moose Jaw, Sask.—Mr. T. H. Brayson will erect a two-storey building next to the Post Office. A business building will also be erected in this vicinity by Matthews-Ferguson Company.

Regina, Sask.—It is stated that the Robert Simpson Company, of Toronto, will this summer erect a large departmental store at this place.

Prince Albert, Sask.—The Agnew Hardware Company will erect a new building to contain three stores.

Calgary, Alta.—Architects Dowler & Michie have prepared plans for a $65,000 business building to be erected for Mr. A. J. Sames. It will be of concrete reinforced, with concrete foundation, tar and gravel roof, steam heating, electric lighting, enamel plumbing. Specifications include electric elevators and vaults.

Calgary, Alta.—Architects Dowler & Michie have prepared plans for a two-storey business block to be erected for Messrs. Mackay & Dipple, at a cost of $9,000. It will be of brick construction, with stone foundationn, paroid roofing, electric lighting, enamel plumbing.

Calgary, Alta.—Architects Dowler & Michie announce that tenders will be received after May 1st for a two-storey business building to erected here for Mr. G. S. Mackie, of Banff. It will be two storeys in height, 125 by 150 feet, of brick construction, with paroid roofing, steam heating, electric lighting, and will be so constructed as to admit of two additional storeys being added.

Edmonton, Alta.—Architects Barnes & Gibbs have awarded the following contracts for a store building to be erected for Mr. I. R. V. Carpenter; General contract, McSpoiran & Co.; plumbing, Standard Plumbing Co. The building will be two storeys in height, 40 by 30 feet, of frame construction, and will cost $5,000.

Edmonton, Alta.—Messrs. Hallier and Aldridge have taken out a permit for the erection of a $35,000 business structure on Rice street.

Strathcona, Alta.—Messrs. A. H. Richards & Company will erect a large store building in the near future.

Banks

Hamilton, Ont.—It is stated that the Bank of Montreal will erect a new building at the corner of Victoria avenue and Barton street for its local branch.

Fredericton, N.B.—Architect F. Neil Brodit, St. John, N.B., is receiving tenders for a bank building to be erected here for the Bank of New Brunswick. It will be two storeys in height, of stone and concrete construction, with concrete foundation, pith and gravel roof, hot water heating, electric lighting, oak interior finish.

Renfrew, Ont.—The Quebec Bank have purchased a site on which they will erect a bank building to cost $25,000.

Montreal.—Architects Ross & Macfarlane, 1 Belmont street, have awarded the following contracts for the erection of a bank building at the corner of Prince Arthur street and St. Lawrence Boulevard, for the Dominion Bank; Masonry and brickwork, Jas. Morrison; carpentry, D. M. Long, rear 89 Windsor street.

Montreal.—Architect Kenneth G. Rea, 9 Beaver Hall Square, has prepared plans for the erection of a bank building at the corner of Park avenue and St. Louis street for the Royal Bank.

Montreal.—Architects Marchand & Haskell, 164 St. James street, have prepared plans for alterations and extensions to the Bank National Building, St. James street.

Clubs and Societies

Toronto.—Plans have been prepared by Architect E. J. Lennox, 164 Bay street, for the extension and improvement of Victoria Hall, Queen street east. The present building will be renovated, and fitted up with steam heating, and ventilating system and elevators. An addition will also be built. Cost of work, $10,000.

Toronto.—Plans are under way for the establishment of a Young Women's Catholic Association and Guild. It is estimated that a suitable building could be erected for $25,000. The project has received the endorsation of all the Catholic clergy.

West Toronto.—A new Masonic Temple will be erected shortly at this place. The proposed building will be located next to the Carnegie Library, and designed on similar lines. President, Henry C. Fowler, Toronto; Secretary, A. B. Rice, West Toronto.

Hamilton, Ont.—The Building Committee of the Y.M.C.A. have approved of the plans prepared for their building. Tenders will be called for in the near future.

Kenora, Ont.—The Oddfellows of this place will erect a block to cost approximately $15,000.

Ottawa, Ont.—The Rideau Club has purchased the property adjoining, on which they will erect an addition to their building. The structure will have a stone front, and will be four storeys in height. H. C. Stone, Montreal, is the architect.

Winnipeg.—An organization is being formed under the name of "The River Heights Club, Limited," for the purpose of erecting a club-house on the athletic grounds on Godfrey street. The capital stock of the club is fixed at $80,000. Arhitect's plans will at once be prepared, and construction commenced, so that the building may be available this season. Hon. T. Mayne Daly, K.C., is president of the club.

Victoria, B.C.—The Pacific Club and adjoining buildings owned by F. B. Pemberton, which were recently destroyed by fire, entailing a loss of between $150,000 and $200,000, will be replaced by a four-storey brick and stone building of larger dimensions, plans for which have been prepared.

Nelson, B.C.—The Y.M.C.A. will erect a three-storey and basement brick building at this place, to cost approximately $30,000.

Victoria, B.C.—The Y.M.C.A. propose to erect a building to cost $100,000 at this place.

Prince Albert, Sask.—The Masons of Prince Albert purpose erecting a three-storey block to cost approximately $50,000, towards whih the sum of $20,000 has already been subscribed.

Saskatoon, Sask.—The Y.M.C.A. has purchased the property on the corner of Twenty-second street and Third avenue for the purpose of erecting a large association building.

Asylums and Hospitals

Toronto.—The following contracts have been awarded for the erection of the new wing for the Home for Incurables, Dunn avenue; Masonry, John Aldridge & Son; carpentry, A. B. Coleman, 191 Dowling avenue; tiling, J. L. Vokes; steel, McGregor & McIntyre, 73 Pearl street; painting, F. E. Phillips, 49 Richmond street east; deck roofing, Carey Roofing Company, 112 Bay street; slate and copper, A. B. Ormsby & Co., Queen and George streets; plumbing, Purdy, Mansell, Limited, 63 Albert street; plastering, R. C. Dancy, 171 Spadina Road. Estimated cost of addition, $30,000.

Toronto.—The following contracts have been awarded for the new Nurses' Home, in connection with the Home for Incurables, Dunn avenue; Masonry, R. Hewitt & Son, 60 Roncevalles avenue; carpentry, John McKerracher; tiling, J. L. Vokes & Sons; steel, Toronto Iron Works, Lawlor Building; painting, H. W. Johnston, 209 Church street; plastering, R. C. Dancy, 171 Spadina Road; slate and copper, J. Matthews; plumbing, Purdy, Mansell, Limited, 63 Albert street. Estimated cost of building, $22,000. Denison & Stevenson, 20 King street west, are the architects.

Ottawa, Ont.—Tenders will be called in the near future for the new consumptive hospital to be erected on a site on Carling avenue, near Holland avenue.

Galt, Ont.—A by-law will be submitted to the ratepayers for the purpose of authorizing the expenditure of $20,000 for an addition and improvements to the hospital.

Hamilton, Ont.—At a meeting of the City Council it was decided to grant $10,000 for enlarging the Isolation hospital

Brantford, Ont.—Mr. E. L. Cockshutt has donated to the city a site on which to erect the proposed tuberculosis hospital, which will cost $14,000.

Peterboro, Ont.—The management of the House of Providence will in all probability erect a new building to cost between $30,000 and $35,000. Application has been made to the City Council for assistance in maintaining the institution, and the matter will be taken up at a special meeting of the Committee, at which Father McColl, the promoter of the project, will be present.

St. Catharines, Ont.—The Woman's Auxiliary, acting in conjunction with the provisional directors appointed by the City Council, have purchased the Collier homestead as a site for a tuberculosis sanitarium. The building at present on the property will be remodelled, and infirmaries built. The institution will be managed by the city.

Montreal.—Extensive alterations will be made to the Hotel Dieu hospital, and an additional storey erected.

Sherbrooke, P.Q.—Plans have been submitted to the Sherbrooke Protestant Hospital Board for the remodelling and enlargement of the hospital, to double its present capacity. Estimated cost of improvements, $15,000.

Ninette, Man.—Final plans for the Provincial Sanatorium at Ninette will be prepared by Architect Wm. Bruce, Winnipeg, and laid before the Trustees. The first unit of the institution will probably have a capacity of sixty patients, and will consist of three buildings, an administrative building and two large pavilions. Initial cost estimated at $39,600. Dr. D. A. Stewart, Superintendent of the Sanitorium.

Middlechurch, Man.—Plans are being prepared for the erection of an addition to the Home for the Aged, at a cost of $27,000.

Coquitlan, B.C.—Tenders for the construction of the proposed hospital at the asylum farm will be called for by the Provincial Government at an early date. Dr. Doherty is the Asylum Superintendent.

Nelson, B.C.—At a meeting of the Kootenay Lake General Hospital it was decided to take steps towards the erection of a new hospital building. The Provincial Government has offered to give 50 per cent of any amount raised locally for the erection of the building. President Hamilton Byers may be addressed.

Chilliwack, B.C.—At a meeting of the citizens the following were appointed to constitute a Provisional Board of Managers regarding the erection of the proposed hospital at this place: Rev. Canon Hinchliffe, J. H. Ashwell, M. Murphy, and T. E. Caskey, representing the city; and Reeve Kickbush, Councillor P. H. Wilson, and A. B. McKenzie, from the country.

Kamloops, B.C.—At a meeting of the shareholders of the Royal Inland Hospital it was decided to make application to the Provincial Government for a site of seven acres of land, back of the Provincial Home, on which to erect the isolation hospital; it may also serve as a site for a new general hospital.

Regina, Sask.—The Health and Relief Committee have secured the adoption of their report providing for the erection of a permanent building on the hospital property, for tuberculosis patients. A small office building will also be erected. The plans as prepared by Meyer J. Sturn, will be revised by Story & VonEgmond, who will also superintend the erection of the building.

Churches

Toronto.—Palmer and Gortiga have the contract for a one-storey brick church to

be built at the corner of Yonge and Lawton avenue for the congregation of Christ Church, Deer Park. Symons & Rae, 15 Toronto street, are the architects. The building will cost $20,000.

Toronto.—Elgie and Page have the contract for a $40,000 brick and stone church to be erected at Roncesvalles and Wright avenues for the Fern avenue Presbyterian congregation. Smith and Gemmell are the architects.

Toronto.—Architect E. J. Lennox, 164 Bay street, has prepared plans for the new St. Paul's Anglican church. The building will have a floor space of 14,000 square feet, seating capacity of 2,500, and will cost approximately $150,000.

Toronto.—Mr. J. C. Eaton has donated to the Methodists in the vicinity of Avenue Road and St. Clair avenue a site at the corner of Forest Hill Road and St. Clair avenue, on which to erect a new church. A provisional board of trustees, composed of the following, has been appointed, viz.; R. W. Eaton, Edward Clark, George Dean, Thomas Miller, G. A. Walton and J. H. Stephens.

Ottawa, Ont.—Plans have been prepared for the new Methodist Church to be erected in Ottawa East.

Hamilton, Ont.—Architect Herbert H. New, 608 Spectator Building, has prepared plans for a $22,000 church building to be erected in Hamilton for the Herkimer Baptist congregation. It will be of brick and cut stone construction, with slate roof, steam heating, electric lighting, whitewood interior finish.

Hamilton, Ont.—The Gospel Tabernacle will in all probability be enlarged to accomodate 2,200, its present seating capacity being 1,500. Also an addition will be built to the rear of the church providing this property can be secured.

Peterboro, Ont.—Murray street Baptist congregation will in all probability erect a new church.

Peterboro, Ont.—Architects Simpson and Young, 17 Toronto street, Toronto, are preparing plans for the new church to be erected for the Knox Presbyterian congregation. It will be of brick construction, with stone front, and will cost approximately $24,000.

Sudbury, Ont.—The congregation of the Presbyterian Church, Sudbury, will in all probability erect a new edifice this summer.

Brantford, Ont.—The congregation of the Park Baptist Church will enlarge the basement under the church, and put in new class rooms, etc., at a cost of several thousands of dollars.

Brantford, Ont.—The Colborne street Methodist church will be enlarged at a cost of approximately $14,000.

Port Colborne, Ont.—Architects Gordon & Helliwell, Confederation Life Building, Toronto, have prepared plans for alterations to the Presbyterian Church, Port Colborne, at a cost of $5,000.

Galt, Ont.—The congregation of the Methodist church will either build a new church, or enlarge the present structure.

Woodstock, Ont.—The local branch Salvation Army is contemplating the erection of a new building at a cost of approximately $5,000.

Montreal.—Architect Jas. B. Adamson, Coristine Building, has prepared plans for the erection of a new structure to replace the old Congregational church.

Cote du Lac, P.Q.—Architect Joseph Venne, 402 Plessis street, Montreal, has prepared plans for the erection of a church at Coteau du Lac, P.Q. Rev. Faubert, Coteau du Lac, will receive tenders for the building.

Winnipeg, Man.—The Building Committee of the Presbyterian congregation has ordered plans for a new church to be erected at the corner of Herbey and School streets.

Winnipeg, Man.—The Central Congregational Church is contemplating making an enlargement to their present structure this summer.

Winnipeg, Man.—Plans have been prepared for a new Sunday School to be built for Augustine Presbyterian Church. The building, which will be of stone, will cost from $20,000 to $25,000. J. H. G. Russell is the architect.

Vancouver, B.C.—Architects Parr & Fee have completed plans for the new Presbyterian Church to be erected at the corner of Tenth and Quebec streets. The building will be 86 by 74 feet, with basement walls of concrete with artificial stone facings and superstructure of brick faced with pressed brick, and artificial stone trimmings.

Vancouver, B.C.—The Fairview Baptist Church will be removed to the corner of Fifth avenue and Arbutus street, and enlargement made to the building.

Kamloops, B.C.—The Methodist Church Board is discussing the question of the erecting a new church, the present building to be used as a school-room.

Rocanville, Sask.—The Methodist congregation will erect a new church in the near future.

Muenster, Sask.—Tenders will be received by the undersigned up to 2 p.m., April 20th, for the erection of a frame church, 56 by 128 feet, for the Catholic congregation. Plans and specifications on file at the office of Rev. Bruno Doerfler, Pastor.

Prince Albert, Sask.—The Methodist congregation proposes to erect a new $40,000 church this summer.

Edmonton, Alta.—A new church building will this year be erected on First street, at the corner of College avenue, by the Methodist congregation.

Residences and Flats

Toronto.—Architect Chas. J. Gibson, 75 Yonge street, has awarded the following contracts for a two and a half storey brick residence to be erected on Dunvegan Road, near St. Clair avenue, for Mr. W. McLaughlin, 476 Huron street, at a cost of $10,000: Masonry, Elgie & Page, 21 Havelock street; carpentry, P. B. Manuel, Bloor street west; plumbing and heating, Bennett & Wright, 72 Queen street east; painting and glazing, F. C. Davies, 213 Montrose avenue; electric wiring, R. A. L. Gray, 87 York street.

Toronto.—Architects Gordon & Helliwell, Confederation Life Building, have awarded the following contracts for a two and a half storey $8,000 brick residence to be erected at 419 Bloor street east for Robt. Mabee, 136 Albany avenue: Masonry, Balderston Bros. & Hutchison; carpentry work, David McMurr, 64 Haydon St.; sheet metal work, G. M. Bryan, 524 Yonge street; plastering, Hanna & Helson, 271 Rusholme road; electric wiring and plumbing, Keith & Fitzsimmons, 111 King street west; painting and glazing, Gould & Malcolm, 385 Givens street.

Toronto.—Architect F. H. Herbert, 65 Adelaide street east, has prepared plans for a two and a half storey residence and garage to be erected in Parkdale for Mr. Geo. Rathbone, Heathcote avenue. The building will be of stone construction, with tile roof, hardwood interior finish, open plumbing, and hot water heating. It will cost $15,000.

Toronto.—Architect F. H. Herbert, 65 Adelaide street east, will erect a three-storey store and apartment building on Queen street, near Church street, at a cost of $50,000. The building will be of pressed brick and cut stone construction, with steel and concrete partitions, open plumbing, steam heating, electric lighting, iron store fronts, passenger elevator and telephone system.

Toronto.—Architects Langley and Howland, Bay and Richmond streets, have prepared plans for a three-storey brick apartment building, at 291 St. George street, for Mrs. E. D. Y. Cohen, 147 Farnham avenue.

Toronto.—Architect Leonard Foulds, 45 Victoria street, has prepared plans for a two and a half storey residence to be erected on Brunswick avenue, near Dupont street, for Dr. Slade, corner Queen and Bathurst streets. It will be of brick construction, modernly equipped, and cost $5,000.

Toronto.—Architects Eden Smith & Son, 199 Yonge street, have awarded the following contracts for a $9,000 brick residence to be erected on Clarendon Crescent, near Poplar Plains road, for Mr. E. B. Walker, 199 Yonge street: Masonry, T. Fussells; plumbing, J. T. Aggett, 180 Yonge street.

Toronto.—Architects Simpson & Young, 17 Toronto street, have awarded the following contracts for a two and a half storey residence to be erected on Broadview avenue, for Mr. W. T. Harris, Harris Abbatoir Company: Masonry, Elgie & Page, 21 Havelock St.; carpentry, Jas. MacKenzie; painting and glazing, Jas. Casey, 33 Richmond street east; tile work, Canada Plate Glass Co.; electric wiring, G. G. Tughon & Co., 30 Oxford street; structural steel work, McGregor & MacIntyre, 73 Pearl street; sheet metal work and roofing, Wm. Saulter, 115 Bay street. Estimated cost, $10,000.

Toronto.—Architects Symons & Rae, 15 Toronto street, have prepared plans for a four-storey apartment house to be built on Madison avenue, for Mr. Henry Symons, K.C., 15 Toronto street. It will be of brick construction and cost $45,000.

Toronto.—Architect Jas. Thompson, 43 Victoria street, has prepared plans for a $6,000 brick residence to be erected on Indian road, near Howard Park, for Mr. Smith. Mr. Thompson has also completed plans for a brick residence to cost the same amount for Mr. C. Oliver, 43 Victoria street, who will build on Lynwood avenue, near St. Clair avenue.

Toronto.—Architect Jas. Thompson has prepared plans for a $4,000 brick residence, to be built on Sidney street near Cottingham street, for Mr. Geo. Bryan, 43 Victoria street.

Toronto.—Architect J. Hunt Stanford, 34 Yonge street arcade, has prepared plans for a pair of semi-detached two and a half storey dwellings to be erected on Havelock street, near Hepbourne street, for Mr. Bishop, 523 Palmerston Boulevard. The building will be of brick construction, equipped with hot air heating, combination lighting, mantels, etc., and will cost $5,500.

Toronto.—Architect J. Hunt Stanford has prepared plans for three pairs of two-storey dwellings to be built on the west side of Concord avenue, near Hallam street, for Mr. R. McCauley, Burton avenue. The buildings will be of brick construction and will cost $9,000.

Toronto.—Architect J. Hunt Stanford has prepared plans for a residence to be erected on Warren road, near Balmoral avenue, for Mr. Geo. A. Powell, 69 Howland avenue. It will be of brick construction and cost $7,000.

Toronto.—Architect J. Hunt Stanford has prepared plans for three pairs of two-storey, semi-detached dwellings to be erected at the corner of Gladstone and Hallam street, for Messrs. Scott & McKee, Deleware avenue. The buildings will be of brick construction and cost $11,000.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and a half storey brick dwelling to be erected on Lonsdale avenue, near Avenue road, for Mr. Botlaw, Markham street. Estimated cost, $4,000. Mr. Stanford has also designed a $2,800 brick dwelling for Mr. J. Forsyth, 16 Jersey avenue.

Toronto.—Architect J. Hunt Stanford has prepared plans for a pair of two and a half storey brick dwellings to be erected on Farnham avenue, for Messrs. J. T. & H. Hutson, 43 Victoria street, at a cost of $5,000. Also a pair of two and a half storey brick dwellings to be erected on the corner of Farnham avenue and Ewan street; a pair of brick dwellings to be erected at the corner of Woodlawn extension and Farnham avenue; a pair of two and a half storey brick dwellings to be erected on Farnham avenue, for the same party, to be built at a cost of $5,000, $4,000 and $5,000 respectively. All buildings will be equipped with mantels, combination lighting, open plumbing, hot water heating, etc.

Toronto.—Architect J. Hunt Stanford has prepared plans for a pair of two and a half storey dwellings to be erected on Shaw street, near College street, for Mrs. Scott, 655 Shaw street. Cost $4,800. It will be of brick construction, with open plumbing, hot air heating, combination lighting, staved columns, mantels and electric bells.

Toronto.—Architect J. Hunt Stanford has prepared plans for three pairs of two and a half storey semi-detached dwellings to be erected on Hepbourne street, near Rusholme road, for Mr. J. G. Kent, 34 Yonge street arcade. Estimated cost $12,000. The buildings will be of brick construction, with slate and shingle roof, open plumbing, hot air heating, combination lighting, leaded glass.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a two and a half storey dwelling to be erected on High Park avenue, West Toronto, for Mr. R. J. Bruce of that place. The buildings will be of brick construction, modernly equipped and cost $5,000. Mr. Galloway has also prepared plans

for seven detached two-storey brick dwellings to be erected on St. Clair avenue, near Yonge street, for Mr. T. P. Stewart, Richmond street east, at a cost of $20,000.

Toronto.—Architect J. H. Galloway has completed plans for a two and a half storey dwelling to be erected on Lynnwood avenue, for Mr. T. P. Stewart, Richmond street, at a cost of $10,000. The building will be of brick construction, with oak floors and interior finish, open plumbing, hot water heating, electric lighting, mantels, electric bells and clothes chute.

Toronto.—Architect E. G. Wilson, 77 Victoria street, will erect a two and a half storey residence to be erected in Avenue road district, at a cost of $5,000. It will be of brick construction with slate roof, oak and pine interior finish, open plumbing, hot water heating, combination lighting, stayed columns and electric bells.

Toronto.—Architect Ewart G. Wilson has drawn plans for a bungalow to be erected on Wheeler avenue, for Miss Logan, at a cost of $2,500. It will be of brick construction, with open plumbing, hot air heating, combination lighting mantel and electric bells.

Toronto.—Architect E. G. Wilson has prepared plans for a parsonage to be erected on Simpson avenue, near Howland road, for Rev. W. E. Baker, 128 Victor avenue. It will be of brick construction, with slate roof, open plumbing, hot water heating, combination lighting, mantel and electric bells.

Toronto.—Architects R. J. Edwards and Saunders (in trust), 16 Toronto street, have awarded the following contracts for a two and a half storey residence to be erected on Wilson avenue, near King street: Masonry, Moore and Stewart, 63 Augusta avenue; carpentry, Geo. H. Walters, Ossington avenue; sheet metal work, Lankin & Son, 58 Lippincott street; painting and glazing, Robt. Morse, 61 Marlborough avenue; heating, John Ritchie Plumbing and Heating Co., 56 Adelaide street east; plumbing, A. F. Passmore, 428 Yonge street; electric wiring, L. B. Jackson. Cost of building, $5,400.

Toronto.—Architect Lewis Reid has prepared plans for a pair of two-storey dwellings on Follis avenue, near Euclid avenue, for Mr. Henry Carter, 716 Bloor street west. The buildings will be of brick construction, with slate roof, open plumbing, hot air heating, combination lighting and electric bells. Cost of building, $4,000.

Toronto.—The following contracts have been awarded for a three-storey apartment building to be erected on St. George street, Toronto, for Mrs. E. D. Y. Cohen, 147 Farnham avenue: Masonry, Smallwood Bros, 97 Clinton street; carpentry, Sim & Smart, 372 Markham street; roofing, Douglas Bros., 124 Adelaide street west; painting and glazing, Taylor & Co., 9 Bloor street east; plastering, Hanna & Nelson, 271 Rusholme road; plumbing and heating, Purdy, Mansell Co., 63 Albert street; electric wiring, Rice, Graham & Co., Stair Bldg. Cost of building, $17,000. Architects, Langley & Howland, Bay & Richmond streets.

Toronto.—Architect P. H. Finney, 43 Victoria street, has prepared plans for two detached two and a half storey dwellings on Major street, near Bloor street, for Mr. Geo. Phillips, 558 Huron street. The building will be of brick construction, modernly equipped, and cost $6,000. Mr. Finney has also drawn plans for a $3,000 brick residence to be erected on Hampton avenue, near Wolfrey street, for Mr. A. Tambling.

Toronto.—Architect P. H. Finney has prepared plans for a two and a half storey dwelling to be erected on Broadview avenue, near Danforth road, for W. W. Hillz, 758 Broadview avenue, at a cost of $3,000. It will be of brick construction, with slate roof, open plumbing, hot air heating, combination lighting, mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for three attached two-storey dwellings to be erected on Hampton avenue, near Wolfrey street, for Mr. G. Tambling, 9 Simpson avenue. The buildings will be of roughcast construction, modernly equipped, and cost $4,000. Mr. Finney has also prepared plans for three attached two-storey dwellings on Sorauren avenue, near College street, for Mr. F. W. J. Hill, 71 Adelaide street east. The building will be of brick construction, with open plumbing, hot air heating, combination lighting, mantels and electric bells. Cost $3,000.

Toronto.—Architect J. M. Cowan, 65 Adelaide street east, has prepared plans for a pair of two-storey dwellings to be erected on Brock avenue, near Bloor street, for Mr. John Boland, 470 Brock avenue. Estimated cost, $5,000. The buildings will be of brick construction, with stone foundation, felt and gravel and slate roof, pine floors and interior finish, open plumbing, hot air heating, mantels and electric bells.

Toronto.—Architect B. A. Stockdale has prepared plans for a two and a half storey brick dwelling to be erected on the east side of Dufferin street, south of Bloor street, for Mr. T. A. Hussey, 929 Dufferin street. Estimated cost $3,200.

Toronto.—Architect Thomas Harris has prepared plans for a two and a half storey brick dwelling to be erected on Boustead avenue, near Indian road, for Mr. Robt. Ewing, 76 Boustead avenue. The building will cost $3,000.

Toronto.—The Architectural Draughting Co., 65 Yonge street arcade, have prepared plans for a two and a half storey residence to be erected on Grace street, near College street, for Dr. L. Clutterbuck, 596 College street. It will be of brick construction and cost $3,500. This firm has also prepared plans for a two and a half storey brick dwelling to be erected on Vanhorne street, near Westmoreland avenue, for Mr. C. Cooper, Vanhorne street, at a cost of $2,800.

Toronto.—Mr. R. Burkell, 318 Crawford street, Toronto, has awarded the following contracts for a $5,000 brick building to be erected at 94-6 Dovercourt road, near Queen street: Masonry, Jas. Hicks, 144 Montrose avenue; carpentry, Mr. Mason, Montrose avenue; plumbing and heating, W. G. Mimms, 562 College street.

Toronto.—The following contracts have been let for a $3,500 two and a half storey brick residence to be erected on Rusholme road, near Bloor street, for Mr. A. Brock, Markham street: Masonry work, R. S. Scrinegour, 124 Concord avenue; carpentry, J. Pearson, 650 Brock avenue; plastering, L. Sparks, 148 Sackville street; plumbing, C. Hicks, 741 Lansdowne avenue; painting, J. S. Bunkor, 106 Wallace avenue; heating, J. M. Holt, 721 Markham street; electric wiring, C. S. Anderson, 105 Borden street.

Toronto.—The following contracts have been awarded for a two-storey pair of dwellings to be erected on Fairview avenue, near Bartlett avenue, for Mr. H. E. Bell, 56 St. George street: Masonry, Balderson & Hutchison, 24 Emerson avenue; carpentry, M. Yetman, 545 Concord avenue. Geo. Harper, 61 Yonge street arcade, architect.

Toronto.—Mr. R. A. Shields, 247 Avenue road, will erect a pair of two-storey brick dwellings on the west side of Sidney street, near Cottingham street, at a cost of $4,000.

Toronto.—Mr. J. J. Downey, 65 Geoffrey street, will erect three pairs of two-storey brick dwellings on Lucas street, near Howard Park avenue. The buildings will be erected by day work, the owner supplying all materials.

Toronto.—Mr. J. S. Case, Parkview Mansions, will erect two detached brick dwellings on Westminster avenue, near Roncesvalles avenue, at a cost of $8,000. The buildings will be erected by day work, the owner supplying all materials.

Toronto.—Mr. T. W. Murray, 41 Callander street, will erect a two and a half storey residence on the east side of Indian road, near Howard Park avenue. It will be of brick construction and cost $4,500.

Toronto.—Mr. Henry Martin, 283 Palmerston avenue, will erect two pairs and one detached brick dwellings on Endean avenue, near Jones avenue, at a cost of $6,800. The owner will supply all materials and erect building by day work.

Toronto.—Mr. Chas. Jolliffe, 419 Gladstone avenue, will erect a pair of two and a half storey dwellings on the east side of Kendall avenue, near Wells street. The buildings will be of brick construction and cost $6,500.

Toronto.—Mr. J. E. Peterkin, 43 Sinclair street, will erect two pairs of semi-detached two and a half storey brick dwellings on the west side of Brock avenue, near Bloor street, at a cost of $8,000.

Toronto.—Mr. H. A. Marshall, 5 Carlton street, will erect a two and a half storey brick dwelling at the corner of Poplar Plains road and Macpherson avenue, at a cost of $2,500. The building will be erected by day work, the owner supplying all materials.

Toronto.—Mr. F. J. Cornell, Heyworth avenue, has been awarded the general contract for a pair of two-storey dwellings to be erected on the west side of Curzon street, near Doel avenue, for Mr. Jas. Crothers, 144 Curzon street. The building will be of brick construction and will cost $3,500.

Wychwood Park, Ont.—Architects Eden Smith & Son, 199 Yonge street, Toronto, have awarded the following contracts for a two-storey residence to be erected in Wychwood Park, for Mr. E. E. A. DuVernet, 199 Yonge street: Masonry, N. E. McGregor, 243 Arthur street; carpentry, Robinson & Wilson, 1123 Dufferin street; plastering, Hanna & Nelson, 271 Rusholme road; painting and glazing, Hughes & Co., 884 Yonge street; wiring, Jones & Moore, 296 Adelaide street west; galvanized iron, Douglas Brothers, 124 Adelaide street west; plumbing, J. T. Aggett, 880 Yonge street.

Hamilton, Ont.—Alderman Cooper is negotiating for a site in the east end, on which he intends erecting six brick houses.

St. Catharines, Ont.—Architect Thomas H. Wiley has prepared plans for a dwelling to be erected on the "Martindale" Fruit Farm, for McSloy Bros. It will be of brick and frame construction, with Georgia pine interior finish, electric lighting, open plumbing, mantels, etc.

Ottawa, Ont.—It is stated that the Hon. William Pugsley will erect a large apartment house on Victoria street, near Bank street. The city has granted Mr. Pugsley permission to construct a tunnel under Victoria street.

Bowmanville, Ont.—Architects Eden Smith & Son, 199 Yonge street, Toronto, have awarded the following contracts for a two-storey brick residence to be erected at Bowmanville, Ont., for Mr. J. W. Alexander, 199 Yonge street, Toronto: Masonry, William Brock, Bowmanville; carpentry, Chas. Neal, Bowmanville; plumbing, J. T. Aggett, 880 Yonge street; wiring, Jones & Moore, 296 Adelaide St. W., Toronto.

Creemore, Ont.—Architect Philip C. Palin, Collingwood, has prepared plans for a pressed brick dwelling to be erected in Creemore, for Mr. D. McArthur, at a cost of $3,000.

London, Ont.—Architect Wm. G. Murray has prepared plans for a $5,000 addition to residence of Mr. B. I. Smallman, Colborne street. It will be of brick, with tile roof, mantels, electrical work, plate glass, etc.

Montreal.—Architect R. Montgomery Redden, 8 Beaver Hall Square, has awarded to Messrs. Laird Paton & Sons, Ltd., 485 St. James street, the general contract for the erection of a summer residence at Val Morin, P.Q., for Mr. Richard Griffin.

Montreal.—Architect Joseph Perrault, 17 Place d'Armes Hill, has prepared plans for a block of apartment houses to be known as "Viewmount Court."

Montreal.—Messrs. Gray & Wighton, 7 Park avenue, have been awarded the general contract for the erection of an apartment house on St. Joseph boulevard for Mr. Louis Richer.

Montreal.—Architect Robt. Findlay, 10 Phillips Place, has prepared plans for a residence to be erected on Westmount boulevard, for Mr. F. T. Watson. It will be of brick construction, with slate roof, hardwood floors and interior finish, open plumbing, hot water heating, electric lighting, electric bells and two mantels.

Montreal.—Architect A. F. Dunlop, Lindsay Building, has awarded to Messrs. Gray & Wighton, 7 Park avenue, the contract for the masonry and brickwork for the erection of the Tatley Apartments on Lorne Crescent.

Montreal.—Architects E. & W. S. Maxwell, 6 Beaver Hall Square, have prepared plans for a brick apartment house to be erected on St. Charles Borromee street, for Mr. Joseph Binnett.

Montreal.—Architect J. Seath Smith, 207 St. James street, Montreal, has prepared plans for an apartment house to be

erected on Mackay street, for Mr. R. C. Murphy.

Montreal.—Architects John James Brown & Son, 207 St. James street, have awarded to Mr. Jas. Young, Outremont, the contract for the masonry and brickwork, for the erection of the Meikle apartment house on Major street.

Montreal.—Mr. Joseph Boulack, 750A Boulevard St. Joseph, will erect an apartment building on St. Louis street, to cost $10,000.

Montreal.—Mr. T. Dwyer, 13 Manufacturers street, will erect a residence on Durocher street, Outremont, at a cost of $5,000.

Outremont, P.Q.—Mr. Joseph Attier, 62 Villeneuve street, will erect an $8,000 brick apartment building.

Moncton, N.B.—Mr. P. M. LePlant has been awarded the contract for a house, to contain four dwellings, to be erected for Mr. A. S. Wartman, at a cost of $5,200. The building will be of frame construction, with stone foundation, shingle roof, warm air heating, electric lighting, plumbing and mantels.

Winnipeg, Man.—Architect V. W. Horwood has prepared plans for a ten room brick residence to be erected at Amherst and Harvard streets, for Mr. A. B. Stovel.

Winnipeg, Man.—Mr. A. Kristmann will erect five houses on Victor street, to cost $15,000, and four on Aiken street, near Machray, to cost 10,000. Mr. Arni Eggertson will erect fifteen houses on Victor street, this summer.

Winnipeg.—Architect Herbert B. Rugh has completed plans for a residence to be erected on Harvard avenue, for Mr. G. S. Robertson. It will be of brick veneer, with stone trimmings, and will cost $10,000.

Winnipeg, Man.—Messrs. E. M. Counsell and W. W. Cross will erect a three-storey brick apartment block at the corner of Wardlaw avenue and Stafford street, at a cost of $45,000. The first storey of the building will consist of stores. John D. Atchison is the architect.

Winnipeg, Man.—Architect J. H. G. Russell has completed plans for a four-storey apartment block to be erected on Edmonton street, near Portage avenue, for Messrs. J. Crichton & Company. The building will be of brick construction and will cost approximately $40,000.

Winnipeg, Man.—Architects Northwood & Noffke, 26 Central Chambers, have finished plans for a $30,000 apartment block to be erected for a syndicate on Spadina avenue, at the end of Rose street.

Vancouver, B.C.—Architect W. F. Jones has prepared plans for a three-storey apartment house, to contain eighteen suites. Owners name withheld.

Vancouver, B.C.—Architect Wilkie Allan, 614 Hastings street west, has prepared plans for a sixty-four suite apartment house, to be built on Alborni street for an American company.

Vancouver, B.C.—Mr. Edward Hobson has prepared plans for a three-storey store and apartment building, to be erected at the corner of Smithe and Homer streets.

Vancouver, B.C.—Architect William Frederick Gardiner has prepared plans for a residence to be erected for Mr. W. D. Morrison.

Vancouver, B.C.—Architects Grant & Henderson, Granville street, will erect a large house and garage at Kitsilano, for Mr. R. P. McLennan.

Saskatoon, Sask.—Architect W. W. LaChance, Saskatoon, has prepared plans for a $35,000 brick apartment house to be erected for Mr. Newton Baldwin.

Indian Head, Sask.—A. M. Fraser, architect, has completed plans for a residence to be erected for W. J. Stevenson and C. J. Lennox; also a large addition to the residence of H. C. W. Wilson.

Edmonton, Alta.—Architects Barnes & Gibbs have awarded to Messrs. McSpoiran & Co. the general contract for a $3,900 residence to be erected on 13th street for Mr. H. B. Spratt.

Hotels

Toronto.—A number of American capitalists have practically secured a site on Yonge street, on which they propose to erect an eleven-storey hotel building to cost $1,500,000. The following are prominent in the undertaking: Mr. E. Clark King, manager of the Brighton Beach Hotel; Col. E. W. Pratt, of Boston; Mr. H. H. Deyo and Mr. J. M. Smart, financiers of New York city. Plans for the building have been prepared.

Keewatin, Ont. Architect V. W. Horwood, Winnipeg, Man., has prepared plans for a large hotel to be erected at Keewatin, Ont. Estimated cost, $40,000. The hotel will be under the direction and ownership of the Winnipeg and Lake of the Woods Development Company, Ltd.

Montreal.—Mr. A. J. Higgins, of Higgins & Cooper, lessees of the St. Lawrence Hall, is endeavoring to promote a company to erect a ten-storey hotel building on Phillips Square, at cost of one million dollars.

Sherbrooke, P.Q.—Architects White & Fouids have prepared plans for a large four-storey brick hotel to be erected at the corner of Belvidere and Victoria streets for Messrs. F. J. and W. H. Southwood.

Vancouver, B.C.—Plans have been prepared by Architect E. Stanlay Milton for a four-storey hotel to be erected on Westminster avenue, between Harris and Barnard street, for the proprietors of the Sherman Hotel.

Opera Houses and Rinks

Winnipeg, Man.—The Granite Curling Club will erect a new three-storey building according to plans prepared by Architect Herbert R. Rugh. The building will be of solid brick, and will cost $40,000.

Winnipeg, Man.—Plans have been prepared by Architects Smith & Bruce for the construction of a theatre, with a seating capacity of 1,000 to 1,300. The structure will cost $50,000.

Fire Stations and Jails

Toronto.—The supplementary estimates provide for the sum of $150,000 for the purchase of lands and the erection of buildings, for the Provincial prison.

Calgary, Alta.—The following estimates will be placed before the City Council by the Board of Commissioners for new fire stations and equipment, viz.: Fire headquarters, with steel concrete floor, $38,750; sub-station, Bankview, $6,049; sub-station, Roverside, $6,049; sub-station, Hillhurst, $6,049.

Schools and Colleges

Berlin, Ont.—The School Board has decided to purchase the property at the corner of David and John streets, as a site for a central school for the advanced grades.

Chatham, Ont.—The Board of Education has authorized the Building Committee to engage an architect to prepare plans for the proposed addition to the Collegiate Institute at this place. Estimated cost, $15,000.

Windsor, Ont.—The Board of Education has decided to erect a four-room addition to the Collegiate Institute, at a cost of $15,000.

Singhampton, Ont.—The town of Singhampton will erect a two-room brick school building. Estimated cost, $3,500. Philip C. Palin, Collingwood, Ont., is the architect.

Stratford, Ont.—The City Council has approved the Public School Board's projected plan of erecting a four-room addition to the Shakespeare School.

Dorchester, Ont.—Architect Wm. G. Murray, London, Ont., has prepared plans for a one-storey cement block school, to be erected at Dorchester. Estimated cost, $4,000.

Port Arthur, Ont.—Plans submitted by architects Simpson & Young, 17 Toronto street, Toronto, have been accepted by the Board of Education, for the erection of a new Collegiate Institute and gymnasium to cost $65,000.

Sudbury, Ont.—The Board of Education propose to erect a new high school this summer.

Orillia, Ont.—The Public School Board has under consideration the erection of an additional wing to the West Ward School, and the installation of a steam heating plant.

Dresden, Ont.—Architect J. W. Wilson, of Chathom, has prepared pencil sketches of the proposed new $25,000 school building to be erected at Dresden, Ont.

Montreal.—Plans for the new building to be erected for the Montreal Technical School are on file at the office of W. J. White, secretary-treasurer, room 52, Montreal Street Railway Building. Tenders will be received up to noon, April 24th.

Montreal.—The Protestant Board of School Commissioners have decided to rebuild the Royal Arthur School, recently destroyed by fire.

Montreal.—Architect G. A. Monette, 97 St. James street, has prepared plans for the erection of a Girls' School in Point St. Charles, for the Catholic School Commissioners.

Notre Dame De Grace, P.Q.—Architect G. A. Monette is preparing plans for a school to be erected at Notre Dame de Grace for the Catholic School Commissioners. The building will be of stone construction, with slate roof, maple floors, open plumbing, hot water heating, combination lighting, fire escapes and fireproof doors.

Halifax, N.S.—The Civic Finance Committee will recommend to the City Council that the property bounded by Morris, Carleton, Sumner and College streets be sold to the Dalhousie University for the sum of $10,000, as a site for their new building.

Moncton, N.B.—At a meeting of the School Board a motion was passed authorizing the Secretary to ask for estimates for the cost of a new school building.

St. John, N.B.—Architect F. Neil Brodie has prepared plans for a two-storey school building, to be erected for the Catholic Bishop. The building will be of brick and stone construction, with concrete foundation, steam heating, pitch and gravel roof, plaster interior finish.

Winnipeg, Man.—Work is to be commenced at once on the new addition to St. Mary's Academy. It will be four stories in height, of solid brick construction, and is estimated to cost $50,000.

Minnedosa, Man.—The School Board has awarded to Mr. Fred. W. Mercer the contract for the construction of the new school building. Contract price, $36,350.

Vancouver, B.C.—The plans for the new brick High School, to be erected at the corner of Parker street and Cotton drive, have been completed by the School Board architect, Mr. A. C. Hope. Estimated cost, $40,000.

Kamloops, B.C.—New school buildings will be erected here as follows: One on J. Adamson's property in the south ward, and one on Thos. Cooper's farm on McKay road, in the north district.

Saskatoon, Sask.—Architect W. W. LaChance has prepared plans for a brick school building to be erected at a cost of $35,000.

Saskatoon, Sask.—The trustees of the High School Board, Saskatoon, have selected a property on what is known as the Louise Grounds, as a site for the proposed new $100,000 school.

Nutana, Sask.—The Nutana School Board has accepted the plans prepared by architect W. W. LaChance, Saskatoon, for the proposed new eight-room school building to be erected at this place.

Edmonton, Alta.—The School Board have completed negotiations for the purchase of a site on which they will this summer erect a new high school building.

Claresholm, Alta.—The School Board will erect an addition to their present school building at a cost of $15,000. Architects' plans may be submitted on or before April 20, to the secretary, H. W. Brownlee, Claresholm, Alta.

Civic Improvements

Toronto.—The City Engineer has recommended the construction of the following pavements, viz.: Asphalts—Dufferin street form Lindsey avenue to Bloor street, $15,594; Van Horne street, from Dovercourt road to Bartlett avenue, $6,134; Frizzell avenue, from Pape avenue to Kiswick street, $3,611; Foxbar road, from Avenue road to St. Clair avenue, $6,981; Fermanagh avenue, from Sorauren avenue to Roncesvalles avenue, $8,742; Ulster street, from Bathurst street to Major street, $7,118. Asphalt Block—Shaw street, from Bloor to Essex, $17,647. Bitulithic—Grafton avenue, from Roncesvalles to Triller, $3,380.

Hamilton, Ont.—The Board of Works has approved of estimates providing for an expenditure of approximately $140,000 on road work, of which over $116,000 will be used for pavement work.

Winnipeg, Man.—The City will expend the sum of $1,113,483 on asphalt pavement this season.

MONTREAL'S NEW POLICE STATION.---Continued from Page 41.

other members stood aside in order that the Chairman should have his turn. Probably it was intended that way from the very inception of the project. Ex-Alderman Houle asked, when the site for No. 13 Station was purchased, that it be measured before the city accept it. Mr. Houle's amendment was lost, and evidently for a good reason. What public official would buy as blindly as this in a private deal? We do not know of one. And how was the city to protect itself in event of litigation with adjoining property holders without an accurate record of the size of the lot?

Another thing which looks decidedly *"off color,"* is the fact that $1,500 of the $2,500 deposited by Mr. Aube with his tender, was refunded by the City Treasurer to Messrs. Proulx on an order from the Police Board. It is another evidence of official knowledge of the whole transaction. Messrs. Proulx had no right to be recognized in this manner at all. In the eyes of the city Mr. Aube was the general contractor. He was responsible for the execution of the work and the amount of his deposit should have been paid back to him or his depositor, and not to an apparent outsider.

Considering the mass of damaging evidence which has been gathered, what chance did an honest contractor have to secure the work? Absolutely none. Not with an official clique ready to subvert the interest of the city to their own private gain; not with an architect who would permit his professional reputation to be dragged into the mire of political corruption; nor with contractors who were willing to do dishonest work when the opportunity presented itself.

Can it be wondered at, in view of circumstances of this kind, that the honest architect and the honest builder, identified with a public improvement which is over and above board, is often subjected to an undeserving mistrust? Such a condition brings both the profession of architecture and the business of contracting, into disrepute. It is a case where the innocent as well as the guilty suffer, and that is wherein the greatest evil lies. No self respecting architect or one who has any regard for his profession; nor any builder who values his good name, or is desirous of promoting the interests of his craft, would permit himself in any way to become entangled in such a despicable and debasing piece of business.

"That there is good and bad in all things," is a proverb that does not hold good in the case of Police Station 13. In its entire fabric and in the circumstances which led up to its erection, there is nothing but that which is absolutely putrid. It is hard to realize how it was ever permitted to be erected in view of the gross "skimping" which was carried on, and it certainly does not speak very highly for the vigilance of Montreal's Building Department. If a proper system of inspection had been maintained, these glaring defects could not have been possible, as even the most cursory examination would have shown that the structure was being put up contrary to the plans and in direct violation of the building by-law.

After what has been brought to light in connection with this scandal, Montreal is perfectly justified in having a superstitious dread of *Number Thirteen*, and if a Royal Commission is appointed to further, probe the charges, it will be found that its most baneful element is *graft*. Montreal is in need of some sort of exorcism, to drive away its evil spell. Just a purging of certain civic departments would undoubtedly prove efficacious. But the most unfortunate thing of the whole affair is, that Police Station No. 13 is so rotten in its construction, as to be entirely unfit, even to incarcerate those who were responsible for its erection.

MEETING OF A.I C. AT TORONTO.---Question of Federation and Other Business Matters Taken Up. ---Exhibition of Toronto Society of Architects.

THE ARCHITECTURAL INSTITUTE of Canada held a council meeting in the rooms of the Ontario Association of Architects, in Toronto, on April 6, at which a number of applications for membership were received and dealt with, and other business matters of the society taken up. A number of associates, fellows, honorary members, and corresponding members were elected, and the vice-presidency, recently held by the late Maurice Perreault, was filled through the election of Mr. J. G. Resther, of Montreal.

Mr. J. P. Hynes, of Toronto, gave an interesting address on Architectural Education, in which he contended that in true architectural education it was the aesthetic that should be developed, more than the scientific. He did not believe that it was at all possible that the educational standing of architects could properly be determined or regulated through legislation. Such could only examine in construction and sanitation. It would be impossible, as well as impracticable, to provide any examination that would test a man's knowledge of art and design. He believed it, therefore, detrimental to the high ideals of the architectural profession,, that any legislative standard should be enacted. Such licensing or registration, he claimed, would have the effect of developing science and not art in the profession, and that a man could not be an architect, and should not be qualified to use such a term, simply because he had qualified before an examination testing his scientific knowledge of construction.

While the significance of Mr. Hynes' remarks were fully appreciated by all those present, his views upon the question of licensing and registration, were by no means unanimously held by his hearers.

The architectural Institute met in the evening, in the rooms of the Ontario Society of Architects, representatives of the various architectural bodies in Canada, for the purpose of determining upon some mutual arrangement whereby all architectural societies throughout the Dominion would become federated under one head (the Architectural Institute of Canada). While no definite action was taken, as a result of this meeting, it was valuable in so far as it gave each representative a complete and fair understanding of the views of the various associations, and it will undoubtedly be the means of forming some equitable basis upon which this desired end may be attained.

A smoker was given at the galleries of the Ontario Society of Artists in the evening, and visiting members were entertained by a number of addresses on subjects pertaining to matters of interest to the profession. One of the splendid features of the evening was the exhibition of architectural drawings, exhibited in the gallery of the O.S.A. by the Toronto Society of Architects. This exhibition is held annually by the latter mentioned organization, and is yearly increasing in both the quality of the work exhibited and the interest manifested in the exhibition by those interested in art and architecture. There were in all 326 exhibits, 221 of which belonged to the architectural section, and 105 to the Arts and Crafts. As an indication of the broad fellow feeling that exists among the various architectural organizations, it was to be noted that a very large number of the architectural drawings exhibited were loaned to the Toronto Society of Architects, by members of other architectural bodies. In view of the fact that this exhibition is carried on annually, solely by the Toronto Society of Architects, this fact augurs much for the broadmindedness of sister associations.

The Toronto Chapter of the Ontario Association of Architects entertained the visiting members of the Architectural Institute of Canada at luncheon at the National

Club. Mr. Geo. W. Gouinlock, president of the O.A.A., occupied the chair. A large number of prominent architects from various portions of the country were present, and addresses were given by Messrs. A. F. Dunlop and J. S. Archibald of Montreal, and Mr. J. P. Hynes, of Toronto.

T.S.A. SMOKER.

IN CONNECTION WITH THEIR annual exhibition, held in the galleries of the Ontario Society of Artists, the Toronto Society of Architects held its annual At-Home on April 13, and its smoker on the evening of April 15. Both functions took place in the gallery of the Ontario Society of Artists. The smoker was not only unique, but proved to be a highly successful event. A very excellent programme was arranged, and everybody present seemed to throw off the garb of conventionality, and enter into the spirit of the evening with great zest. About two hundred guests were present, not one of whom but appeared to thoroughly enjoy himself. This type of entertainment, although not usually indulged in by architectural organizations, proved to be a highly pleasant innovation.

THE LATE MR. HARRY D. WARREN.

MANY MEMBERS of the building fraternity will learn with profound regret of the death of Mr. Harry D. Warren, president and treasurer of the Gutta Percha and Rubber Manufacturing Company, Limited, of Toronto, which occurred at his residence, "Red Gables," in Toronto, on March 5. Mr. Warren had been ill for sometime, and had undergone two operations, but his recovery was confidently looked for by his family and immediate friends.

Mr. Warren was born May 8, 1860, in Brooklyn, New York, being the son of Dorman T. Warren, who is now a resident of New York City. His education was completed at Princeton University, after which he accepted a position with The Gutta Percha and Rubber Manufacturing Co., of New York. The company organized a selling agency in Canada, which was followed by the establishment of a branch factory at Toronto, the business of which, in 1887, was incorporated in Ontario as The Gutta Percha and Rubber Manufacturing Co. of Toronto, Limited. Mr. Warren had meanwhile gone to London to represent there the Otis Elevator Co., in which his father was a director, but in 1887 he returned to America, to accept the management of the Toronto business. In time the New York and Toronto companies became entirely distinct, and Mr. Warren became the head and guiding spirit of the Canadian company.

Mr. Warren was for several years a director of the Canadian Bank of Commerce, and associated in an official capacity with various otner companies and organizations. He was a member of the leading clubs of Toronto, Montreal, and Ottawa. For many years he occupied a high position in social and financial circles in Toronto, where he was most highly esteemed, and his death is a loss to the rubber industry generally, the city in which he lived, and the country in which he chose to make his home and in which his large interests were centered.

Mr. Warren was a member of St. Simon's Anglican church, and is survived by a widow and five children. His will provides that the business of the rubber company, in which he held a controlling interest, is to be continued as heretofore.

THE PROVINCIAL GOVERNMENT of British Columbia has appointed E. Cuddle, of Victoria, to the position of Supervising Architect of the Department of Public Works. The position was recently created, and Mr. Cuddle will have charge of the preparation of plans for all public buildings.

BUILDING STATISTICS FOR MARCH.---Steady Increases Noted in All Sections of the Country.---Twelve Cities Show Average Gain of 127 50 per cent.---No Indications of Let Up.

INSTEAD of there being any indication of a let up in the building line, greater activity becames manifest as the season advances, and it seems no longer a question as to whether Canada will surpass all previous records, but more of a matter of speculation as to how great the gain will actually be on the year's work. Returns for March as supplied CONSTRUCTION from centers reflecting the situation in every section of the Dominion, show that not only has the month registered a material increase over the substantial gains made in the two preceding months, but that a remarkable building wave is sweeping over the entire country.

Of the fifteen cities reporting, twelve submit comparative figures which place the gain for the month at 127.12 per cent. over the corresponding period last year, while in no place, it is gratifying to note, has a decrease been recorded. One thing quite evident, in view of the volume of construction now being carried on, is that the money of the country has found its way back into the channels of trade and that loans for good prospective investments are much easier to negotiate than for some time past.

The biggest increase for the month (646 per cent.) is noted in the case of Winnipeg which so far this year show an expenditure of $1,059,000 for new buildings as against $141,000 for the same months of 1908.

Peterboro has the second largest gain that of 294 per cent., and while the amount is small, it shows nevertheless that work undertaken was greatly in excess of that of the corresponding month of last year.

Edmonton, the only city in last month's table to show a falling off, has reasserted herself by recording a gain of 269 per cent., and Calgary has again come forward with an increase of 125,41 per cent., which is indeed remarkable in view of the high percentages this city has shown in the past four months.

Substantial gains are also noted in the case of Vancouver and Victoria which surpass last year's figures for March by 64.50 per cent. and 9.78 per cent., respectively. Both of these cities have shown a steady advance since the first of the year, and it is reported that at no previous time has there been as great an amount of work in immediate prospect.

A striking features of the month's report is the strong upward trend which prevailed throughout Ontario. Every city submitting comparative figures has more than doubled the amount in building operations, as compared to the month of March of last year.

Fort William's gain was 26.9 per cent.; Toronto 103 per cent.; Ottawa 106 per cent.; London 175 per cent.; Peterboro, as previously stated, 294 per cent.; and it is quite likely that equally as good a showing would have been recorded in the case of Windsor, Berlin and Kingston had comparative figures for the corresponding month

Continued on page 86.

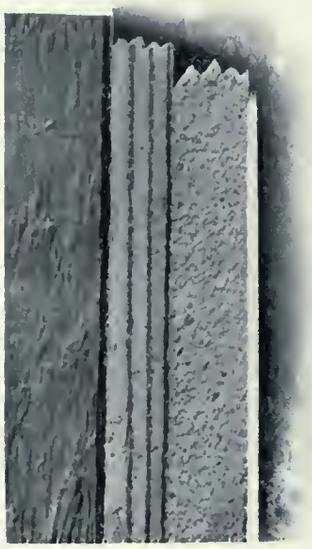
	Permits issued for Mar. 1909.	Permits issued for Mar. 1908	Increase per cent.	Decrease per cent.
Berlin, Ont.	$ 14,000	$		
Calgary, Alta.	94,900	42,100	125.41	
Edmonton, Alta.	179,395	57,020	232.15	
Fort William, Ont.	56,000	15 150	269.83	
Halifax, N.S.	109,490	29,300	273.68	
Kingston, Ont.	15,000			
London, Ont.	69,095	25,050	175.83	
Montreal, Que.	376,275	197,683	90.34	
Ottawa, Ont.	144,175	69,775	106.62	
Peterboro, Ont.	5,695	1,445	284.11	
Toronto, Ont.	1,703,640	838,130	103 29	
Vancouver, B.C.	788,750	485,555	64.50	
Victoria, B.C.	121.640	110,800	9.78	
Windsor, Ont.	42,000			
Winnipeg, Man.	851,700	114,100	646.45	
	4,510,955	1,966,108	127.12	

MACHINERY AND TRADE

SACKETT PLASTER BOARD.

A BUILDING COMMODITY which owing to its many meritorious features has much to commend it to architects and builders is Sackett Plaster Board. The universal recognition which this material has received since it was first introduced in 1891, is perhaps the best evidence as to how well it meets the requirements for which it is intended.

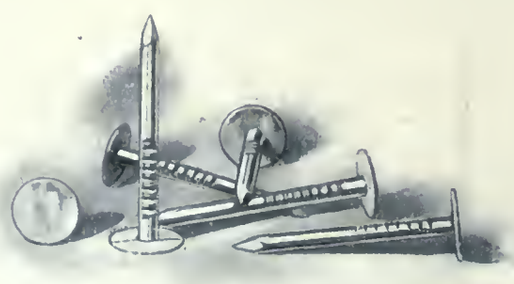
Combining lathing and fireproofing in one material, and effecting economy and speed in construction, Sackett Plaster Board is adapted to every character of building from the largest commercial structure, apartment house, hotel, hospital, theatre, down to the very smallest type of cottage. The material itself consists of alternate layers of felt and plaster, made on special machines, 32 x 36 inches. It is nailed directly to furring and studding, of the ceiling, walls and partitions and can be applied in



SECTIONAL VIEW (FULL SIZE) OF SACKETT PLASTER BOARD, APPLIED TO WOODEN STUD, WITH ⅞-INCH GROUNDS.

half the time required to cover the same surface area with the ordinary lath.

By its use there is no warping or swelling joists and frame work as in the case where wet mortar is applied, and it forms a perfect adhesion with the finishing



LARGE HEAD, 1¼ INCH 11½ WIRE NAILS BEST ADAPTED TO SECURE SACKETT PLASTER BOARDS IN PLACE.

plaster which results in a smooth, permanent and highly satisfactory surface.

Illustrated herewith are three cuts showing a full size sectional view of the plaster board, the manner in which it is applied and the style of nails best suited to fasten it in place. These serve to give a good idea of the thickness and texture of the material and the expedious and thorough manner in which the work can be carried out. The plaster board can be cut to meet any requirement with an ordinary saw when necessary,

METHOD OF APPLYING SACKETT BOARDS TO WALLS AND CEILINGS.

or by scoring it with a lather's hatchet it can be broken on a straight edge.

Aside from being most desirable for walls, ceiling and partitions, it also possesses the virtue of acting as a most effective deadener, and when laid under the floor and roof renders a house warm, dry and vermin proof. It is also especially adapted as sheathing instead of lumber under the weather board and is extensively used for this purpose. In manufacturing plants it is used as an effective and economical covering for exposed wooden parts as a protection against fire and, owing to its non-conductive nature it is an excellent material for insulation in refrigerating plants.

Sackett Plaster Board is now supplied to the Canadian trade by the Stinson-Reeb Builders' Supply Company, Montreal, who have recently taken over the agency for the entire Dominion. This firm through its wide awake business methods have built up a trade which make it one of the biggest factors in the building material line in Canada. Mr. Kennedy Stinson is a member of the executive board of the Canadian Cement and Concrete Association and one of the best known supply men in the field to-day.

Send for their booklet showing views of buildings in which Sackett Plaster Board has been used. Among the Canadian buildings illustrated are Renouf Building, Montreal; the Canadian Pacific Railway Company's buildings, Winnipeg; and the fine residence of Wm. Price, Quebec City.

NEW GREENING CATALOGUE.

THE FIRST OF A SERIES of illustrated catalogues, each on a separate line of goods manufactured in the several departments of the B. Greening Wire Company, has come to hand, and is a mots comprehensive compilation of descriptions of wire screen-

ing, wire cloth and perforated metal, manufactured by the above firm.

In appearance, this book is everything that could be desired, being an excellent example of the printers' art. To the user of these materials, this book will prove a very instructive and useful one. It is copiously illustrated, and has a number of tables of hard wire screening, showing the decimal of the wire and the weight of the finished article. In wire cloth, tables are shown giving almost every possible mesh and weight in this material that is likely to be called for, from 3-4 in. to 90 mesh, together with the gauge of wire and the decimal size of the opening. Illustrations are given of wire cloth suitable for different purposes, such as milling, bolting, for threshing machines, sand machines, malt kiln floors, etc. The table of both brass and copper wire and further full tables and illustrations of perforated metals in steel, zinc, brass, copper, etc., are also given.

In the introductory pages, a half-tone is shown of the large complete plant of this firm, in Hamilton, and perhaps one of the most interesting half-tones in the booklet is that showing the four generations of Greenings that have been in the wire business as far back as the year 1799, and continuously up to the present date. A short sketch is given dealing with the history of the wire business, and the connection of the Greening family with this industry as far back as the year 1600. This book, we may say again, is one of the most interesting, if not the most interesting and instructive, covering this branch of the wire goods industry that came to our notice, and it will be found a very convenient reference book for those either using, buying, or specifying screening, wire cloth or perforated metal. Any of our readers who desire one of these books, can procure same by addressing the B. Greening Wire Co., at Hamilton. The other books, taking up the other branches of the wire goods industry, will follow in due order.

MECHANICS' SUPPLY COMPANY.

WE ARE PLEASED to draw our reader's attention to the attractive advertisement appearing in this issue, of the Mechanics Supply Company, Quebec City, one of the largest jobbing concerns of its kind in Canada. This firm carries a most complete line of plumbing, heating, electrical and mechanical supplies and appliances, and it is admirably equipped to meet the requirements of the trade. A glance at the accompanying illustration will give a good idea of the number of employees the company now requires to look after its rapidly growing patronage.

The company solicits correspondence from any party constructing, remodeling or repairing houses. Their handsome illustrated booklet entitled "The Home Beautiful and Healthful" will be sent gratis to all interested parties.

BUILDING STATISTICS FOR MARCH.---

Continued from Page 83.

of last year been submitted. From the manner in which Toronto is forging ahead, it looks very much as though her total valuation for new buildings this year will come close to the $16,000,000 mark. Fort William also will undoubtedly have a much higher per cent. gain than ever before, while Ottawa will, in all probability, witness the greatest building year in her history.

In Montreal everything is moving along in a most satis factory manner, the gain for the month of 90.34 per cent. following the marked increases in January and February indicating that the metropolis is enjoying a very material expansion.

Halifax gain of 273 per cent. also brings her conspicuously to the fore, and despite of the falling off experience in January, this city has almost trebled her figures on the season's work.

Reports from the various cities as to future work shows the outlook to be most propitious. Kingston reports "very bright"; London "excellent prospects for all classes of buildings"; Windsor "bright;" Fort William "very bright;" Berlin "good"; Edmonton "looks very bright"; Calgary "excellent, never looked better"; Winnipeg "bright"; while in Toronto, Halifax, Vancouver, and Victoria many large improvements are in imediate prospect.

OFFICE STAFF OF THE MECHANICS' SUPPLY COMPANY, QUEBEC CITY.

Laprairie Bricks

Roman - Pressed - Plastic

FOR

Durability Elegance Economy

HAVE NO EQUAL.

HERE IS PROOF

Impervious to Fire, Water, Smoke and Frost. Cannot scale.

The only plant in Canada manufacturing all their product from Utica Shale Rock.

Tests at McGill University

Pressed Brick Absorption, 7.7%. Compression, 6,573 lbs. per sq. inch
Plastic Brick Absorption, 2.1%. Compression, 15,000 lbs. per sq. inch

The best of machinery and skilled workmanship, combined with natural color and quality of our material, gives the FINISH for which LAPRAIRIE BRICK are noted.

Fire-resisting qualities unequalled.

Immediate delivery made of any quantity.

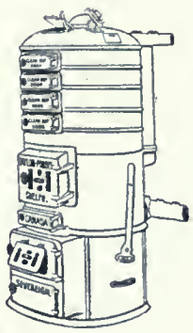
LAPRAIRIE BRICK CO'Y,

Limited

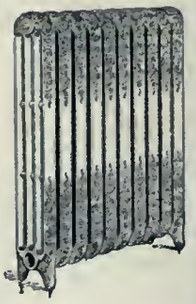
25 BOARD OF TRADE BUILDING

Montreal - - - - - - Que.

"Hill Croft," a Residential School for Young Boys in the Country. W. T. Comber, B.A., Wadham College, Oxford, and University College, Toronto, Principal. W. A. Langton, Toronto, Architect, and Morrison Bros., Lindsay, Heating Contractors. School is heated with one No. 7 and one No. 5 Twinned "Sovereign" Boilers and "Sovereign" Radiation made by Taylor-Forbes Company.



Taylor-Forbes heating systems, hot water and low pressure steam boilers and radiators, enjoy the patronage of the most experienced architects, builders and heating engineers.



"SOVEREIGN" Hot Water Boilers and Radiators

TAYLOR-FORBES COMPANY, LIMITED, GUELPH, Can.

Branches and Agencies:

TAYLOR-FORBES CO., 1088 King St. W., TORONTO. TAYLOR-FORBES CO., 122 Craig St. W., MONTREAL
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MECHANICS' SUPPLY CO., QUEBEC. H. G. ROGERS, 53½ Dock St., ST. JOHN, N.B.
THE BARNES CO., CALGARY, ALTA. VULCAN IRON WORKS Limited, WINNIPEG, CAN

ILG Self Cooled Electric VENTILATING FANS

The Ilg Patented, Self-Cooled Motor Fan is the only electric ventilating fan, using a direct connected, enclosed type motor, which cools and ventilates itself with clean, cool air taken from outside the building. The motors cannot become clogged with dust and dirt, or become over-heated, and they require less current to operate them than any other fan of an equal size. They are easy to install, run noiselessly, and require no attention whatever after once being placed in position.

They are particularly adapted for the ventilation of Theatres, Theatoriums, Churches, Assembly halls School and Hotel Lavatories, Hotel Dining-rooms and Kitchens, Restaurants, Grill Rooms, Lodge Rooms, Smoking Rooms, Laundries, etc.

Bulletin No. 50 sent on request

ILG AUTOMATIC SHUTTERS

The Ilg Shutter is an automatic device for protecting air vents or openings, used for ventilating purposes, against the ingress of sweeping winds, drafts and rain, which frequently cause annoyance and damage by blowing in through the unprotected vent when the fan is at rest.

These Shutters are opened by the force of the air current from the fan, and when the fan is stopped they will drop shut automatically by gravity. They can also be furnished with Solenoid Controllers, which can be connected to any standard light or power circuit, and the Shutter opened or closed by means of a switch operated from a distant point. The Solenoid Controller can be connected in series with the fan motor, so that the shutter opens and closes as the motor is started or stopped.

The Ilg Automatic Shutter consists of several horizontal, aluminum slats, pivoted into a rigid angle iron frame, heavily enameled, the rods are of bessemer steel copper plated, with working parts of phosphor bronze. They are not affected by any kind of weather or salty atmosphere and consequently do not corrode.

No attention need be given them. They take care of themselves.

FIG. 48. SHOWING SHUTTER CLOSED.

Write for Bulletin No. 50.

SHELDONS LIMITED

Galt - Canada

FIG. 49. SHOWING SHUTTER OPEN.

"A PERTINENT INSTANCE"—EDITORIAL IN APRIL "CONSTRUCTION" BRINGS TO LIGHT UNWARRANTED USE OF NAME OF PROMINENT ARCHITECTURAL FIRM. - -

UNDER THE CAPTION of "A Pertinent Instance," CONSTRUCTION in its last issue, had some emphatic outspoken things to say on the subject of professional ethics in general, and graft in particular, drawing up a composite case that illustrated very clearly its ideas regarding the evils of professional graft.

In the course of that article, we stated that *"the name of one of the largest architectural firms in Canada (if not the largest) had been carted about the country in promotion of a scheme,"* and that the name of the firm in question *"is associated with the project either with or without their consent."* Also that *"it has even been whispered, confidentially, that one of the members of the firm was financially interested in the enterprise."*

This article has naturally created more or less of a sensation, and has been a subject of wide spread discussion among the professional and commercial branches of the structural industry, and it is perhaps not unnatural that much speculation is rampant as to just what firms were referred to in the article.

Our attack upon the principle of architects' names being associated with enterprises outside their profession, which obligated them to firms whose materials they have the power to specify or reject, has already served one very valuable purpose. It has brought to light the fact, that the name of at least one prominent firm of architects, has been used without their knowledge or consent, in the promotion of a commercial enterprise, and these architects, after investigation, have been enabled to put a stop to any further use of their good name in connection with any such scheme.

It is with considerable pleasure that we state unreservedly, that the persistent and adverse trade comment of the past few months, connecting the name of this particular firm of architects with any such schemes, has been, we find, based on purely circumstantial evidence, and it is gratifying to us, and it must be to the whole profession, to be assured that there is no promoter or firm of promoters of schemes, who have any right to use in any way, shape, or form, in connection with such schemes, the name of this, one of the oldest and most reputable firms of architects in Canada, and, furthermore, if any one has used their name in connection with any such scheme, it has been wholly without their knowledge or consent.

CONSTRUCTION, during its short but aggressive and progressive career, has received not a few compliments from the industry to which it is devoted, regarding its various features, and in particular it has been praised for its fearless and outspoken attacks on the various forms of graft, chicanery, and unprofessionalism, which, unless vigorously stamped out in their inception, would eventually undermine every principle of professional and commercial decency. In following up this definite policy, an occasional concrete exposure of an incipient cancer must be made, and in every instance including those here under discussion, we have received an instantaneous response of approval of our action, from all the leading members of the architectural profession.

We might just add here that the condition of affairs that brings about the use of the names of reputable architects, for the promotion of any commercial undertaking, is most unfortunate, and any and every architect in the Dominion, should be most careful in just how far he permits his name to be used, and he cannot be too cautious, in even the endorsement of a proposition, in which it is the aim to solicit patronage from any branch or branches of the building fraternity.

While on the subject, let us make it perfectly clear to our readers that CONSTRUCTION stands fully back of every word it has said in its previous issues, and its stand against professional graft has the full endorsement of every architectural firm in Canada, including any of those whose names have been used in conection with any such enterprises as referred to. As comment had existed, such an editorial was necessary, and the profession quite concurs with us in this view.

If through CONSTRUCTION's stand on this very important subject, the improper use of the names of architects by promoters of the various schemes that are annually brought before the contractor, the building material dealer, and manufacturer, we have served no other purpose than making architects more careful how they handle the man, who wants to secure their endorsement or support in soliciting patronage from men with whom the architect's name might have some influence, we believe it has served the profession well.

YANKEE CONTEMPORARY CALLS "CONSTRUCTION" PEVISH AND ITS POLICY AGAINST UNLAWFUL IMPORTATION OF FOREIGN PLANS, MERCENARY. - - -

CONSTRUCTION IS CALLED "PEVISH" by our contemporary, THE WESTERN ARCHITECT, because we were not inclined to accept their charitable advice about the benefits the profession in Canada would enjoy through the encouragement of the importation of plans of American architects.

Our contemporary says American architects do not care, whether or not, foreign architects are allowed to design buildings in the United States. Then why does not the American republic take down its tariff walls against the importation of foreign plans? And why are the U.S. custom authorities so diligent in the collecting of such duties? Our friend in Minneapolis says American architects are not concerned about securing a Canadian clientile. Then why do they go so far as to solicit (business) in Canada and attempt to devise schemes for avoiding the rightful payment of Canadian customs duties?

THE WESTERN ARCHITECT maintains that architects are alike the world over, and that they are not concerned about such boundries as are defined by such a plebian creation as a customs duty. This statement we hardly believe will hold water.

Again it charges that CONSTRUCTION'S stand is prompted by its consideration for the material man "for whose interests CONSTRUCTION wishes to pose as champion, and the prosperous appearance of that journal (CONSTRUCTION) would indicate that he (the material dealer) appreciates its efforts in his behalf." Canadian architects and material dealers know why CONSTRUCTION looks prosperous. We have no explanation to make on this score. However, we would state that CONSTRUCTION does not preceed its editorial pages with a *"Publisher's Department,"* a department devoted exclusively to free readers designed to boost the products of its advertisers. Our contemporary makes the still more amusing statement that it is published in the interests of Canadian architects, "from *Nova Scotia* to Vancouver (why not say Halifax to Vancouver) in quite the same proportion that it is, say, on the Pacific Coast from Vancouver to Los Angeles."

At first glance we are inclined to accept this statement, for in looking through the illustrations of the April issue of the WESTERN ARCHITECT, we find two Canadian buildings treated, a residence at Walkerville, Ontario, and a bank at Windsor. Six pages are devoted to the former and one to the latter. But upon closer observation, we discover that one was designed by a Detroit architect and the other by a New York architect.

We believe if nothing else, the publication of these two structures erected in Canada and designed by foreign architects, will convince Canadian architects that THE WESTERN ARCHITECT is entitled to pose as the champion of their cause, and that it is published in the interests of Canadian architects from Vancouver to (Nova Scotia) just as much as it is published in the interests of American architects from Vancouver to Los Angeles.

MORE STRINGENT REGULATIONS URGED FOR PROTECTION OF CANADIAN ENGINEERING PROFESSION—FOREIGNER OFTEN GIVEN PREFERENCE. - - - -

"THEORETICALLY it may be all right to have the engineering profession as broad as the four winds of Heaven, but practically I say it is absolutely absurd and ridiculous." This was a statement made by one of the members of the Canadian Society of Civil Engineers, at one of their sessions of the Annual Meeting recently held in Toronto. This statement was brought forth in a discussion of the question of the employment of foreign engineers on Canadian work. It was pointed out that Canadian corporations had in many cases given foreign engineers the preference while there were many capable young members of the profession in Canada, who had been out of employment during the major portion of 1908.

In the same discussion, it was further pointed out that the qualifications for admission to Associate membership of the Society were greatly at fault, in that it permitted many foreigners who were without qualifications equal to those of the graduates of our schools of Applied Science in Canada. While there were some members that thought the Society should be an international one, there was a strong feeling that some action should be taken to protect the profession in Canada against the incursion of foreign engineers who flocked to Canada, when out of employment in their own country.

Canada, without doubt, offers excellent opportunities for the young engineer. The vast amount of railway construction, municipal work, bridge construction, building construction, water power development, electrical construction, development of mines, and in fact, engineering work of almost every description, will attract engineers from every country in the world.

On the other hand, our schools of Applied Science are sending forth hundreds of young Canadian graduates every year. If Canadian work is to be done by foreign engineers, then must the young Canadian seek employment in other climes. This surely is not a condition to be desired. Why should English or American engineers be permitted to come to Canada, a land foreign to them, and exile our own citizens to foreign lands. Why should we trade a stout hearted Canadian for an American or a German.

If protection is given to the corporation that employs the engineer, why should not the same paternal government protect the engineer. If it is deemed expedient to protect the manufacturer against the dumping of foreign products upon the Canadian market, why should not the professional man be protected against the dumping of foreign, surplus, professional services in Canada.

Canada is a rich country. The Twentieth Century belongs to us. The world is waking up to a realization of this fact, and we must see to it that we hold what we have. It is hard to understand how Canadian corporations can expect the public to sympathize with their plea for more protection when they insist upon going upon the open market for professional services, yes even their labor.

APRIL BUILDING RETURNS FROM REPRESENTATIVE CENTRES IN CANADA SHOW A CONTINUANCE OF MARVELLOUS GAINS.

THE HIGHLY SATISFACTORY condition in the building line, so marked during the first three months of the year, still prevails, and April tacks on a substantial increase over the corresponding month of 1907, to the splendid gains already made so far this season. All sections of the country are enjoying a steady advance in construction work and it seems quite evident in view of the heavy influx of settlers into western provinces of the Dominion and the attendant growth of the middle and eastern portions, that even the high percentage gains already attained will be surpassed within the next few months.

The average gain for April, as based on returns submitted to CONSTRUCTION from fifteen representative centres throughout the country, twelve of which supply comparative figures, is 53.36 per cent., and only one city in the entire list shows a falling off. This decline is noted in the case of Vancouver which, after an extended period of consecutive gains, records a decrease of 42.77 per cent. It is quite probable, however, judging from the indication at hand, that Vancouver will quickly wipe out the deficit as a large amount of work is at the present time on the tables in the various architects' offices.

The largest increase for the month, is that of Fort William, which takes the stellar position by a gain of 1180. per cent., a remarkable advance, especially so, in view of the enormous building strides this city has been making within the past two years.

Peterboro maintains the second place by virtue of a striking gain for the month, of 287 per cent., the total amount for permits issued being $81,721, as against $21,-110 for the same month of 1908.

The next largest increase noted is that of London's whose gain for the month is 149 per cent., following the lead of 175 per cent. for the previous month, shows the rapid and substantial growth which she is experiencing at the present time.

Toronto again registers a material gain, by an advance of 71.28 per cent., the total value of permits issued for new buildings being $2,003,398 as compared with $1,169,635 for April, 1908. It is expected that Toronto's monthly showing hereafter will be materially

improved by the recent annexation of West Toronto, as that city is building up very rapidly.

Other places in Ontario which are taking extraordinary steps forward are Berlin, Kingston, and Windsor, as is seen by the amounts set opposite their names in the following table. While none of these cities give comparative figures, all of them so far this year have more than doubled their totals over the corresponding months of last year.

In the eastern portion of the Dominion, Halifax and St. John both show material headway, the former again noting a big gain, (44.29 per cent.) and the latter a large volume of work (no comparative figures submitted) in its total for the month of $108,000.

Montreal's increase for the month, that of 169 per cent, which was received too late to be included in the following table, is the largest and fourth consecutive gain made so far this year; and as the present satisfactory condition promises to continue throughout the entire season, it is quite likely that Montreal will pile up a total annual amount greatly in excess of anything registered heretofore.

In the west every city, with the exception of Vancouver, has over-reached last year's figures for the month. Regina has a most gratifying increase of 131.12 per cent.; Winnipeg records 65.81 per cent.; Calgary 63.59 per cent.; Victoria 45.07 per cent., and Edmonton 6.75 per cent.

Reports as to immediate prospects are most encouraging, as is evidenced in the following notations: Calgary, "excellent"; Winnipeg, "good"; Windsor, "bright"; St. John, N.B., "fair"; Berlin, "exceptionally good"; Edmonton, "good"; Kingston, "very bright"; London, "continues excellent." Vancouver reports "the present outlook is for steady increase over last year for the next six months," while in Toronto, Montreal, Peterboro' and Victoria the indications were never better.

	Permits for May, 1909.	Permits for May, 1908.	Increase, Per cent.	Dec., P.C.
Berlin, Ont.	73,300	.....	.....	....
Calgary, Alta.	174,150	106,450	63.59	....
Edmonton, Alta.	210,890	197,453	6.75	....
Fort William, Ont.	1,114,900	86,500	1,188.90	....
Halifax, N.S.	57,125	39,590	44.29	....
Kingston, Ont.	43,000	.....	.....	....
London, Ont.	177,250	71,000	149.64	....
Peterboro', Ont.	81,721	21,110	287.11	....
Regina, Sask.	71,875	31,098	131.12	....
St. John, N.B.	108,000	.....	.....	....
Toronto	2,003,398	1,169,635	71 .28	....
Vancouver, B.C.	784,750	1,371,260	.....	42.77
Victoria, B.C.	188,060	129,625	45.07	....
Windsor, Ont.	65,450	.. ...	.....	....
Winnipeg, Man.	1,066,000	642,900	65.81	....
	5,930,119	3,866,621	53.36	....

ARCHITECT EDEN SMITH, TORONTO, ANSWERS CRITICISM OF HIS LETTERS IN "CONSTRUCTION" BY PRESIDENT OF TORONTO BUILDERS' EXCHANGE. - - -

WE PUBLISHED in the March issue of CONSTRUCTION a letter from Mr. Arthur Dinnis, President of the Toronto Builders' Exchange, in which he deprecated a statement made in a letter by Mr. Eden Smith, published in the February number of CONSTRUCTION, and advocated a closer relationship between architects and builders. We publish below a reply from Mr. Eden Smith.

From the tone of both Mr. Dinnis' letter and that of Mr. Smith, we are inclined to think that there is some misunderstanding between these two gentlemen on the points under discussion.

The following letter arrived too late for publication in April CONSTRUCTION.

Editor of Construction:

I am sorry to ask again to trespass on your pages, but I should like an opportunity to defend myself, as you allowed Mr. Dinnis to select some portions of sentences from my last letter and by means of them to accuse me of calling the Toronto Builders dishonest.

I do not resent his calling me egotistical or pharisaical, Mr. Dinnis' example will help me to cure that, but when the whole intent of that part of my letter was, using his own phraseology, "to boost not to knock," or to show, not that any one was dishonest but rather that some one was honest enough to be allowed about without fetters, I do not object to Mr. Dinnis' imagination making this an attack upon the innocent flock he shepherds, for no other reason, that I can see, but that he may prance up and down and gallantly rush to their rescue.

I only said in my letter that architects were honest, I did not say that builders or any one else were dishonest. Surely "honesty in work" is a phrase familiar enough to every designer, craftsman, or employer of labor to admit of its being used without libelous intent.

I might use Mr. Dinnis' own method of expression and ask him what kind of architects has he been in the habit of dealing with that he so indignantly resents my assertion of their honesty.

My letter contained no personalities. I did not consider my honesty was a part of the discussion and did not seek to advertise it. So far from thanking God "I am not like other men." I dare not claim even equality with Mr. Dinnis when as he points out "honesty admits of no comparative degrees," and that he in this quality is simply perfect. I am really content to be like Verges, "as honest as any man living that is an old man and no honester than I," but I am afraid again I shall offend Mr. Dinnis' grammatical ear when I quote Shakespeare, and I must not, like Hamlet, imagine a man might be "indifferent honest" or that to be "honest as this world goes is to be one man picked out of ten thousand." That would only be an allowance of seven hundred men in the Dominion of Canada, which if there are Builders' Associations in other towns would be so soon used up that it would account for Mr. Dinnis' surprise when I said architects were honest.

But for Mr. Dinnis' assurance that beyond all degrees of comparison he is absolutely honest, I should have considered it not quite straight forward to quote a portion of my letter which when read by those who did not know its context or the subject of the letter would be taken as an objectless expression of ill will.

Yours truly,

Toronto, April 13, 1909. EDEN SMITH.

O.A.A. ARRANGES WITH CANADIAN NATIONAL EXHIBITION BOARD FOR EXHIBIT OF ARCHITECTURAL DRAWINGS. - - -

FOR THE FIRST TIME in the history of the Toronto Exhibition, will there be space allotted for the special purpose of exhibiting architectural drawings. At this great Exhibition, attended by from 600,000 to 800,000 people annually, the securing of suitable space wherein noteworthy architectural drawings from every part of the Dominion may be exhibited, means much to the architectural profession in Canada. We know of no conditions under which the exhibition of architectural drawings could be held, that would make it possible to have the exhibits viewed by so large a number of people.

The Ontario Association of Architects are to be credited with this great victory for the profession, for it was through their efforts that the Exhibition Board consented to set aside space. Mr. Edmund Burke is chairman of the committee in charge of the exhibition, and he begs to announce that the committee is now prepared to receive drawings from architects from every portion of Canada, and, in so far as the space is somewhat limited, the committee will have to exercise a great deal of discretion in the selection of the most praiseworthy designs.

It is to be hoped that the architectural profession in Canada will show their appreciation of the consideration given them by the Exhibition Board, by doing their part to make this architectural exhibition as interesting as possible, so that this space may be retained year after year.

The new Roman Catholic Cathedral at Westminster, London, the finest and most extensive example of Byzantine architecture in England. This style of architecture is particularly interesting in that in its development the architects of Byzantine were the first to demonstrate the possibilities of brick in decorative work.

Residence of J. B. O'Brian, Upper Scarth Road, Toronto.—A recent adaptation of domestic architecture in which the artistic use of brick is seen. Eden Smith and Sons, Architects.

ARCHITECTURAL POSSIBILITIES OF BRICK.---The Early Uses and History of Its Development.---Examples of the Middle Ages in Northern Italy.---Modern Brick Buildings.---Brickwork, Ancient and Modern. By F. W. FITZPATRICK.---Brick from the Mason's Viewpoint. By T. B. KIDNER.---Ideals in Brickmaking. By A. BERG.

FROM A VERY REMOTE PERIOD in the history of man, down to the present day, brick has been more or less of an important factor in the architectural development of the world. It was an exigency placed by nature upon the Babylonian—the absence of quarries and forests—that first led to the utilization of clay as a building material, and if, as is asserted by eminent authorities, the earliest civilization was formed in Babylonia, brick, therefore, may be deemed the earliest material used in permanent construction, as well as the basis for the invention of the arch, dome, tunnel and other methods of vaulting which had their origin at the time.

Walls and ruins of brick have been discovered dating long before 4000 B.C. Both Egypt and Assyria early adopted the use of this material, although with the former the use of brick was not so general, owing to the abundance of building stone at hand. Assyria, however, followed Babylonia more closely, using stone hardly at all, except occasionally for foundations and facings. Two kinds of brick were generally employed—the crude or sun-dried, and the kiln-dried or fired brick, the latter being used principally for the facing of masses of crude brick so as to preserve them from disintegration, especially by water, and for thin and inner walls. The Babylonians allowed the bricks to dry thoroughly before use, but the Assyrians were satisfied with brief and imperfect desiccation; for usually it has been possible to detect separate courses and even separate bricks in Babylonian ruins, but in the Assyrian walls all individuality has been lost through the adhesion of moist surfaces.

Possessed of an innate sensuousness, the builders of those days were not slow to recognize the value and possibilities of the material they had at hand, and very substantial progress was made both as to quality and variety. Besides the regular sized burned bricks, others were moulded in special shapes and sizes—segments of circles for use in columns; wedge shapes for use in arches; triangular for corners, and even convex and enamel bricks came prominently into use. Usually one of the flat sides was stamped with the name and titles of the reigning king, and it is due to this means that archeologists have been enabled to fix the dates of many of the early temples and palaces in Babylonia and Assyria.

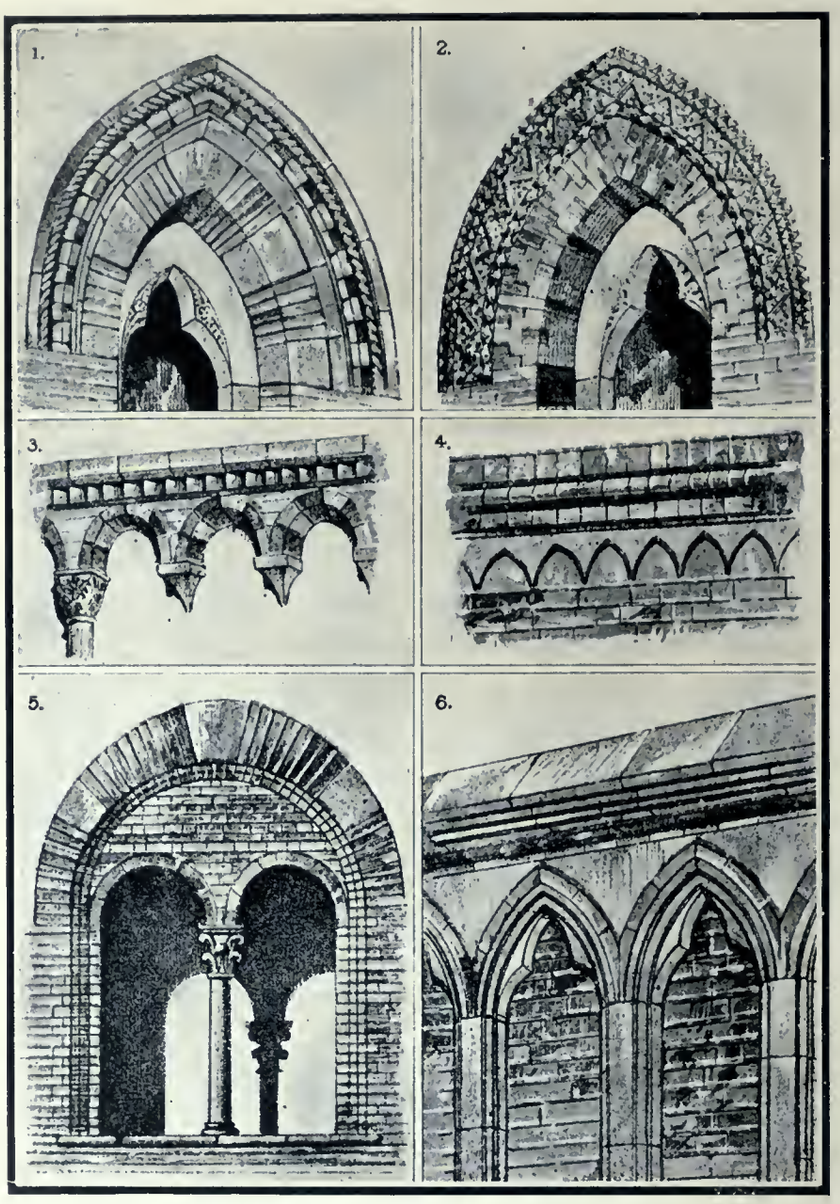
Other countries also took up the manufacture and use of brick. The Roman began by using crude brick almost exclusively, and sun-baked brick of ancient date have been found in the mud walls of old towns in India. The Greeks, owing to their possessing plenty of stone, cared little for building with burned clay, yet it is quite certain that crude brick was in general use among them, especially in the earliest times.

The Romans employed a smaller brick than any hitherto made—a norm 12 x 6 inches being adopted—and for the first time the square form was abandoned. At the time of the reign of Augustus, fire brick had largely substituted the crude, in both public and private buildings; and the adoption of concrete faced with fire bricks in place of the earlier stone walls, gave permanent prominence to this kind of construction throughout the civilized world.

With the rise of Christianity, brick work became even

Ed. Note.—The drawing of brick details of old Italian buildings used to illustrate this article are reproductions from Mr. Street's book on "Brick and Marble Architecture of the Middle Ages in Northern Italy."

more prevalent than ever. The followers of Christ when they threw off the yoke of paganism, discarded with it the forms, arts, and customs of the people who had oppressed them. Constantine and his Christian advisers—who in their campaigns through Persia and the east, had become impressed and fascinated with the charms and beauty of its arts, the architecture of its buildings, the material and knowledge of statics displayed in their construction, the perfection of form and correct balance between structure and ornament—employed in the main men trained in the Orient, if not Orientals themselves, in the upbuilding of the world's new capital at Byzantium, 328 A.D. The Byzantine architects made but little use of concrete, and stone as a basic building material practically ceased to be used throughout Hellanic lands by the Seventh Century. Brick was their principal material and by its use they were enabled to decrease the thickness of their walls without in any way sacrificing the strength or structural character of the building. For their domes they used hollow conical bricks of light clay, which fitted into each other and which gave a minimum of weight and a maximum of cohesion. Of the many splendid structures erected by the Byzantines, St. Sophia, Constantinople, the work of Anthemius and Isadore, two architects of Asia Minor, is the most notable. No other Byzantine church ever undertook to rival or imitate St. Sophia, even in plan, and for ages it has been the marvel of all who appreciate and admire the beauties of good architecture. It is the Byzantines to whom we are indebted for the first examples of decorative brick work. They soon sought to vary their surfaces, and the exterior instead of being of plain bricks, had alternate courses of brick and stone or marble, and were diversified by inset panels and patterns of relief, as well as by pilasters and arcades. Churches thus constructed became numerous in the Ninth and Tenth centuries.



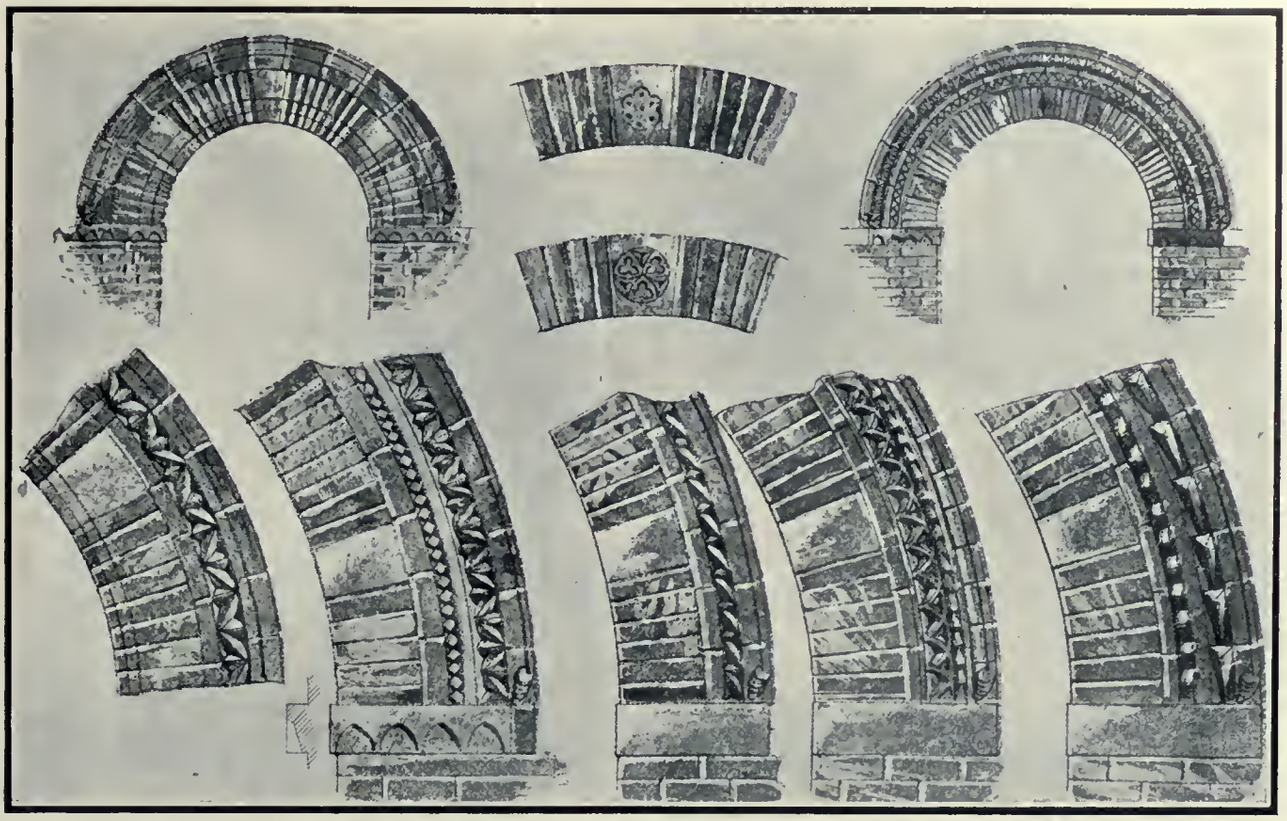
Italian Brickwork of the Middle Ages.—1 *and* 2.—*Windows at Verona.* 3.—*Cornice work, S .Ambrogio, Milan.* 4.—*Cornice work of Bretlotto, Brecia.* 5.—*Window in Broletto, Monza.* 6.—*Wall Arcade, S. Fermo Maggiore.*

In the west, however, owing to the decline of Rome and the universal decadence which followed, little or no progress was made in the use of brick. True, the architecture of the Byzantines, pervaded certain parts of Italy as early as the Sixth century, but it was not until the good traditions maintained in the east—not only by the Byzantines, but by the Mohammedans of Persia, Syria, Egypt and other countries—passed into the Romanesque art of Italy in the early part of the Eleventh Century, that any good brickwork appears.

When, however, it had taken a firm foothold, rapid progress was made in its use and development. There arose, at the time the one really decorative school of brick architecture in two main branches, the first and finer in northern Italy, the second in northern Germany. In the southern portion of France, the builders also gave expression to their ideas in considerable good brickwork, and it was here that wall patterns were sometimes obtained by bricks of different colors, or a mixture of stone and brick, especially during the Renaissance. Its largest monument, St. Termin, at Toulouse, is partly of brick, and the convent of the Jacobins, also situated there, is a most artistic brick structure.

But Italy remained pre-eminently the home of brick construction, and the Lombard School solved the problem of effectively combining it with details in marble and terra cotta, and by inventing a wonderful variety of molded bricks which have served down to the present day as models for ornamental brickwork. Pavia, Bologna, Cremona, Milan, Bergamo, Brescia, Verona, and many more cities, are full of churches and town halls—splendid examples of brickwork—built between the Eleventh and Sixteenth Centuries. Mr. Street's book, BRICK AND MARBLE ARCHITECTURE OF THE MIDDLE AGES IN NORTHERN ITALY, published in 1855—in which he gives the results of his studies and observations through that picturesque country—came as a revelation of its constructive and artistic uses.

To wander through the pages of this book is to journey through the most delightful and fascinating realm



Details of archivolts of the Broletta or Town Hall, Brescia, Italy, erected in the 13th century and still standing. Note the variety of exquisitely moulded bricks to be seen in this one building.

of brick architecture. At Brescia, one sees the Broletta or town hall—built in the 13th century—with its perfect west front characterized by beautiful detailed doors, rose window and cornice, all executed in finely moulded brick; and the brick church of San Francisco, with its

Brick window in north transept of Cathedral, at Cremona, Italy.

circular window, exquisite moulding and arched eaves cornice.

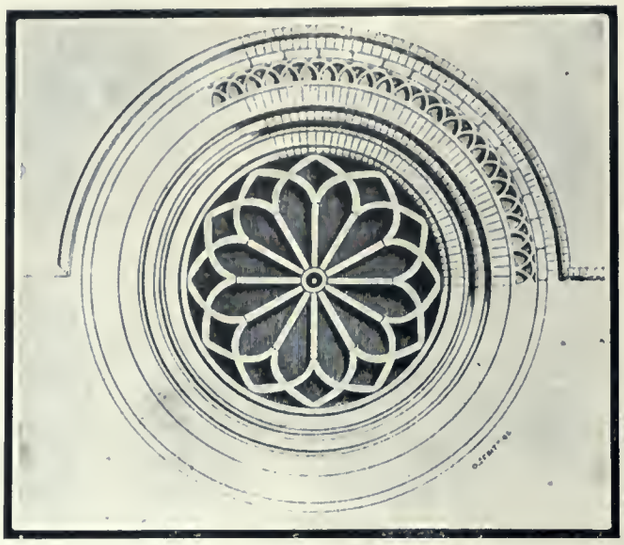
In Verona there is the campanile, a magnificent, lofty, simple, unbroken piece of brick work; the church of Sta. Anastasia, the noblest distinctly Italian church in Northern Italy; S. Pietro Maitre, a small church, with its windows marked by wide outside brick splays and arches built of alternate voussoirs of brick and stone; and the basilica of S. Zonona, a beautifully proportioned grand old church, with perfect details, breadth and simplicity, built of ordinary brick with red brick arch work. A particularly excellent example at this place, which the author describes, is an old house near the Palazzo Scaligeri, characterized by rounded and pointed arches, most of which have alternate voussoirs of brick and stone. Beyond the outside line of the arch is a line of very thin brick delicately defining, without pretending to strengthen the arch, while at the top, the house is finished with a quaint and swallowed-tailed battlement.

Another notable example is found at the extreme edge of the city of Verona, in the Ponte Pietri, a grand bridge spanning the rushing Adiga, built entirely of brick with parapets of the regular Veronese type. The pier between the arches are rather large and angular and finished with battlement rather above those of the bridge. The main arch, according to Murray, measures 160 feet.

Detail of window-jamb, Cremona, Italy.

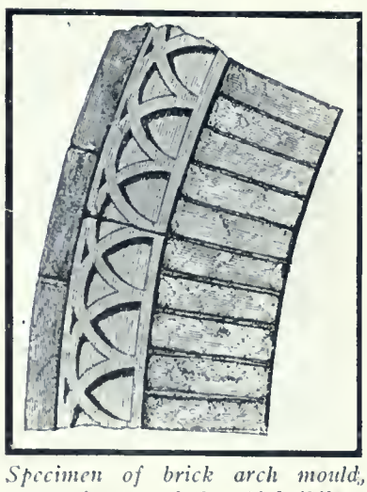
These and many other structures—such as the Church of St. Antony, built at Padua in 1231 by Nicolli Pisano, then one of the most eminent men of his day; the Ducal Palace at Mantua; the Palace of Jurist Consults, Cremona, and the bold use of brickwork as seen in Sta. Marie Glorisora Dei Frari and SS. Giovanna e Pavlo Madonna

dell' Orto in Vienna—serve to give an adequate idea as to the enduring qualities of brick and how readily it lends itself to architectural expression.



Detail of rose window, executed in brick, Cathedral, Cremona, Italy.

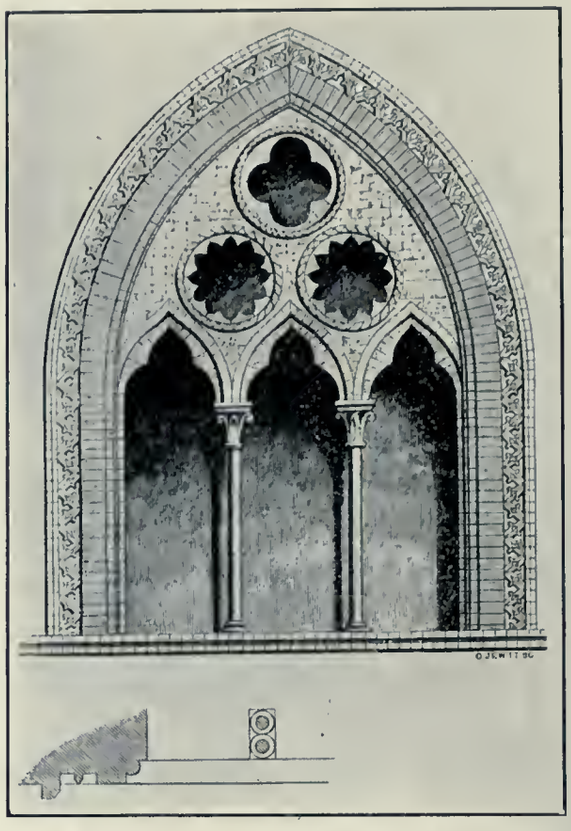
While in England, kilns were established as far back as the days of the Romans, the rise of Gothic architecture brought about a general decline in the use of brick and it was not until the Elizabethan period that their popularity again took hold. Then brick buildings rapidly multiplied and great progress was made, especially in the domestic architecture of the country. During the reign of Queen Anne a further impetus was given to its use and numerous buildings in which the artistic possibilities of brick was strikingly demonstrated, sprang up in all sections of the land. Thus we see the progress of the material in the early and middle ages, and how well the builders of those times found it adapted to meet their constructive and architectural requirements.



Specimen of brick arch mould, seen in one of the old buildings at Cremona, Italy.

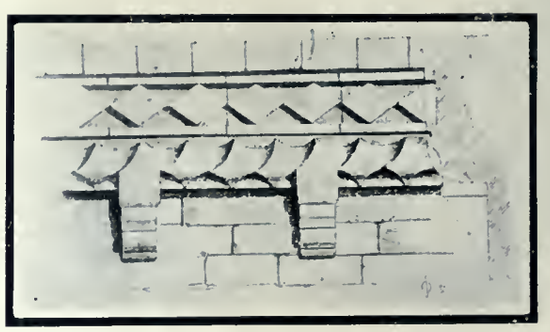
On this continent bricks were first made in the Colony of Virginia in the year 1612. Prior to that time small quantities had been imported from England and some fine examples of colonial architecture in brick work of the early days are still extant. However owing to the great cost of brick at that period and the large tracts of timber available, wood became the principal material employed, and it was not until after the revolutionary war that the manufacture and use of brick became general thing. Then followed a period of prosperity in which the people developed a taste for stonework, and brick for a while was regarded as being a secondary or inferior material; and again came the time when in the rapid growth of various sections, the builders utilized chiefly the materials native to their community. Field stone, quarried stone, brick or wood, was adopted according to the degree of their availability.

But in the past twenty-five or thirty years brick has become more of a general building product, until within the last few years its use perhaps over-reaches by far any other element related to building construction. The increasing fire hazards in our towns and cities, more stringent building by-laws, and the desire for a better and more substantial type of structures, have all tended to greatly increase its demand. Aside from this both the



Detail of brick window of St. Andrea, Mantua, Italy.

architects and the owners are seemingly more fully recognizing in it, qualities which are peculiarly its own. In our steel framed commercial buildings where light and lightness are both to be desired, no material offers greater architectural, protective or economical advantages. In manufacturing plants it also has a decidedly permanent structural value, while in domestic architecture brick has done much to improve our residential districts.



String Course of Brickwork, Palace of Jurist-Consults, Cremona, Italy.

Schools, libraries, churches, depots and public and semi-public institutions are other buildings for which brick construction is particularly well adapted, and the many structures of these various classes erected within the past few years, have no apology to make for their existence. While some of them are not up to the desired

standard of design, nevertheless they indicate a steady architectural progress, and it is extremely doubtful if

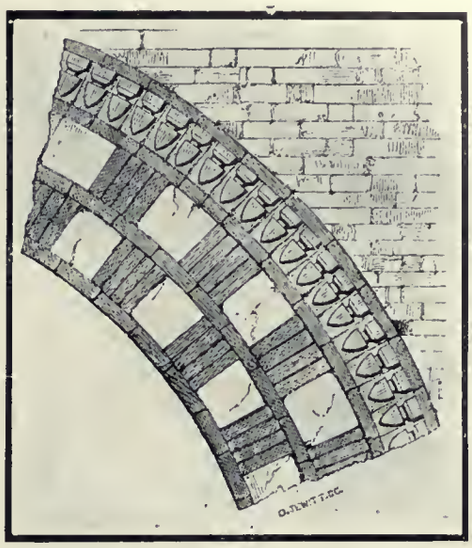
Detail of brick window of St. Andrea, Mantua, Italy.

equally as good results could have been obtained by the use of any other material.

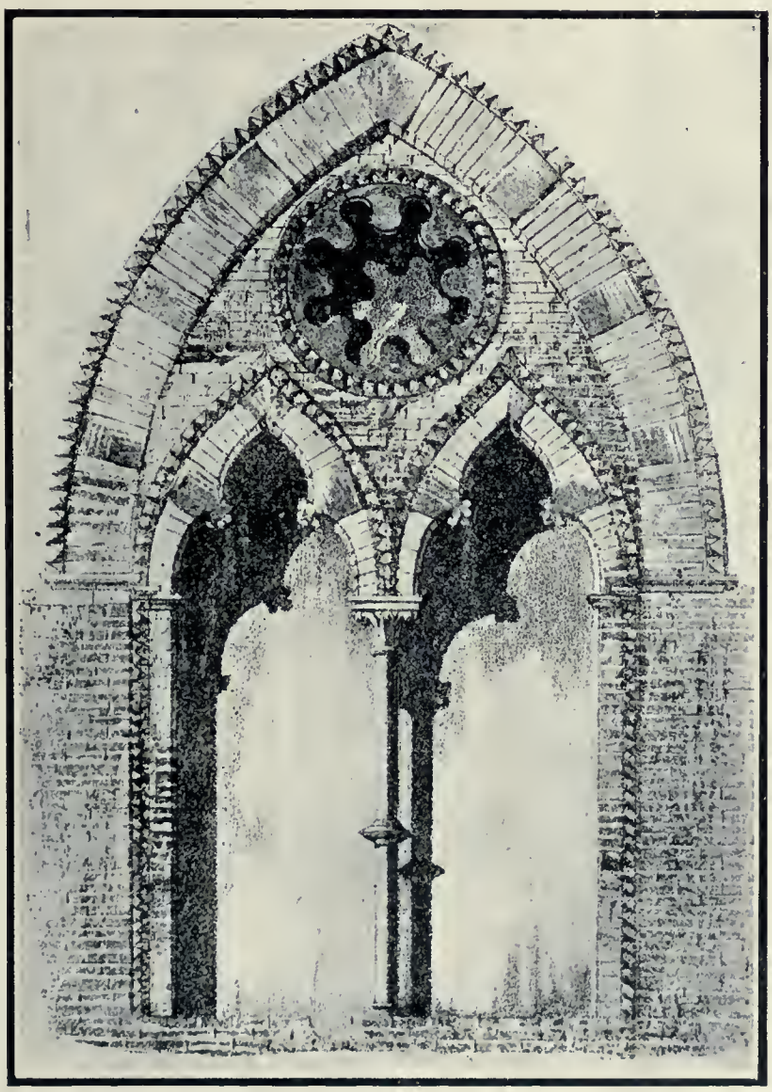
As regards architectural expression there is no other product in which the possibilities are as great. Even in the simplest wall treatment well proportioned pilasters and the predominance of straight lines of the panels have a peculiar charm which place brick in a class distinctly by itself. In interior work also we are beginning to witness a more extensive use of brick in wall surfaces and arching. Especially is this feature being developed in many of our modern railway stations and in some of our recent commercial buildings are to be seen splendid examples of counters and screen work carried out in this material.

Brick also has a peculiarly combining quality which gives it a special advantage in that it can be used effectively in conjunction with all other building materials. With wood or granite, stone or stucco, concrete or steel, it fits readily into place, and this can hardly be said of any other structural product.

Modern appliances and modern methods of manufacture are enabling architects to meet their every requirement. Moulded bricks are produced in every variety of design from simple sections like those of cornice, plinth and string course bricks up to the most elaborately decorated blocks of different forms such as voussoirs for arches, diaper patterns for walls, panels, and mouldings for entablature work.



Brick archivolt, Vescovato, at Mantua, Italy.



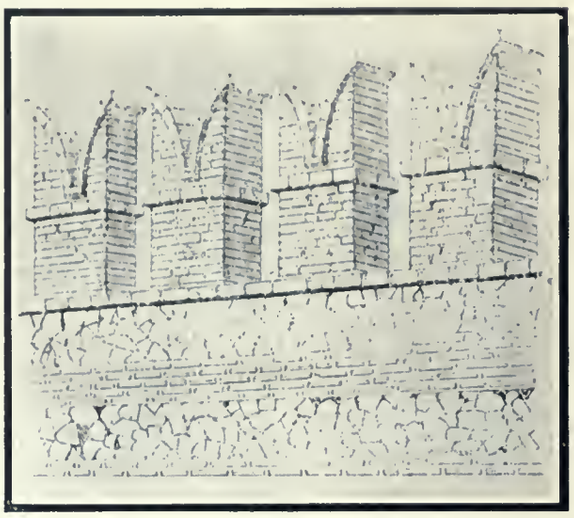
Window in Ducal Palace, Mantua. A fine example of early Italian brickwork.

In Canada, the manufacturers of brick are turning out a product of a superior kind as regards color and texture, quality and design, and there is no need of our architects or builders going further than the borders of their own country in order to meet their requirements in this respect. The Dominion offers the very best that is to be obtained anywhere, and the large beds of suitable clay—as recent exploitations show—found in various parts of the country, make plain that brick is one of our best and most available materials. The specifying of foreign made bricks by Canadian architects is rendered ridiculous in view of the excellent materials we have at hand.

BRICKWORK, ANCIENT AND MODERN.

By F. W. FITZPATRICK

PRIMARILY, or perhaps we should say fundamentally, the brick manufacturer is interested in his material as a purely commercial proposition. He has invested a certain amount in a plant and it is up to



Brick Battlement of the Viccolo Cavaletto, Verona, Italy.—A characteristic style of parapet found in many of the old buildings of that city.

him to keep that plant at its full capacity in order to get therefrom the greatest return upon his investment. We, the architects, are interested in brick as simply a unit, one of many, used in the expression of our ideas, in the materialization of our designs. In those two basic viewpoints our interests are dissimilar but immediately thereafter they draw closer together. We want the very best thing we can get and it is to the manufacturer's interest to come as near supplying that demand as he possibly can. Some would have us believe that there is inborn antagonism there, a sort of distrust of each other, the one ever criticising and demanding something better and the other yielding just as little as he possibly can. This is the wrong view. The closer the architect and the manufacturer get together and train themselves to think with each other, so to speak, the better it is for them both and for the buildings, the art, that yields them both not only their bread but the opportunity to develop, to attain eminence.

There were makers of brick at a very remote period in the history of man, perhaps even before there was any need for architects. The monuments of stone and of marble have decayed, the story they tell us in their hieroglyphics and pictured carvings is well-nigh obliterated, but the work of the potter, the maker of tile and of brick, has been preserved to us in almost perfect condition. The buildings may have crumbled, on account of the disintegration of the mortar used in the joints of such brickwork, but the claywork itself is unworn, intact. See what has been unearthed at Babylon, at Nineveh and at Hebes, and look at the splendid work in tile and in brick still standing in all its pristine perfection in Persia, Assyria, India, and in the early Christian examples of architecture at Byzantium and the other Roman dependencies. Surely we have precedent enough not only as to how to make brick that will last, but how we may put those brick together to form architectural masterpieces.

In ancient times there were rather sharply drawn lines in the use of materials. Geography and geology had much to do with the establishment of these demar-

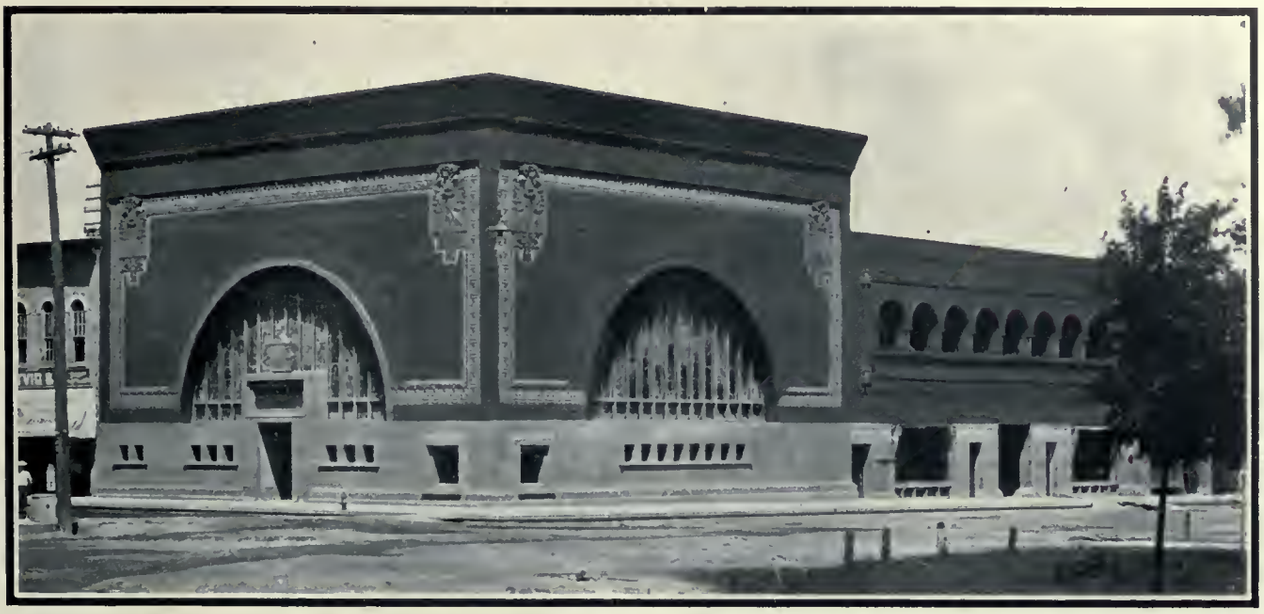
Detail of pointed and rounded arch windows, old brick house, Verona, Italy.

cations. In places where stone was found and was easily quarried, stone, of course, was the most used material; in the neighborhood of great forests wood came easiest to the hand of man, to be fashioned into habitations and shelters, and then in regions in which neither timber nor stone was plentiful, man quickly learned to make for himself a building material from the clay of the soil, molding it with his hands and letting the sun harden it into permanent form or burning it with the straw and refuse of his cultivated fields.

Copyright 1898—Underwood & Underwood.

Old Roman brick bridge "Ponti Pietra," spanning the Adige, at the extreme edge of the city of Verona, Italy. Its main arch is 160 feet. Note the large and angular spring of the arches.

In our own time and land, the history of brick has been most interesting. Its career may be said to have been checked, but it has succeeded in making a place for itself that is unassailable and most deserving of respect. In the early days, it was a luxury and brought here from the mother country at great cost. Then each brick was as precious as a drop of its owner's blood and as carefully guarded. The theft of brick was a very serious offence indeed and punishable with the severest penalty. Then our fathers began to make brick themselves, rather a crude affair, but, laid up with a wide joint, the effect was quite artistic. Later, for awhile, everything had to be of stone. A man must indeed be of common



National Farmers' Bank of Owotonna, Minnesota.—A notable example of the use of brick in modern bank building work Note the perfect contour of the arches and the rich detail of the cornice and panelling, all of which strikingly demonstrates the advantages of this material as a medium of architectural expression. Louis H. Sullivan, Architect.

clay if he abided in but a brick house. Stone and marble were the proper materials, and if he could not afford them, why he stuccoed his brick and jointed it up in beautiful ashlar, or he built of wood. It was fashioned to imitate stone with joints, however, and everything most painfully copied.

In our own times brick was revived; there was a species of Renaissance, but it was only used for secondary buildings, as we might call them, the really monumental affairs having to be of granite, stone or marble. Those secondary or commercial buildings, nevertheless, were of more or less importance, and though we could not afford to make them of marble, stone or granite, we craved something better than ordinary brick and so pressed brick came into vogue. Kilns were carefully picked over and each building presented a most uniform appearance. The brick were all of an exact size with the narrowest imaginable joint, and of precisely the same shade in color—you can still get exactly the same effect by whitewashing or kalsomining a wall surface. It was distressingly beautiful. Some thought that galvanized iron and similar ornamentation was not quite the right thing, and so the brickwork was ornamented per se. Bands of black brick were introduced, little spots of other colors were injected, and dog-tooth effects were everywhere. Then we had molded brick, but the desire was always to get something that looked as nearly like stone as possible. We seemed to realize and properly appreciate that brick was only used as a substitute, something cheaper than what we would like to use, and it was for us to make it look as much like the real thing as we could. We always apologized for a brick building.

Interior of Farmers' National Bank, Owatonna, Minn., showing the possibilities of brick for interior work, as is seen in the counter and screen. Louis H. Sullivan, Architect.

It has only been within the last ten years that brick has really come into its own and taken its proper place among the available media architectural. Our architects have

One of the several handsome brick buildings which comprise St. Anne's College, near Montreal. Hutchinson and Wood, Architects.

found that granite, stone and marble buildings, where at all exposed to fire, have been cruelly spalled and damaged. They realize that in our highly combustible cities nearly every building they erect is exposed to a greater or lesser fire hazzard on account of its neighbors, and they have found that brick best withstands fire. It has also dawned upon them that much expression can be obtained with brick, and latterly they have used the material from preference, selecting it regardless of price, instead of granite, marble or stone. The old notion of uniformity of color and great exactness as to shape has given way to the saner adaptation of rougher forms and varying tints. It is surprising to note the beautiful effects that can be obtained in brickwork today. In a stone building, elaboration of ornament and paneling and moldings are necessary, or the mass of a building becomes brutally heavy and uninteresting. An architect generally fights shy of much plain wall surface in stone. In brickwork just as great an architectural variation can be obtained. There can be produced seeming elaboration, plays of light and shadow, and at infinitely less cost than the carvings and moldings in the stonework. At the same time, also, a plain wall surface is sought for by the artistic designer. If there is no occasion or reason for his diversifying that wall in the flat by diaper work and artistic jointings, the crude, plain wall surface itself is most effective and prettier far than an equal surface of any other building medium. There are finer gradations of tint in it than in any other material, save possibly some of the very expensive foreign marbles, and these in large masses weary the eye.

Usually it has been the architect who created the demand for certain kinds or forms of material, but in the case of artistic brick the manufacturers have taken the initiative and produced the material first and offered it to the architect. This has been much to the latter's pleasant surprise and it has taxed him to apply that brick in one-half of its possibilities of artistic effect.

There is a rather unfortunate tendency toward ultra-specialization in materials. The concrete enthusiast wants his house entirely of concrete. If he could only get it transparent enough he would have it in his windows. The glass people have had in mind a building entirely of glass, with fittings and furnishings of glass, everything of glass whether it would best suit the purpose or not, and so it goes. I believe in a judicious combination of materials, each one in the place for which it is best suited, therefore I am not clamoring for a brick roof, brick downspouts and brick window sash; but I do believe that there are yet endless, almost unthought of possibilities in brick construction that for the best interests of architecture, let alone the brick manufacture, we should seek to discover, to develop, or to perfect.

Central Market, located in the West Side District, Chicago. A simple, but effective treatment of brick work in wall, tower, and parapet design.

FROM THE BRICKMASON'S VIEWPOINT

By T. B. KIDNER.

IN LOOKING BACK over the progress in architectural matters during the past twenty-five or thirty years, there is perhaps no feature more remarkable than the increasing attention which has been given to brick construction. Of the many reasons which may be adduced for this, probably the most weighty one is the undoubted fact that of all materials used in building construction, brick is preeminent in durability and strength. Of course, this has been recognized from the earliest times, but the increasing dimensions of modern buildings has emphasized the necessity for strength of materials, and the size of the cities of to-day, the importance of their durability, the herding together in vast cities such as New York and London, which one sarcastic writer recently characterized as "diseased growths, not cities," has rendered the air full of noxious vapors which attack the majority of building stones more or less. Hence a media like brick, which is absolutely impervious to atmospheric corrosion and decay, is par excellence the material for urban buildings.

Franciscan Monastery of the Trinity, Dantsic, Germany.—A splendid example of Gothic architecture, 300 years old, in which the wall construction, including the arching, cornice and panel work, is entirely executed in brick.

The present generation has also seen the birth and phenomenal growth of brick-incased steel construction, where again brick is preeminently adapted for the purpose. Mention must be made of the increased demand for fireproof construction, which has been such a marked feature of architectural practice during the past few decades, and for which there is no better material available than brick.

But there is another quality of brick which has been slower to be recognized, and that is its possibilities for artistic and decorative architectural effects. There is, of course, in the plainest of brick buildings, if properly carried out with good materials, the beauty of "line upon line," which is always attractive. For a long period,

Light manufacturing and office building, showing the satisfactory and unpretentious brick exterior of a steel frame structure.

however, it seemed to be a settled conviction of architects that brick required dressings or trimmings of stone for

Residence of John M. Bowman, Toronto, an example of clinker brickwork in domestic architecture.

quoins, windows, doorways, cornices and similar features of construction, which are usually chosen for embellish-

ment, and only in recent years has it again been recognized that brick in itself offers a material entirely suitable for the decoration and embellishment of any part of a

Main entrance of Blow School, St. Louis, Mo.—A rendering in simple brickwork, which is rich in its general effect.

building, as well as for the plainer, solid portions to which it had for too long been almost wholly relegated.

In saying that its decorative possibilities have "again" been recognized, one has in mind that great period of artistic brick buildings, the reign of Queen Anne. In Great Britain, dotted up and down the land, are numerous examples of Queen Anne brick houses which, for thoroughly satisfying architectural effects, are hard to beat. Whether in the form of an old manor house, embowered amid the trees and lawns and hedges of some sleepy village, or of a town house in some old city square, with severe and formal outlines and surroundings, a Queen Anne brick house is alike a delight to the eyes and a monument to the honest old craftsmen who built them.

The revival of the Queen Anne style in Great Britain some thirty years ago, while primarily concerned with furniture and interior decorations, caused architects to turn their attention once more to the possibilities in the use of brick and undoubtedly led to the great modern development of artistic brickwork in that country.

On this side of the Atlantic, also, we have a good many fine examples of brick houses which have come down to us from Colonial days, and the interest taken in late years in the Colonial styles of architecture and the widespread adoption of many of its characteristic features, have undoubtedly given a great impetus to the art of brickmaking in North America. While, perhaps, for some years to come the complete brick house in Colonial style will be a luxury for the comparative few, the possibilities of brick in interior decorations have opened a large field for its use in houses of all classes. To name one feature—the

Main Entrance of Edward Wyman School, St. Louis, Mo.—A commendable architectural treatment expressed in hard and red brick, mixed as to color, and laid in up with a Flemish bond. Note the simple details of the towers and the arcading under balcony over doorway.

"Colonial" brick chimney-piece—there are hundreds of thousands of houses in this land whose "ain fireside" is furnished with one of these substantial and artistic specimens of the modern brickmaking art.

For this, some thanks are surely due to the numerous magazines devoted to homemaking in whole or in part, whose wealth of illustrations and suggestions in the direction of honest, substantial furnishings and decorations are in opposition to the gimcracks and gilt of a generation ago. Most of all, however, must the credit be given to the enterprise of our manufacturers of artistic brick who

Branch Library Building, Queen St. West, Toronto.—A treatment in brick and stone work.

have "produced the goods," not so much in response to a general demand, but who have largely created that demand by the excellence of their wares.

We cannot, however, pride ourselves yet in this country that the fullest recognition has been accorded to brick in its capabilities of application for exterior constructional decoration, though a great deal has been done in that direction.

The demands for brick masonry, on account of its sterling utilitarian qualities referred to above, have been so great that very few of our architects have given much attention to the question of decorative exterior planning of brick details, and we are considerably behind some European countries in that respect.

Two avenues are open to the architect designing brick decorations and architectural features. One, offering by far the largest scope, depends on the carrying out of the architect's details by the brickmaker, who will mold and burn ornaments, moldings, pilasters cornices, dentils, arch members and similar pieces, ready for laying in place in the job by the brick-setter.

This involves on the part of the brickmaker not only a high degree of ability to interpret architects' drawings and details, but also the most careful attention to matters of bond, etc., which cannot be decided on the job by the skill of the man who is setting the brick, but must all be carefully worked out by the brickmaker's own draftsmen before a single mold is prepared.

The second method of decoration available for the architect is scarcely practised at all in this country and consists in the use of soft brick which can be cut with a sheet tin or wire saw, and worked into various ornamental details, just as soft sandstone is wrought by the mason at his bench; or can be laid in place in the building and molded or carved with mallet and chisel while in position. These soft brick are widely used in Great Britain under the name of "red rubbers," being so called from their being rubbed to form fine joints in gaged brick arches, etc., which are usually specified "to be gaged, rubbed and set in fine lime putty with joints of 1-32 of an inch." Although exceedingly soft when new, exposure to the weather renders these brick hard and impervious to the action of rain or frost, without any further treatment. For brick arches with orders or moldings worked on the several rings; in simple molded window openings or doorways for paneled pilasters, or sunk panels with name or date of building cut in, red rubbers are particularly suitable, being susceptible of the finest ornamentation, and chaste but rich in appearance when so treated. As intimated above, however, the field in this direction is limited in comparison with that offered by brick molded and burnt to pattern by the makers; the cost of cutting and laying red rubbers being high, in fact, prohibitive for all but the highest class of buildings.

National Club Building, Toronto.—A most acceptable structure of Georgian design, in which the principal material used is brick. S. G. Curry and Sproatt & Rolph, Associate Architects.

We must look mainly, then, to the manufacturers of brick goods if artistic brick masonry is to come fully into its rightful place in the architecture of this continent, but architects must first be satisfied of its possibilities, and to that end every means available should be employed to bring before them and also before the general public as many examples of good structures as possible. To reach the former there are, of course, the splendid photographic illustrations, which are such a feature of professional magazines and architectural journals to-day, but better still the manufacturers themselves must bring constantly before the designers of buildings the splendid field open to them in this direction.

To reach the general public, new buildings themselves will largely appeal, but here also advantage should be taken of the numerous magazines which publish views of domestic architecture especially, and by means of suitable illustrations and articles, create a taste and a demand for this best of all building materials. As an instance of the value of this kind of campaign, one has but to point to the case of the concrete-block makers, who have been in evidence in practically every magazine, professional and general, during the past three or four years.

To sum up then, while brick has an undoubted supremacy for strength, durability, sanitary qualities, and general structural value, it may be shown that as an artistic medium it has values equally high. In fact, there is no class of building, from the suburban residence to the Gothic cathedral, where brick masonry will not lend itself to the best and highest artistic effects.

IDEALS IN BRICKMAKING.

By A. BERG

OF ALL THE ARTS practised by man during his period of existence on this earth, that of building is the most ancient and most enduring. The love of architectural beauty has been a predominating feature of the greatest and most progressive periods of history. The art of brickmaking has preserved for us the pyramids of the almost prehistoric Paroahs and has left us the vestiges which display the grandeur of the ancient classical civilization.

Such an art has lasted from time immemorial, deserves therefore all our respect and admiration, not only on account of its age, but also on account of what it has accomplished for the progress of humanity. But in the present age we are sorry to state the ideals of this art have often been sacrificed for the material glory of making money from nothing. The feverish desire, so prevalent in recent times, of putting out products to pay a handsome return on capital invested, the insane craze of sweating every available cent of profit at the expense of other

Large Modern Apartment House.—A type of building for which brick, more than any other material, is particularly well adapted.

considerations—has caused a great degeneracy in even the ancient art of building. As a result, a great many buildings are put up, which, although fair to look at, are rotten at the core. The materials used are often of the most flimsy kind, and the structures built of these materials are permanent sources of danger to both life and property.

It is up to us to combat this modern tendency: We must try with all our might to oppose the use of all bad building materials, and we can do this by stirring up the municipalities to pass stringent regulations to this effect. There are already in existence regulations and specifications for deciding between good and bad cements, but no such step has ever been taken for brick in this country, at least. The various Canadian municipalities from whom some united action in this direction ought to have been expected, have so far neglected to standardize a material which they are daily inspecting and for which they must assume the responsibility. The city of New York has seen the need of such safeguards against the indiscriminate use of all kinds of building materials, and in 1905 it adopted certain conditions that a standard brick ought to fulfill.

Without going into the complete details of the methods specified by them, it will suffice to quote some of the conditions required of any new material before permitting of its use in buildings: "The ultimate crushing strength of such material must average 3,000 lbs. per sq. inch, and must not fall below 2,500 lbs. in any case. The percentage of absorption by weight must not exceed 15 per cent. on the average, and must not be greater than 20 per cent. in any case. The reduction in compressive strength must not be more than 33⅓ per cent. The freezing and thawing process must not cause a loss in weight greater than 10 per cent. nor a loss in strength of more than one-third. The fire test must not cause the material to disintegrate."

We must conclude from this that any brick which cannot stand a crushing load of 2,000 lbs. per sq. inch ought not to be used in any building, and a brick which stands no more than 1,000 is certainly deserving of being condemned; and yet a great many of our light colored common brick have a crushing strength below 1,000 and even down to 300.

With the small means at our own command, we have long fought against the use of all bad building materials; but how much more may be accomplished if only we all unite in this? A nation may be judged by its names, its public buildings. It ought to be our ideal to make our country proud of these things. We can do so by doing the very best that is in our power; and with the success in accomplishing this aim will come an even greater prosperity in our trade and the greatest reward of all—the satisfaction of having accomplished something for the progress of our country.

CLAY PRODUCTS IN THE UNITED STATES

TAKING UP THE QUESTION of clay products in the United States and the capital invested in the industry there, the SCIENTIFIC AMERICAN touches on a subject which may be of interest to Canadians in that it probably furnished a basis from which a relative idea can be obtained as to the amount invested in the manufacture of, and the use of these materials in the Dominion. That journal says:

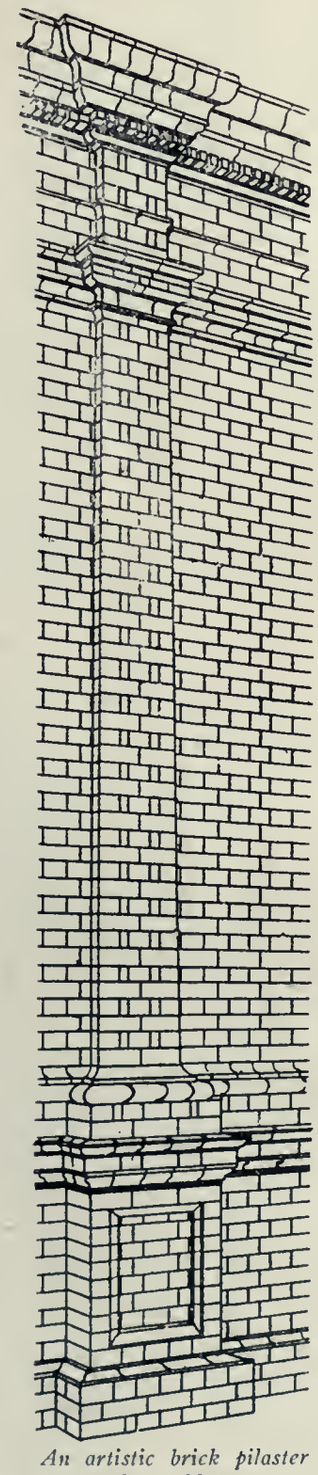
In this country brick were probably first burned in the colony of Virginia as early as 1612, says Charles E. Hall in an interesting Bulletin of the Bureau of the Census. In New England brick and tile making seems to have been followed as an independent calling about the year 1647. Though the product was of good quality the industry did not thrive as money was scarce and timber plentiful, and it was not until after the revolutionary war that home-made bricks came into general use. With increasing prosperity the desire and necessity for more substantial structures arose. The growth of the industry from year to year naturally provided a stimulus for the invention of machinery that would produce better brick, new shapes, and different sizes; and in turn these new inventions contributed to further the growth of the industry. The

Detail of Bronx Church House, New York City.

earliest record of a patent issued by the United States Patent Office for brickmaking is dated May 15, 1800, and was for a brick and tile machine invented by G. Hadfield, residence not recorded. Other patents issued about that time were one to E. Miller, July 17, 1802, for a brick machine; one to N. and P. W. Miller, January 5, 1804, for a brick and tile machine; one to W. Hodgson, Richmond, Va., May 22, 1805, for an apparatus for making

tile, brick, etc.; and one to J. F. Gould, Newburyport, Mass., March 1, 1806, for a brick machine. The first patent granted for a brick-kiln was issued to H. Read, of Kensington, Pa., June 17, 1840; and the first for a brick dryer, to S. M. Parish, of Baldwinsville, N.Y., August 16, 1864.

Although much the same process for making brick and tile has been used for ages, the evolution of the industry through the use of improved methods and machinery has brought about a great change in the character of the product. It is a long stride from the use of hand pick and shovel to steam shovel in uncovering the clay bed; from the old-fashioned ring pit to the machine that grinds, tempers, and molds; from the use of a hand mold to the machine with a capacity of 100,000 bricks per day; from the open air system, or a weather beaten drying shed, to the utilization of artificial heat for drying; from the temporary to the patented continuous kilns; and from the poorly made product of years ago to the firm, straight-edged, and otherwise well finished product of to-day. Of the $119,956,959 capital invested in this industry, the machinery, tools, and implements represent $33,295,324, or 27.8 per cent., an increase in five years of $16,045,486, or 93 per cent.



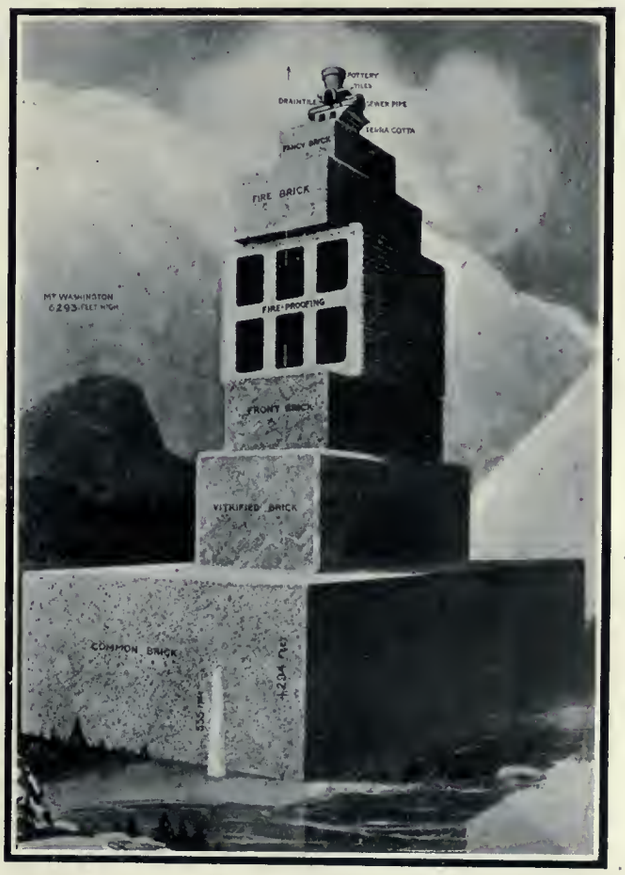
An artistic brick pilaster and entablature.

In the production of red front brick great care is exercised in the selection of raw materials and in the process of manufacture. The clay must be well tempered; the brick molded free from flaws or sand cracks; the method or drying be more complete than for common brick; and the repressing and subsequent drying, setting in kiln, and burning, skillfully and systematically managed.

Fancy colored and ornamental brick are primarily pressed brick. The different shades of color in the former are produced by the addition of artificial materials or by the manipulation of the kiln fires, while the distinguishing feature of ornamental bricks are the designs in relief or in intaglio upon the surface to be exposed

As the name implies, fire brick are used where intense heat must be withstood as in cupolas, blast and glass furnaces, coke ovens, locomotive fire boxes, etc. The utility of the appliances just mentioned depends largely, if not altogether, on construction out of materials which will stand intense heat without fusing, cracking, or yielding in any way.

Possibly nothing has contributed more to the demand for burnt clay products, and brought more clearly to the attention of the public their value as a fire retardent, than the recent great fires in Baltimore, Rochester, and San Francisco. Without considering, however, these occasional catastrophies, it is estimated that the United States yearly sustains a fire loss of $250,000,000, a sum almost double the combined value of all clay products manufactured in this country during the same time and nearly three times the total value of all the brick, fireproofing, terra cotta, lumber, hollow building blocks or tile, and roofing, floor, and encaustic tile. With such an enormous annual property loss, and with the thinning out of the forests of the country, it is reasonable to believe that a change in building methods is imminent, and that the new era of construction will be of immeasurable benefit to



Pyramid, 4.294 feet high, giving a graphical comparison of the various burned clay products used in the United States in one year. It represents a total value of $158,942,369. Reproduced from the Scientific American.

those engaged in the manufacture of burnt clay building materials.

It is claimed that the annual fire loss in this country during the past five years amounted to about $2.50 per capita, as against only 33 cents per capita in the larger European countries. This unsatisfactory showing for the United States has resulted in a growing demand for a fireproof brick that can be used in the construction of moderate-priced dwellings, and several large plants are now making a specialty of such an article.

The accompanying engraving shows a graphical comparison of the magnitude of clay products for one year. The pyramid would be 4,294 feet high and looms well up toward the summit of Mount Washington.

Fireproof residence of Dr. George E. Harter, Elkhart, Indiana. An adaptation of the Mission stytle of architecture, built of concrete blocks with cement stucco exterior.

View of residence of Dr. George E. Harter, Elkhart, Ind., in process of construction, showing the concrete block walls before the cement stucco was applied.

Club House, Dallas Driving Association, Dallas, Texas. An attractive structure of concrete block, cement stucco, and half-timber construction.

CONCRETE BLOCKS.---Their Present and Future.---Availability* and Cost.---Color, Texture and Design.---Careful Selection of Aggregates and Proper Mixing Essential to Obtain Best Results.---Designs Now Produced to Meet Every Requirement of the Architect.

By J. AUGUSTINE SMITH

J. Augustine Smith.

CONCRETE BLOCKS are destined to play an important part in all forms of construction work in the future. Concrete construction is here to stay. It has every virtue possessed by any other building material and possesses some not possessed by any other. When we look back and see the development of the concrete block; note the difficulties through which it has passed; consider the mistakes that have been made both in its manufacture and exploitation; it is a wonder it has survived, and it would not have survived had it not inherently the virtues it possesses.

I need not touch upon the history of this material; how it was first molded in sand, then in wood forms, then in iron forms, and then when the demand for their more rapid manufacture became apparent, machines were invented for producing them. Machines were devised with the idea of supplying a concrete block, with ventilated chambers, which would secure greater resistance to moisture, heat and cold in the constructed wall. These first machines were regarded as a remarkable development in the art of manufacturing concrete blocks, and they were a long step in advance of the prior art.

With the invention and discovery of these machines, there followed a period of strong effort to have the blocks used in construction work generally, but with indifferent success. Then followed a period of constant pioneering, and finally came the invention of a simpler machine, of more perfect type, that opened the way for a large increase in the number of those manufacturing concrete blocks.

Unfortunately, with the great development in the use and manufacture of blocks, there entered into the business many incompetents, whose strongest desire was, in many cases, to produce blocks without regard to their worth or stability from a structural standpoint; just so they could be sold for a profitable price. Furthermore, many of these people lacked business training and business instinct, and they were satisfied to turn out blocks that were porous, imperfectly made, and an eyesore and detriment to the business.

It has been said, and truly, that "bad news travels fast." Never was this truism so aptly illustrated as in the case of concrete blocks. One poor, badly constructed building, of porous, poorly made, concrete stone, has done more harm to the industry than fifty well made, well built houses that were constructed of good, high class, concrete blocks could offset.

The manufacturers of machinery, too, must bear their share of the blame for furnishing designs of the rankest artificiality. I refer particularly to the rock faced pattern, which has received the condemnation of architects and builders, everywhere. Furthermore, many machines were produced of rude, crude type, which turned out

*Paper read at Toronto before the first convention of the Canadian Cement & Concrete Ass'n.

blocks which were untrue in measurement, preposterous so far as the ventilation of the block was concerned, and of designs that were, to say the least, extremely inartistic.

In every great business we find a first period of enthusiastic effort, then a re-action ensues, and then comes the conservative painstaking, upbuilding era, which means the development of the business on fundamentally correct lines.

Since the unpromising beginning, which I have just related, perhaps it is necessary to show the development of concrete blocks from that beginning In the first place, as I have said, many machines fell into the hands of incompetent people, people who had no experience whatever with concrete, knew nothing whatever of the selection of aggregates, mixing of material, or curing of the stone and they, therefore, found the easiest way to turn out blocks was to make them with the least possible water. They added too little water to properly crystallize the cement.

The development of the manufacture of good concrete blocks in this regard has been marked and pleasing until now, instead of dry tamped blocks, they are tamped wet, just as much water being added as will permit the block to be removed from the machine without sagging or sticking. I desire to say that it is essentially necessary for the proper manufacture of good cement blocks, to select your aggregates with great care. That proportion of sand and gravel should be used which will secure the least possible voids.

Proper mixing is essential. If hand mixed the mass should be turned over at least three times in a dry state, and at least three times in a wet state after the water has been added. You will find also, if you use an ordinary rake as a last means of mixing your concrete, both in a dry and in a wet state, this will help the mixing of the materials very much. I need not say this should be done after the mass has been turned at least twice with a shovel.

I want to lay particular stress upon the use of the proper kind of water and the necessity for measuring the amount of water used in making concrete block. It has come under my observation in several cases, where blocks of different colors and shades were produced, using identically the same material, the same cement, and the same water, it was found that the cause of this change of color was due to the water used. Tanks were erected for settling purposes, the cleared water used in the manufacture of the blocks, with the result that this discoloration, or change disappeared entirely.

With regard to the use of the proper amount of water to be used—the question as to which is the better, the wet or the dry mixing of concrete, I have recently seen an editorial in one of the trade papers which purported to give the result of extended experiments covering some four years recently made in Germany. From these reports the conclusion is drawn that the smallest amount of water which produces a mixture suitable for ramming, gives the strongest concrete. It is, of course, conceded that this amount of water must be sufficient to properly crystallize all the cement used. At the same time the concrete worker who attempts to use the smallest amount of water will produce a mixture suitable for ramming, will find many difficulties. There is, therefore, but one thing to do, viz., measure the water as well as the other aggregates, for each batch mixed. There should be no guess work about it.

Residence of Dr. George E. Harter, Elkhart, Indiana, as viewed from the river front.

The proper curing of blocks after they are made, is, of course, essential, indeed it is very essential, but it only plays its part in the whole process of manufacture. It is just as necessary that the aggregates should be selected carefully, and the materials mixed properly with sufficient water, as it is to thoroughly cure the stone afterwards. Furthermore, blocks should be properly tamped, and I strongly urge, wherever machines of good type can be secured that the mixing of the materials and the tamping of the blocks should be done mechanically.

MATERIALS.

The materials most commonly used in concrete block manufacture are sand, gravel, crushed stone and Portland cement. Much could be written on sands alone, so I will touch upon this subject very briefly. The term is confused by a great majority of concrete block manufacturers. In concrete work sand is that material which will pass a quarter-inch screen, and a good sand should be graded from coarse to fine, with the coarser grains predominating. A sand which is well graded from coarse to fine will make strong concrete. It will also make dense concrete. The strength of concrete varies directly with its density. Let me lay down one fact, however, and call your particular attention to it, viz., that no concrete can be stronger than the materials from which it is made.

Many block manufacturers insist on using for facing a very fine sand, mixed in the proportions of one part of cement to two parts of sand, not realizing that a coarse, well graded sand will give as strong a facing with a one to three mixture and a block of as good appearance as well. They seem to think they must use a fine sand in order to get a smooth block.

When the tamping is directly against the face, as in most machines, the finer particles work themselves through the coarser ones into the face, and thus the surface is just as smooth as though a fine sand were used.

As good a surface can be obtained by using coarse, well graded sand, and it will be far stronger and more waterproof. The reason for this is, that in a fine sand the grains are nearly all uniform in size, and the percentage of voids will be between 40 and 50 per cent, whereas, in a well graded sand, the voids may be as low as 25 per cent. Consequently, when using the same amount of cement with both sands, the coarser sand will make a coarser, denser, more waterproof concrete.

The fine sand also has a greater number of particules and consequently there is more surface to be coated with the cement mortar. This means that more cement is required.

FACING OF CONCRETE BLOCKS.

The subject of facing concrete blocks is one that well deserves attention. Blocks are usually sold because of their good appearance and satisfactory qualities. The manufacturer who faces his blocks with materials which give them life, is the one who gets the business.

One of the most serious objections to concrete blocks in the past, is their dark gray appearance. This can be overcome by using light colored sand or crushed stone, with a white Portland cement, which will give a light gray effect. If a pure white effect is desired, then white cement should be used with white sand or crushed stone, mixed with a little marble dust. It is very difficult to obtain a coarse, white sand, although I have seen a few samples which were quite coarse.

I find white sand used alone with cement will not make a thoroughly dense, waterproof facing. In order to make such facing waterproof, I have found it necessary to use a proportion of marble dust, or crushed stone, with the sand. Care should be taken not to use too much marble dust, for if too much of this is used, the facing will check and show unsightly cracks. For this reason marble dust should never be used alone with cement. Usually the checks and hair cracks referred to will not show until the blocks have aged several weeks, or even months, but eventually they are bound to come.

The amount of marble dust to be used should not be more than 1½ parts to 4 parts of white sand. If the facing is too rich in cement, checks and hair cracks are liable to appear as when marble dust is alone used with cement.

Passenger Depot, O. S. L. Railway, Payette, Idaho. A highly acceptable design carried out in concrete blocks with buff brick trimmings.

Very good results can be obtained by using limestone screenings from coarse to fine, which will pass a quarter-inch screen, but usually it is advantageous to use a little white sand with this as well, in order to obtain a smooth, dense surface.

PROPORTIONS TO BE USED.

The proportions which should be used to produce maximum strength in concrete blocks, is one which has received much thought and consideration. The specifications of the American Association of Cement Users require proportions which will insure a minimum crushing strength of 1,000 lbs. per square inch of superficial area at the age of 28 days. They call for proportions of 1 part cement, 3 parts sand, 4 parts gravel.

Where a good coarse sand is obtainable it is sometimes more economical to use sand only in the proportions of one part of cement to four parts of sand, pit run. If the sand is coarse and well graded, blocks made with these proportions will develop over 1,000 lbs. per square inch in 28 days. It should, therefore, be the aim of your

association to insist upon such proportions as will secure an adequate minimum crushing strength within a given specified time.

It has always seemed to me that it is most important to get the requisite strength regardless of proportions, and if a 1 to 4 sand concrete will give these results, I unhesitatingly say this should be permitted. The same

A concrete two-family block villa, designed and erected by the owner, David Brown, Jr., at Paisley (near Glasgow), Scotland. The total cost of this building was $3,360.

holds true of a 1-3-6 mixture, provided it will give the required strength. Proportions of 1-2-4, 1-3-4, 1-2½-5, and 1-2-5, should all prove rich enough in cement to make blocks which will develop a crushing strength of 1,000 lbs. per square inch in 28 days, provided, of course, the aggregates used are of good quality and free from extraneous material.

CURING.

Wet tamped blocks should be sprinkled two or three times daily for a period of from 14 to 21 days. They should be sprinkled after molding as soon as the concrete has obtained its initial set, which it will do in from 12 to 24 hours.

The temperature of the curing room should never be lower than the freezing point of water, for if carried below this point the blocks will freeze, the setting of the cement will be delayed, and even if the blocks are not injured, they will be no stronger when they thaw out than when they first froze, for the process of hardening or crystallization stops at the time of freezing and does not resume until the blocks are thawed out.

Many manufacturers supply blocks for use a few days after they are made. This is a great mistake and should never be done, as blocks cured by the sprinkled method for a few days are not strong enough to use in structural work, and it is errors of this kind that discredit the use of this material. Every now and then one can see blocks in buildings that are so soft and crumbly that the surface can be cut away and this almost invariably is caused by insufficient water in the mixture or insufficient curing. It is sometimes caused by not using enough cement, but the former reasons are more often the cause.

Another point I want to emphasize strongly is the fact that no amount of subsequent sprinkling during the curing process will make up for an inadequate amount of water in the mixing of the concrete; that is to say, if a man uses but half as much water in his concrete as he ought to, no amount of subsequent sprinkling will make that block what it should be.

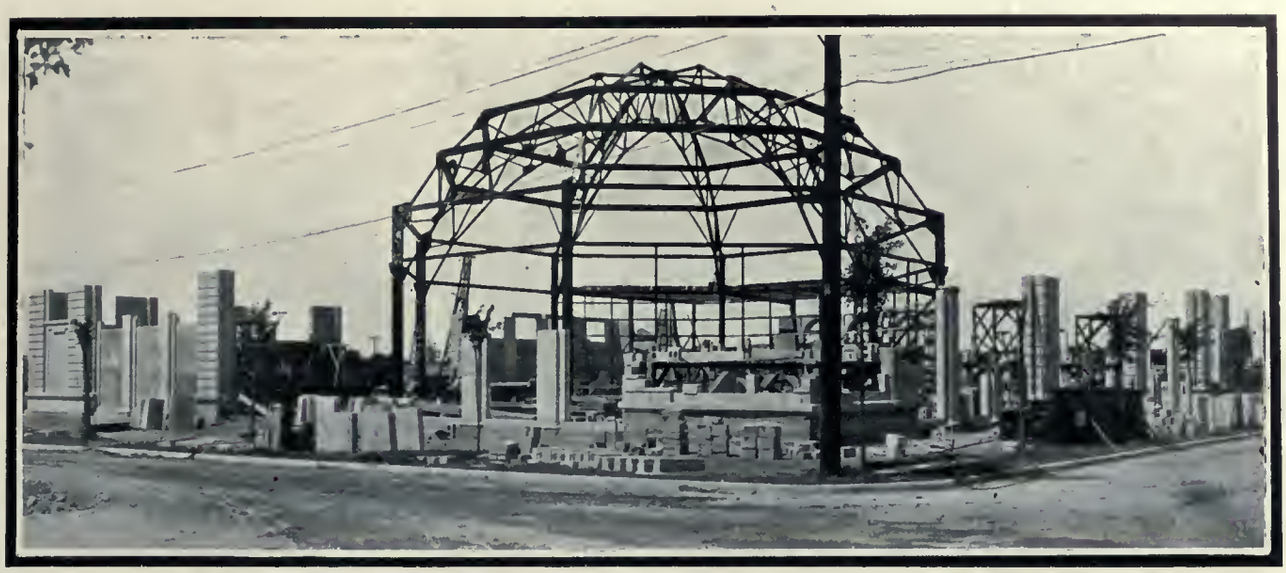
WATERPROOFING.

This is a subject that has had the earnest attention of many people. As I have before stated, good, dense concrete, absolutely waterproof and impervious to moisture, can be made by the proper selection of aggregates, the proper mixing of the materials, the addition of a sufficient amount of water and a proper curing of the stone. This is particularly true where you use a rich facing mixture for the block. To make assurance doubly sure, and to reduce the human equation to the lowest possible point, there have been devised waterproofing compounds and waterproofing fillers to make the blocks dense and impervious to moisture. Most of these compounds are water repellants. The use of them seems to me to be illogical, in view of the fact the desired end in making concrete is to secure perfect crystallization *by the use of water.*

A new development in this regard was shown at the Cleveland Exhibition of the National Cement Users, and the annual cement show in Chicago, recently held. This is a process by which perfect crystallization is secured without the use of waterproofing compounds or fillers as described.

Summer residence of Beyer Bros., at Winona Lake, Indiana, erected at a cost of $13,000. *The first story consists of alternating courses of 8-inch and 4-inch rock face blocks, while the second story and towers are built of plain blocks.*

It is to be regretted that the attitude of the insurance



Ladies' Art and Textile Building, State Fair Grounds, Dallas, Texas, in process of construction, showing the use of concrete blocks in conjunction with structural steel work.

underwriters is at present so unfavorable to concrete block construction. They fail to give credit where credit should be given; that is to say, where good concrete blocks are well made and well laid, and unfortunately, as I have before pointed out, bad practice in concrete block construction has counted infinitely more than good practice, and one poor example where failure under fire stress has occurred, has weighed infinitely more with insurance underwriters than evidences of good fire-resisting concrete block construction

In this regard I desire to call your attention specifically to the tests made by the United States Government at the Structural Materials Laboratories at St. Louis. It was conclusively proven there that of all building materials, concrete blocks stood the test of fire better than any other material. Tests were made of granite, limestone, marble, Bedford stone, sandstone, hollow tile, and brick, as well as concrete blocks, these materials being subjected to 1,700 degrees Fahr. for two hours, followed by application of water.

The hollow tile showed a fracture of the web and a falling away of the protective surface following the application of water. Extreme disintegration was shown in the case of the granite material. The limestone, marble, Bedford stone and sandstone, all went to pieces under stress of fire and water, and even such an excellent fireproof material as St. Louis brick was partially destroyed under conditions of these tests. Dry tamped cement blocks showed a remarkable resistance, merely surface disintegration following the application of water. Tests were made of gravel concrete in the form of short beams assembled as blocks, granite concrete beams or blocks, as well as cinder concrete blocks, and in each case they showed low thermal conductivity, paper labels on the backs of some of the specimens not even being scorched. The damage to these blocks was entirely confined to the surface.

In view of these tests, as well as other evidence of the remarkable resistance of concrete blocks to fire, it is astonishing that insurance companies should not seek to promote the use of this material rather than take the unfavorable stand they have taken in many cases, by exacting inequitable, unfair and absolutely exorbitant rates of insurance where this material is used.

I wish to record the fact, however, that many insurance people are awakening to the remarkable character of this material, and I feel safe in saying it will not be long before a change in this regard has come about

The possibilities of the concrete block business have been too greatly underestimated until the last few years, and even now prospective builders and the public at large are just beginning to understand their remarkable utility and availability. A few years ago concrete blocks were used for little less than foundations and cellars. The

Concluded on page 67.

Concrete block machine shop erected for the Wolverine Motor Works, Bridgeport, Connecticut. According to the statement of the owners, who made the blocks themselves, the complete cost of this building (120 ft. by 240 ft., and 24 ft. to top of saw-tooth roof) was $2,800, the cost of blocks being six cents each.

THE SOUTHAM PRESS BUILDING.—New Structure Recently Erected at Toronto.—Floor System and Columns of Reinforced Concrete.—Plan and Elevation Simple and Direct.—Fireproof Throughout.—Time Required in Construction and Cost of Work.

By W. N. MOORHOUSE

IN A BUILDING designed for the purpose of a large industrial company, the chief consideration should be "directness." If properly designed and carried out, this attribute, with its synonym "simplicity," will represent structural efficiency, satisfaction in the subsequent conduct of business, and a pleasing sense of harmony in the elevations. The figure that represents industry is not that of a king decked with gold and jewels, but of a young man, his only beauty that of natural strength and dignity, his only ornament the tools that represent his office of toil. So it is with the inanimate representative of industry, whose lines should spring boldly in conformity with its purpose, which its mass and proportions should express in no uncertain language.

This has been the aim in the design of the Southam Press Building, successors to the Mail Job Printing Company. Its motto is "directness." Simple in plan and elevation, the lines and proportions of which are its ornament, it represents "efficiency."

CONSTRUCTION.

The system of floor and columns construction adopted was that of concrete reinforced with ordinary mild steel bars and expanded metal. Before such a decision was arrived at, tenders were taken for various types of construction, including steel and concrete, and steel and tile. The closest tender to that accepted, represented an increase in cost of $8,700. The basis of tenders placed on the same footing all approved systems of fireproof construction, cost alone ruling the selection. The type of construction adopted produces a strictly fireproof building of a monolithic character, free from vibration.

TIME REQUIRED IN CONSTRUCTION.

In rapidity of construction it cannot be surpassed, as the following statement will show. Mill construction is generally considered to be the type that may be erected with the greatest ease and rapidity. A general comparison might be of interest. In a building of the mill construction type recently completed here, within a close time limit, the average rate of placing each floor of 5,400 square feet area, was ten days. In this building, herein described, the time taken to lay each floor of 10,000 square feet are, including setting up of forms, placing of reinforcement and such pipes, leads, etc., as were fixtures in the slab, and pouring of columns, beams and slabs, was two weeks. This does not include the finished wood floor, but a cement grout could have been put on in three days extra per floor. While on the question of time of construction, it might be of interest to give a short progress chart:

Ground floor Aug. 31 Sept. 4. 12 days behind Sept.22

	Start	Finish.	Days per floor	Progress of contract.	Forms removed.	
	——1908——					
Foundations	Aug. 7	Aug. 28				
Ground floor	Aug. 31	Sept. 4		12 days behind	Sept. 22	Con.
1st floor	Sept. 2	Sept. 17				Brick
	Sept. 17	Sept. 21	15	7 days behind	Oct. 7	Con.
2nd floor	Sept. 21	Sept. 28				Brick
	Sept. 30	Oct. 3	10	On time	Oct. 20	Con.
3rd floor	Oct. 2	Oct. 10				Brick
	Oct. 13	Oct. 16	11	8 days ahead	Nov. 4	Con.
4th floor	Oct. 16	Oct. 26				Brick
	Oct. 27	Oct. 30	13	15 days ahead	Nov. 17	Con.
Roof	Oct. 31	Nov. 10				Brick
	Nov. 13	Nov. 18	16	17 days ahead	Dec. 4	Con.

This shows a total time of construction of the foundations, walls, columns, floors and roof, that is the main body of the building, of three months and four days.

New Southam Press Building, recently erected at Toronto. A simple designed, well proportioned, reinforced concrete structure with brick curtain walls. Messrs. Sproatt & Rolph, Architects.

COST OF WORK.

The cost of this building was 11¼c. per cubic foot, allowing for everything including plumbing for three floors and offsets, for rest building, office fixtures on the fourth floor, and electric light and power conduit work (the latter not generally included in such estimate). As a comparison, it might be said that the cost of the building of mill construction type herein before mentioned, was 10¾c. per cubic foot.

A few of the patent advantages of a type such as the Mail Job Printing Company's building, are:

(a) A smaller percentage to be reckoned per annum as depreciation.

(b) A saving in insurance rates.

(c) Fireproof quality in reference to value of rents

if the proprietor wishes to let the building in whole or in part.

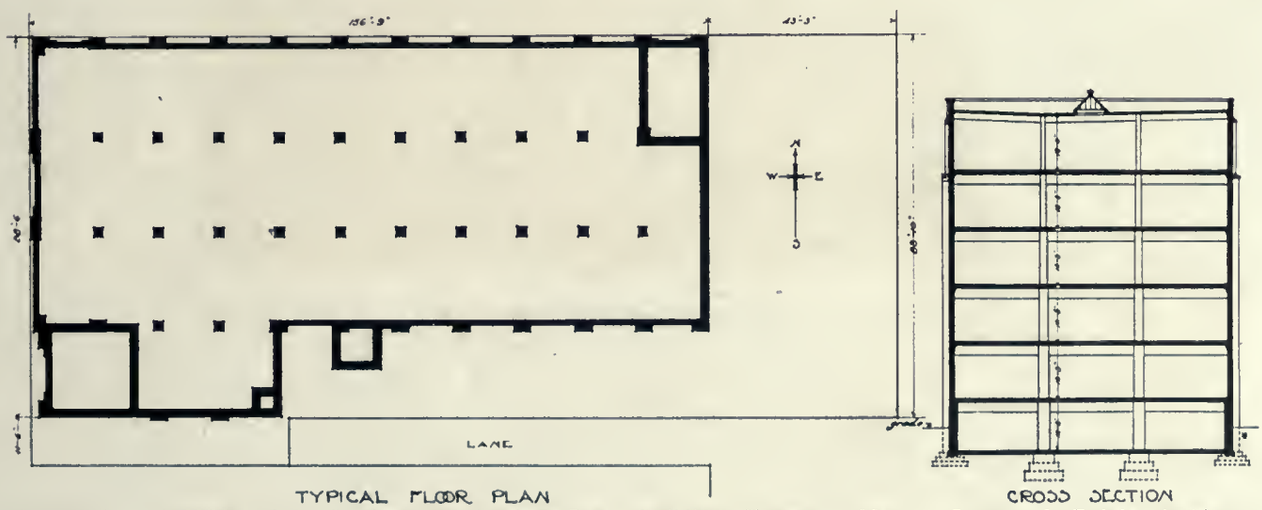
In reference to item (b), it might be said that the rating of a building of this kind, however perfectly fireproofed, depends largely on the report of the inspectors as to the environment. This building, however, gets the lowest possible rating, viz., 15c. per hundred per annum, which effects a saving of 5c. to 15c. per hundred per annum over types of fireproof buildings where structural steel is used.

View of one of the floors, new Southam Building, Toronto, prior to applying the finishing coat or laying the hardwood super-floor. Messrs. Sproatt & Rolph, Architects.

DESCRIPTION OF THE BUILDING.

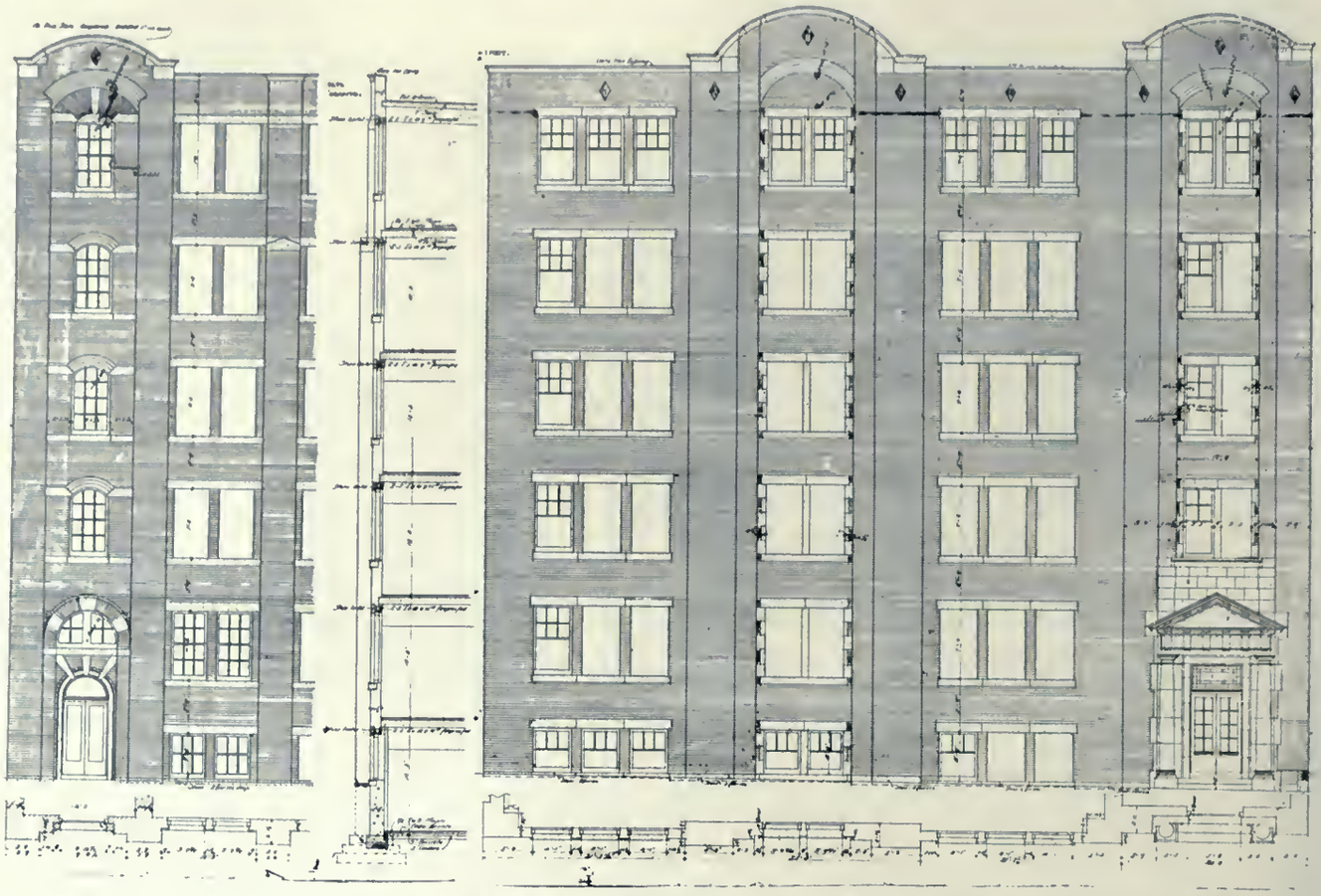
The columns and beams are not figured on the plans shown with this article, as these are the original tendering plans before the method, of columns, beam and slab construction, were decided on. The types adopted consists of girders covering the 22 ft. spans between the columns across the building and a 9-in. slab reinforced with expanded metal and ¾-in. bars at 7.8/ centres spanning 14 ft. lengthways of the building. This does away with intermediate beams, giving free passage of light and doing away with concentrated loads on girders. The columns in basement are 32 by 32 inches, reinforced with six 1 11-16 in. square bars and hooped with iron straps placed at centres equal to the diameter of the column. The floor girders are 20 by 28 inches, reinforced with three 1¼ in. and three 1-in. square bars, three of these being straight and three trussed.

The depth of the floor slab provided an efficient method of disposal of light and power leads and also sprinkler hangers, all of which were well covered with



Typical Floor Plan and Cross Section, new Southam Press Building, Toronto. Messrs. Sproatt & Rolph, Architects.

asphalt paint before placing. The finished floor was composed of bevelled sleepers with 2-in. fill of cinder concrete and covered with ⅞-in. maple matched and dressed pany. The sprinkler hangers used were such that after being placed in the bottom of the floor slab, they allowed play of one inch each way for centering, which is a diffi-



Main and Sectional Elevations, new Southam Press Building, Toronto. Messrs. Sproatt & Rolph, Architects.

flooring. This gave a convenient method of disposal of pipes for plumbing and heating. By leaving out a 12-in. section of cinder fill and carrying heating pipes under finished flooring close to the wall, the difficult alternative of carrying the pipes under the girders below and providing two sleeves for delivery and return at each radiator, was avoided. The position of the freight elevator shaft, nearly central with the building, gave a convenient method of carrying up the heating mains, etc

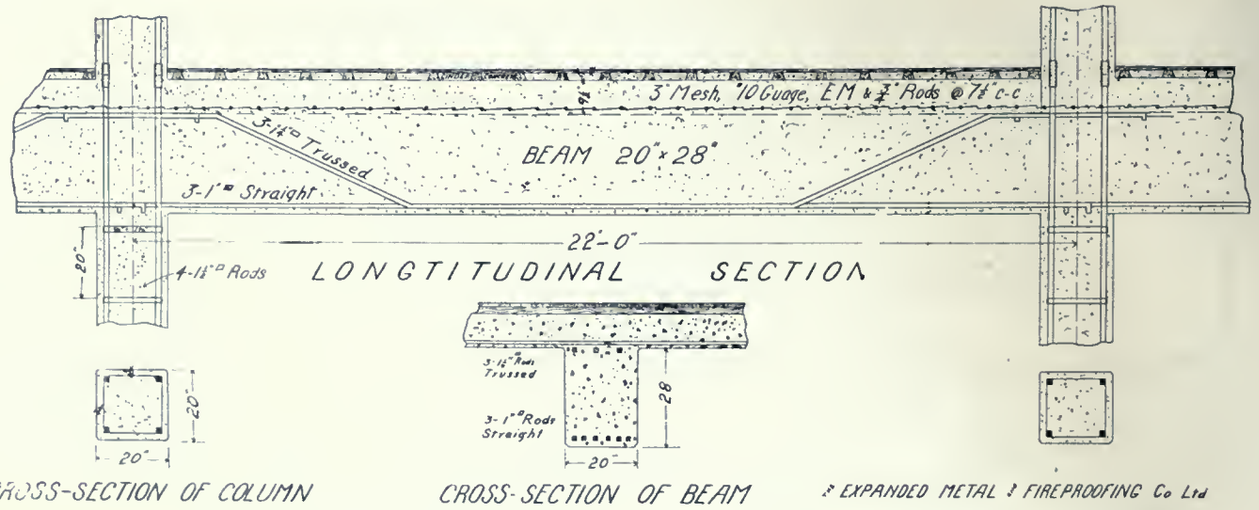
The sprinkler system is according to requirements of the underwriters, with automatic electric alarm system connected with Dominion Messenger and Signal Com-

cult matter when the pipes are carried through sleeves in the girders.

On the south and east sides of the building, metal frames and sash with wired glass, were used. The windows are as large as possible, steel lintels enclosed in concrete being used in place of reinforced concrete beams to gain window height.

The building is served by a main stairway with passenger elevator on the west from the Duncan street entrance. The employees' stair is situated in the north-east

Continued on page 70.



Details of reinforced concrete construction, new Southam Press Building, Toronto. Messrs. Sproatt & Rolph, Architects.

CONSTRUCTION

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 Toronto, May, 1909 No. 7

Current Topics

WATER TANKS of white pine used on railroad work have in the past had a maximum life of 20 years, while the maximum life of cypress is 25 years.

* * *

ASBESTOS IS USED in large quantities in and about Birmingham, England, according to a recent report of Acting Canadian Trade Commissioner J. E. Ray, who adds that numerous inquiries regarding Canadian manufacturers are being continually received at his office.

* * *

THE MESSINA EARTHQUAKE had no effect on the reinforced concrete buildings at Favelloni, in Calabria, although other structures in their vicinity were injured. These buildings were constructed after the earthquake of 1905, which also had destructive results in that neighborhood.

* * *

A NEW CORPORATION at New Westminster, B.C., is the Pitt Lake Brick Company, which has been organized to exploit the extensive clay bed discovered at Pitt Lake. It is understood that samples of brick made from deposit are rich in texture and of a highly durable character. The company has made arrangement for the installation of a modern brick plant and soon expect to have their product on the market.

* * *

THE FIRST PASSENGER ELEVATOR to be installed in a Hamilton church and possibly the first in the entire Dominion, has just been placed in the house of worship of the Centenary Methodist congregation. The car is of sufficient size to carry three or four persons and it is provided for the benefit of those who find it a difficult matter to climb up the large number of steps from the entrance on Main street to the auditorium.

A THIRTY-ONE STOREY HOTEL BUILDING is to be erected in New York city, if plans recently submitted to the bureau of buildings are favorably passed upon. The site of the proposed structure is at the southwest corner of Madison avenue and 42nd street, a stone's throw from the Grand Central Station, and from curb to roof the building will be 376 feet high. It will be the highest hostelry in the world and overtop by ten storeys any hotel structure in the city. A local real estate company is behind the project and will expend $2,000,000 to complete the building.

* * *

PLANS FOR THE QUEBEC BRIDGE are well underway and it is expected that they will be completed early next fall. According to the present intentions of the government, as soon as the drawings have been finished and approved of, the task of supervising the erection of the structure will be placed in the hands of Mr. Vautelet, the Canadian member of the board of engineers who now have charge of the work, while Mr. Fitzmaurice and Mr. Modjeska will be retained only in a consulting capacity. It is reported that the Grand Trunk has made a proposition to the government to take over the construction of the bridge.

* * *

VARIOUS METHODS of applying preservatives to railroad ties and telegraph poles have been in practical use in Europe for more than thirty years; and it would be difficult to find in any advanced continental country a single railroad, telegraph, or telephone company which has not adopted some means in this respect with highly gratifying results. In recent years the most usual preservative agents in use have been chloride of zinc, creosote, and bichloride of mercury, applied by imbibition, or by impregnation by injection forced by the pressure of the air. This second method of treatment generally consists in placing the wood in closed metallic recipients from which the air is pumped, and the liquid then introduced under high pressure.

* * *

ONE OF THE SUMMER ATTRACTIONS at Vancouver hereafter will be a concrete bathing pavilion, 276 feet long, which is to be erected on Beach avenue, overlooking English Bay. The roof of the structure is designated so as to be used as a promenade from which a splendid view of the harbor can be obtained. In the centre of the pavilion a large office will separate the men and women departments. Each wing will contain fifty-four well lighted and ventilated dressing rooms with convenient show bath facilities, and the doors, grating and seats will be so arranged as to allow all room to be easily cleaned and drained. The beach is to be approached by a flight of steps from each side, and a broad terrace will run the full length of the building.

* * *

RICH DEPOSITS OF GYPSUM have been discovered at East Bay, about fifteen miles from Sydney, Nova Scotia. The whole extent of a local railway company's present holdings and a large section of contiguous country appear to fairly abound with the material. Explorations are now being made by the present owners, with the assistance of government experts, and calyz drill operated at the base of the hill has been driven down through the plaster to a depth of about eighty feet without any break being found in the deposit. The analysis, straight through, shows nearly 99 per cent. of purity. Some 20 tests have been made, and it is claimed that in every instance the pure gypsum has been found at an average of 10 to 12 feet beneath the surface.

A 2,000,000 BUSHEL ELEVATOR, together with wharves and other facilities for handling this vast quantity of grain, is to be built at Flat Point, Victoria Harbor, Georgian Bay by the Canadian Pacific Railway at a cost of $1,000,000. The closing of this contract, it is said, assures the construction of a line from this point through Orillia and Lindsay to Peterborough, a distance of 100 miles, where it will connect with the company's main line to Montreal and Quebec.

* * *

NEGOTIATIONS ARE NOW UNDERWAY between the Dominion Government and the Equitable Engineering Company, of New York, for the removal of the debris of the fallen Quebec bridge. The New York company controls the Oxy-Acetylene process by which a bar of iron five inches thick can be cut through in a few seconds. If satisfactory arrangements are brought about the work will begin during the summer and all the steel and iron work now clinging to the piers will be detached within a few weeks by this new process, which, it is said, will save considerable time and involve an expense much smaller than would be necessary by the ordinary processes.

* * *

ACCORDING TO THE REPORT of the engineer in charge of the Hudson Bay railway survey, as transmitted to the Department of Railways and Canals, a canal could be built to the Hudson Bay which would enable ocean vessels to take cargo at Winnipeg, and thus establish a direct waterway route from the West to Liverpool and other Atlantic ports. From a glance at the map such a route is not only feasible but practical. However, it is still a question as to whether it will offer any advantage over the present means of transportation, and in the opinion of the Hon. Mr. Graham it will need a good deal of further investigation before the work would actually be entered upon.

* * *

A CLAMSHELL DREDGER BUCKET, which had been damaged by cracking one of the arms says the ENGINEERING RECORD, was recently repaired at Stockton, Cal., by welding with Thermit, and at the same time a cast-steel bumper plate was welded between the arms, which were of 2 x 11 1-2 in. forged steel. The bumper plate was about 2 in. thick and 12 in. wide, and had legs turned at right angles for bolting to the arms. The crack was about one inch wide, and extended through one of the bolt holes. Reinforcing strips were placed on each side of the crack and on each side of the bumper plate. Double gates and risers were used, and 137 lbs. of Thermit, 10 1-4 lbs. of steel punchings, 10 1-4 lbs. of cast-iron borings and 2 3-4 lbs. of ferro-manganese were required. A second operation was necessary to weld the bumper plate to the other leg, requiring, however, somewhat less welding material.

* * *

UPWARD OF 12,000 FEET above the level of the sea is to be the elevation of the railway which will shortly be built across the Andes from Arica in Chili to La Paz in Bolivia by Messrs. Sir John Jackson, Limited, a well known firm of English engineers and contractors, who have just been awarded the contract for its construction. This line which will extend a little over 300 miles, will undoubtedly be the highest railway route in the world. The first fifty to sixty miles will be across a desert, and the contractors will be required to provide a complete system of water supply over the entire distance. From this point on for fifty miles the road will pass through the Andes, while the last two hundred miles will be over the high tableland upon which La Paz, the highest city in the world, is situated. At present the only means of transit from coast to coast is by mule trains, in which two mules have to carry fodder and water for every baggage-carrying mule.

THE HIGH LEVEL TANK at the top of Rockland Avenue, Victoria, B.C., erected as an auxiliary unit to the city's water supply system, is now ready for service connections with the water main having recently been made. Both from an architectural and constructive standpoint the structure is said to be very acceptable. Buttresses ornament the sides and about seventy to eighty feet from the ground where the base of the tank proper commences, a small balcony extends around the outside wall. The structure is further rendered attractive by a pleasingly detailed roof. From its lowest point to the roof the structure towers one hundred and twenty feet. The tank itself is forty feet high and twenty-two feet in diameter, having a capacity of one hundred thousand gallons. Its entire construction, including the foundation, is of reinforced concrete, and the cost of the structure complete is figured to be about $12,000.

* * *

THE FOLLOWING FIGURES AND FACTS are furnished in regards to the mammoth apartment building which is now being built in New York City on a site covering the entire block bounded by Eighty-sixth and Eighty-seventh streets and Broadway and Amsterdam avenue. It will house a community as large as that of many a town, as it will contain 175 apartments, with 2 080 rooms, and the number of occupants including servants will be 1,225, it is estimated. The outside dimensions of the building are 350 x 200 feet. Its twelve floors and a mezzanine floor contain 50,000 square feet apiece, one and one-eighth acre to the floor, and thirteen and one-half acres in all, after deducting the space occupied by the open court, which will be 25 x 100 feet. Figures given as to the material which will be used in its construction are: Bricks, 7,000,000; steel, 6 000 tons; steel beams, 74 miles; plaster, 6,400 tons, covering 2,500,000 square feet; plumbing pipe, 20 miles; limestone facings, 30,000 cubic feet; moulding wiring, 189 miles; electric light bulbs, 16 000; steam pipe, 86,000 feet; radiators, 1,600.

* * *

SOME INTERESTING DATA which enables one to intellectually grasp the magnitude of the new C.P.R. bridge which is now in process of construction, over Belly River, near Lethbridge, Alta., was recently given out by a prominent official of the company. According to the statement made, the structure will be more than double the height of the ill-fated Quebec bridge. The latter bridge was to have been 150 feet above the level of high water while the C.P.R.'s new bridge will be 307 feet above the water level, and combining both its height and length it will be the largest bridge in the world. Its length will be 5,327 feet, or some twelve yards over a mile, and the cost of the structure will amount to $1,500,000. Comparison with other great bridges of the world show that the Lethbridge structure surpasses in length the bridge over the Dnieper at Jakaterinoslaw, Russia, which is 4,557 feet in length; the Alexandrowski bridge over the Volga, near Syzran, 4,871 feet; the Severn bridge 4,162 feet and the Empress bridge over the River Sutlej, on the Indus Valley railway. Of the bridges which approach it in height, the Kentucky bridge is important, having a height of 275 feet 6 inches above low water; while the C.P.R.'s own bridge over the Fraser river is 125 feet high. The structure which spans the Victoria falls of the Zambesi river has the advantage of the new C.P.R. bridge in height, but fails in comparison in length. The Lethbridge bridge will also be twice as high as the famous Forth bridge, and nearly five times as high as the Victoria bridge at Montreal, although both of these bridges are of greater length, the latter being nearly two miles long. The concrete foundation of the structure at Lethbridge goes down to 24 feet below low water, and stands on hard shale. Twelve thousand tons of steel, 18,000 cubic yards of concrete, 20,000 barrels of cement, and 15,041 piles are being used in its construction.

ORNAMENTAL CONCRETE STONE.*---Methods of Treating Surfaces to Produce Satisfactory Results as to Color, Texture and Detail.---Selection and Intelligent Manipulation of Aggregates Important.---Some Examples of Decorative Concrete Work.

By FRED. A. NORRIS, C.E.

IT IS NOW a generally accepted fact that properly made concrete possesses all qualities of the best natural quarried stone that would make it desirable as a building material, with the exception of a pleasing appearance, which it generally lacks.

For massive masonry construction, concrete has taken the place of old fashion stone masonry to an enormous extent, because of its comparative cheapness; and it might almost be said that natural stone is practically confined in use to facings and ornamental trim on pretentious buildings, where moulded courses, cornices, capitals, columns, and other ornamental features are employed. It is used in these cases nearly always purely on account of its superior appearance. Its principal function is to ornament, not to support loads.

It is well known that concrete can be moulded or cast into any desired form, but then, its appearance, especially in color and texture, unless this is done by careful, intelligent men, trained in this special work, is usually so undesirable that it cannot be used successfully on buildings of the first class.

In view of these facts, it is apparent that if we could make its color and texture pleasing to the eye and its form accurate in every detail, so that it would not appear moulded or cast, but have sharp arises and true lines, it might largely take the place of quarried stone, even where now used.

As our creterion of appearance, fixed habit, is that of quarried stone, and as concrete is really itself stone, we naturally try to approach in color and texture the article made by nature, not necessarily because we wish to imitate it for the purpose of deception—although in practice this is unfortunately often the case—but because in our imaginations we have no better standard of looks.

Therefore, the nearer this material comes to looking like quarried stone in color, shade, texture, and accidental tone, the better it is. I am confining my discussion now to its use on structures as a substitute for quarried cut stone But it need not even then deceive or be known as anything but what it is, because the jointing can be arranged to conform to the possibilities of the material and be unlike what would be possible or practicable of accomplishment with natural stone.

There are two methods of surface treatment usually employed in making concrete stone of this character.

One, and to my mind the most important and satisfactory method, is to reveal selected aggregates by tooling the surface after the concrete has thoroughly set.

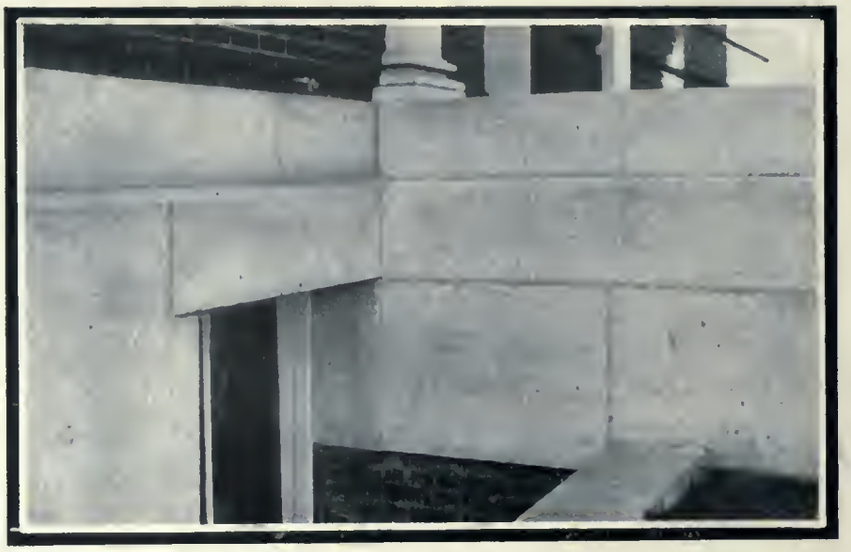
In order to attain good results by revealing aggregates, the aggregates must be worth revealing and be pleasing in themselves; furthermore, they must be placed in the forms and be manipulated after being placed, in such manner as to be uniform in distribution, and show no markings of the form or demarcations between successive layers installed at different periods of the work. They must also be properly selected as to size and must possess a number of other qualities, such, for instance, as the ability to reflect light well, and be distinctive and different from each other in shade or color, or both.

Office building, Boston. An example of artificial stone construction in which the texture of the material and the simplicity of design combine to produce a highly satisfactory and effective exterior.

We have been very successful in employment of a selected material of different sizes of black and white marble; and concrete made of this aggregate instead of becoming dull with age, weathers better and retains distinctive textural advantages over even most granites. Some kinds of crushed granite serve very well, but require in nearly every case a small portion of aggregate of a different kind, distinctive in color, and also brilliant in order to give the desired "life."

It is nearly impossible to proportion the aggregates of a given stone so that there shall be a minimum of voids, thereby making it possible to use the least possible amount of cement and then reveal the aggregate and obtain the appearance of the stone from which the aggregates were taken. In other words, it is nearly impossible to crush up granite, mix it with cement, reveal the aggregate and get a product that will look like the original granite, and this applies to nearly every other stone. Besides, even if it were possible in a laboratory; in actual work carried out on a large scale in the field, the variations in the operation would make the results anything

*Paper read at Toronto before the first annual convention of the Canadian Cement and Concrete Association.



The above illustration shows the remarkable similarity to natural stone produced in concrete work, in that the stone on the left and over basement window is Medford pink quarried granite, while that on the right is a concrete monolith, built in position, with marked off joints.

but uniform, even with the most careful superintendence.

While we are on the subject of aggregate, I should like to call attention to the fact that if sharp arises and fine ornamental detail are required aggregates of small size must be used. It is a common error of design to select a concrete of too coarse texture for the detail.

On account of the cost, it is often desirable to form only the surface of selected materials, placing them in position at the same time that the backing of coarser concrete is installed. If this be properly done a perfect bond between the fact and backing can be made.

Ornamental concrete work, private Estate, Massachusetts.

The second method is to make the concrete surface take on its color and texture from different substances placed in contact with the wet mix in the moulds or forms. If concrete is poured quite wet into a mould made of a porous substance, such as sand or a mixture of sand and other desired material, the surface of the concrete which comes in contact with the mold, will take on the texture and color of the material of which the inside surface of the mold is composed. When concrete is of this wet consistency the surplus water it contains naturally carries with it the very finest particles which are composed largely of neat cement. This comes to the surface, percolates through the porous substances on the inside face of the mold, leaving behind it on the surface a sufficient quantity of neat cement to adhere to the particles forming this surface of the mold, taking them up and making them an integral part of the body of the concrete, thereby forming the surface of the same color and texture of the material with which the mold is lined. There are many possibilities in this direction still undeveloped.

When concrete is used structurally in large masses it should not resemble stone, but its surface should either be treated to give a pleasing appearance and at the same time look like concrete, and nothing else, or it should be covered either with a paint of some kind, such as lime and water or cement and water, or it may be plastered with a Portland cement and sand plaster.

Many authorities disapprove of plastering concrete surfaces, claiming that a proper bond cannot be secured between the backing and the surface and, therefore, in a short time the plaster will come off. It is possible to make a durable job in this manner, however, and we do it and have done it regularly for some years. I shall not take up your time by going into details as to methods, but in a general way state that the surface must be well roughened, preferably by tooling, and then it should be thoroughly wet, in fact, it should be soaked in water. The first rough coat must then be thrown on with force and allowed to harden before the second coat is applied. The second coat should then be thrown on the roughened, wet, hard first coat in the same manner. This requires experienced men, and on top of that careful supervision and failures are either due to ignorance or attempts at labor economy.

There is another method of treating concrete surfaces

Gore Hall (Library Building) Harvard University, showing concrete addition in the foreground. The surface of the concrete in which the selected aggregates are revealed, has the appearance of Quincey Granite and strongly simulates the natural stone used in the original building.

Garden in an estate at Bar Harbor, Maine. An example of concrete in decorative landscape work.

by embellishing them with colored substances in design, such as terra cotta, colored glass, mosaic, brick, and similar substances, but I shall not dwell on this.

We have all heard recently much talk to the effect that concrete should always appear as concrete, and never have its identity concealed, or be used as an imitation material, but I think it perfectly proper to paint it or plaster it just as we do wood or iron, and if we wish to use it for fine ornamental work and we can simulate natural stone in appearance and at the same time produce a better article in some respects, why not? It can be made fireproof without strata or bed, and reinforced with steel. It has qualities which quarried stone does not possess.

CONCRETE BLOCKS.---Their Present and Future. ---Continued from Page 59.

blocks of those days were usually of rock design, and, as I have pointed out, the very worst rock effect at that.

It seems strange, upon consideration of this part of the business, that that design was chosen for the general exploitation of cement blocks, which represented to the highest degree the artificial character of the product and at the same time the most difficult to closely imitate.

English Garden, private Estate, Massachusetts, another example of the decorative possibilities of concrete.

There is no dressed stone design that varies so greatly as the rock, or quarry face stone, and there is no dressed natural stone so cheap as this design. Therefore, in selecting this one for exploitation of cement blocks the extraordinary and peculiar fact was brought home to us all, that it required a greater variety of face plates, and also required greater care in the manufacture and use of this design to produce a pleasing effect than with any other that could be secured.

All this has been, and is, in process of being changed, however. Good plain designs are now being urged upon every manufacturer of blocks, designs that can be produced with natural and telling effect, and the future I believe will show the elimination entirely of the rock face concrete block.

The present is showing, and the future will still more show, the extraordinary development of this remarkable material. Wherever you go, east, west, north or south, particularly in the United States; everywhere, you will find evidences that concrete blocks are receiving more and more favorable consideration. You will find foundations,

Temple in formal garden, private Estate, Massachusetts, built entirely of ornamental concrete stone.

houses, schools, churches, public buildings, factories, and even complete manufacturing plants constructed with cement blocks. Good concrete blocks are now being sold in the United States at a figure where they compete with common brick, and where pressed brick or cut stone was formerly used, concrete blocks have now an ever enlarging field. This is as it should be, for as I have pointed out, there is no virtue in any other building material not possessed by concrete blocks, to which may be added the fact that they can be produced in as high a grade as any other building material from an architectural and structural point of view, and at a cost lower than any other building material except lumber. Lumber is becoming scarcer and more expensive, and as a consequence, people everywhere are looking for another building material, and right here the concrete block steps in and claims its own. Its plastic character makes it possible to produce it in any desirable design. Its remarkable resistance to fire has been thoroughly attested, and in a few more years

we will see concrete blocks used as commonly as brick is now, and that means that blocks will be used in the construction of the great majority of buildings.

Of all forms in which concrete can be used, I desire to specifically state that the cement block represents the most approved method. You ask why? Because it elimi-

Entrance, Ivanhoe Apartments, Allston, Massachusetts. Note the excellent texture, detailed effect, and granitic appearance of the concrete.

nates to the largest extent possible, the human equation in making concrete; because a cement block is a unit that can be inspected before it goes in the building; therefore, its stability and perfection can be assured: because it secures the use of a ventilated wall, and this fact is a distinct advantage in construction: Furthermore, this ventilation saves material and permits the installation of wires and pipes within the walls of the building itself, and, the block when delivered on the job is finished in design and needs no further dressing of the exterior surfaces. In factory and other general construction work it is possible to dress both the exterior and interior surfaces, as has been shown in recent samples exhibited.

Designs are now produced for cement blocks which makes it possible to meet every demand of the architect for beauty of design. One of the most promising developments in the use of cement blocks has been shown lately in their use in conjunction with reinforced concrete columns, beams and girders. Many buildings have lately been constructed of reinforced interior, with concrete blocks for the exterior walls and partitions.

PITTSBURGH'S UNIQUE CHURCH-OFFICE BUILDING.

SHOULD THE PRESENT PLANS be carried to a successful conclusion there will soon be erected upon the historic site of the oldest religious congregation in the city of Pittsburg a church and office structure which will be unique among the country's examples of imposing architecture. The combination building will rise on the block now occupied in part by the church of the first German Evangelical Protestant congregation, which traces its origin back to the year 1782. The site upon which the church and adjoining buildings now stand is regarded as one of the most valuable in the congested business district, and while the property is too spacious for church purposes alone, measuring as it does 240 x 110 ft., at the same time the business buildings are wholly inadequate. The structure, which has been designed by Architect E. C. F. Ernst, consists of a solid block in one street front of which is the church edifice flanked and surmounted as it were by a business building 14 stories in height. The right and left wings unite with the trunk of the business building above the sixth floor, so that the entire space from the seventh to the top floors may be devoted to offices, of which each floor will have 58. The business sections of the right and left wings may be occupied by two separate establishments if desired, or they can be devoted to one enterprise if necessary, as the rear entrance forms a connecting passage. On the upper floor is a large assembly hall 240 x 110 ft. in area with a pilaster facade built around the light court. The church auditorium is 80 ft. wide amply lighted by 10 large windows opening on the street, as well as by a 24 x 48 ft. skylight and several windows 20 ft. wide bordering on the light court. The height is 48 ft. to the cove and 62 ft. to the crown of the dome. The main floor has a seating capacity of 860 and with one gallery will seat 1,150 people. On the sixth floor are the social rooms of the congregation and at this level is also placed the church clock, which has a face of 10 ft. in diameter. The architecture of the church is pure Gothic, while the rest of the structure is of the Renaissance type. Three large portals admit to the vestibule 48 ft. wide, where on both sides staircases 8 ft. wide lead to the main floor of the church auditorium. The architect's design shows at the peak of the front gable, a distance of 128 ft. from the street level, an eagle holding in its talons the American and German flags.

IN THE SOUTH OF FRANCE is a concrete arch bridge, known as the Pont du Gard, which was erected

Concrete Mantel, private house, Boston. Both in design and texture of material this mantel is especially worthy of note.

56 B.C. It is regarded as an excellent example of the early use of concrete. The composition of the bridge differs from the concrete of crushed stone, sand and Portland cement now employed in work of this kind, in that it consists of alternate layers of large and small stones, gravel and other cementitious materials

New eight-room fireproof school building now being erected at Oklahoma City, Okla., in which a number of innovations of a structural character are introduced.

AN EIGHT-ROOM FIREPROOF SCHOOL BUILDING.---New Type of Structure Now Being Erected at Oklahoma City, Okla.---Structural Economies Effected by the Use of Reinforced Concrete and Metallic Lath and Stud Partitions.---Cost Compares Most Favorably with Wooden Structure of Same Cubical Contents. ∴ ∴ ∴

THE LACK of fireproof school buildings in most of our communities is not due to the want of architects to design them; nor can it be ascribed, as a rule, to the failure of the authorities in charge to realize the need for such structures. There are both, numerous architects capable of planning buildings of this type, and a strong desire on the part of public to have them; but the impediment which usually precludes their erection, has been the increased cost which such construction involves. For this reason, school boards have been inclined to adhere to the older methods of construction, and to rely upon the proximity of the class-rooms to the exits, in the event of an emergency.

In view of this fact, the new eight room school illustrated herewith, now being erected at Oklahoma City, Okla., will undoubtedly prove of interest in that, it is claimed, the building is a successful solution of fireproof construction in which the cost has been reduced to a minimum.

This building while introducing a number of new innovations of a structural character, makes no variation in the arrangement of the rooms. The plan is direct, and simply consists of corridors on both floors extending through the centre of the building to stairways at each end, and having two class rooms on either side.

The distinctive feature of the construction lies in the abandonment of the interior brick walls and the substitution for them of metallic lath and metal stud partitions. The partitions are not designed to sustain any weight, as the reinforced concrete floor and roof are carried on reinforced concrete beams, which in turn are supported on reinforced concrete columns placed along the line of corridor partitions.

The framing, which is not shown in the plan presented herewith, consists merely of reinforced concrete beams set parallel with each other and running from the columns to the piers of the outside walls. This divides the floor into panels, approximately 13 feet in width which are spanned with concrete floor slabs. The roof is constructed in the same manner, the necessary slope being given by a fill of cinders which in turn is finished with a coat of cement and sand and covered with a tar and gravel protective coating.

While the cost of the concrete floors is more than the cost of wood floors, it is said that the difference in cost is practically offset, owing to the economical proportion of the concrete floor slabs, and also to the saving made at various points by the use of reinforced concrete and metal lath and studs for partitions. Usually where wood floors are employed, the thickness from the bottom of the plaster line to the top of the finished floor is 19 inches, while in this case the concrete floors, including the wood superfloors, are only eight inches thick. This has effected a saving of 11 inches per story, which together with 10 inches economized in the roof, gives a total saving of 32 inches in the height of the building, without any decrease in the available spaces.

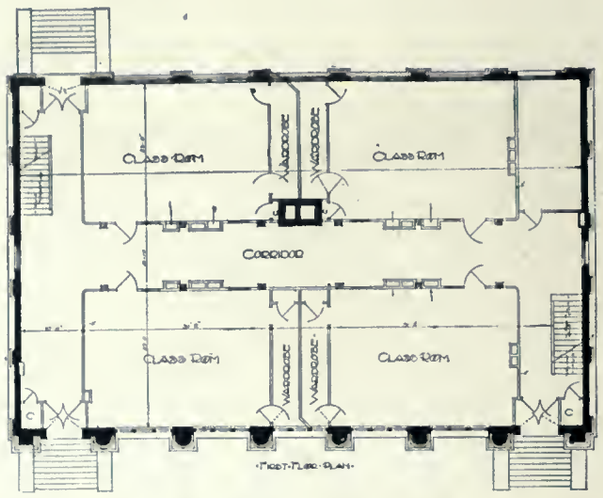
The metallic lath and metal stud partitions, in that they are but two inches thick after being plastered, also effect a big saving of space in the interior walls. The plaster work instead of two and three coat work, as usually applied to brick and where wood lath is used, consists of a skim white coat of plaster applied directly to the concrete.

The need of any deadening material between the wood screeds to which the hardwood superfloor is nailed is obviated owing to the type of floor construction employed. There is a filler of lean-cinder concrete, but this has been adopted mainly because of the difference in cost between lith and cinder concrete is much in favor of the latter,

and not because it is intended to act as an agent to retard the transmission of sound.

The interior foundations consist of isolated concrete piers, 4 feet 6 inches square and 18 inches deep; a character of foundation which is structurally perfect, and which it is said, contributes to the moderate cost of the building.

The result of the combined structural economies worked out in the school in question as regards cost, is shown in the comparative cost of this structure and a wood building of the same class. The contract price of this building complete, exclusive of plumbing and heating, was $25,145.00. After receiving tenders the school board decided to widen the corridor 2 feet, and consequently the contract was let on a plan 2 feet greater in one dimension than that of the plan shown. With this addi-



Ground floor plan of new eight-room fireproof school building, Oklahoma City, Okla. The framework is of reinforced concrete, while metallic lath and studs partitions are used for interior walls. Layton, Smith & Hawk, Architects.

tion, the cost of the building exclusive of heating and plumbing was 12.4 cents per cubic foot.

Figures were also taken on a building of the same dimensions in wood. The lowest tender in wood was 11.3 cents per cubic foot. In order to secure a structure of the same net area, however, the cubic contents of a building constructed of wood would have to be increased by 29,200 cubic feet. This was not considered in the alternate figures as the increased size of partitions in the wood building reduced the room dimensions. The rate per cubic foot established by the alternate tender multiplied by the cubic contents of a wood building with the same working space, gives an estimated cost for the combustible structure of $26 243, a figure actually greater than the cost of the fireproof building.

In order to enable a comparison of the cost of this building in Oklahoma with a similar building in Canada the prices of material and labor in Oklahoma will be of interest. Common brick there costs $8.00 per 1,000 on car, builders' sand costs $1.60 per cubic yard, crushed rock for reinforced concrete costs $2.05 per cubic yard, Portland cement costs $1.50 per barrel, and dimension lumber $25.00 per M. These prices are delivered on the building site. Ordinary labor costs $2.25 for nine hours, carpenter labor costs 45c. per hour, and brick layers and plasterers get $6.00 per day. It will be seen that these prices should result in a building of approximately the same cost as a similar structure in most portions of eastern Canada.

The use of reinforced concrete results in an arrangement of outside walls which readily permits of maximum window spaces. This is shown in the elevation of the building under construction. The spandal section as shown is built of metal lath and metal studs covered with galvanized iron. This construction is not suitable for Canadian climate, and this point is the only one which would require an increase in cost in Canada, as compared with Oklahoma.

A wood building of this class is subject to an annual depreciation of from three to five per cent. of its value. The type of school herein referred to is far more durable and its structural portions become stronger with age. It also has a further value which is not measured by dollars and cents, as there is no commercial criterion by which the value of the safety of children can be measured.

The reinforced concrete work was designed by C. W. Noble, 117 Home Life Building, Toronto, and the cost of the building included his fees. The reinforcing rods used are unpatented.

THE SOUTHAM PRESS BUILDING.---Continued from Page 62.

corner of the building, with entrance from Adelaide street. These stairways, of simple steel and cast iron construction, were built by McGregor & McIntyre, Ltd.

The building is equipped with a passenger elevator and a freight elevator, these being electrically operated by machinery installed at top of shaft. A hydraulic plunger hoist runs from the shipping floor on the south side of building to the basement. These elevators were supplied by the Turnbull Elevator Company. The structure is heated by the vacuum system of steam heating.

The brick throughout is Port Credit Brick Co. kiln-run, laid in cement mortar.

The cement throughout is Canadian Star Brand, from the Canadian Portland Cement Company's works at Port Colborne, Ont. The different carloads were fairly uniform in test, the following figures being average values:

Initial set, 260 m. Final set, 420 m

Tenstile strength--

Neat cement—24 hrs.		354 lbs. per sq. in.
	7 dys.	601 lbs. per sq. in.
	28 dys.	640 lbs. per sq. in.
3 to 1	7 dys.	230 lbs per sq. in.
	28 dys.	294 lbs. per sq. in.

The concrete, on placing in forms, was of a quaking jelly-like consistency for floor-slabs and slightly drier for beams and columns. The results on the removal of forms were highly satisfactory as regards finish of surface. A subsequent test of 700 pounds per square foot placed on floor showed no appreciable deflection.

The lintels, sills, coping, etc., are of Canadian art stone, while the entrance on Duncan street of Indiana limestone.

The reinforced concrete work throughout was executed according to the system of the Expanded Metal and Fireproofing Company, Toronto, who were the contractors for this branch of the work.

A feature of the building is the employment, in nearly all of the trades, of materials of Canadian production.

RED BRICK TOWERS, it is observed by Mr. T. M. Grose Lloyd, who writes the extremely interesting account of the "Ancient Churches of Essex," in "Memorials of Old Essex," are a unique characteristic of the county. These brick towers, and the timber towers and turrets, are the most characteristic features of its churches. The wood towers and turrets are often covered with shingles, a kind of roof-covering that nowadays is much more common in America than it is in this country. The porch of Feering is vaulted in brick; the tower of Sandon is donned over in brick and shingle, and Cignal Smealy is built entirely of brick, even to the font.

SOME OLD DOORWAYS.---Several Interesting Doorways of Quaint and Historic Places, Which Are Still to be Seen in England. ---Examples of Early Architecture Dating Back to the Time of Edward IV.

By HENRY WALTERS

WOOLSTHORPE MANOR HOUSE. This old homestead is situate on the outskirts of the village of Colsterworth, on the Great North Road, a few miles south of Grantham. It will ever be memorable as the birthplace of Sir Isaac Newton. The cross-bones which appear above the doorway are the arms of the Newtons, and the inscription immediately below reads as follows:

"In this Manor House Sir Isaac Newton, Knt., was born on 25th December, 1642."

Woolsthrope Manor House, the birthplace of Sir Isaac Newton.

OLD HOSTELRY AT FOTHERINGHAY. When Fotheringhay Castle was in its glory the accommodation within its walls was insufficient to accommodate the numerous visitors. King Edward the Fourth therefore built a hostelry in the village of Fotheringhay for the entertainment of those who were unable to find room in the castle. The hostelry is now occupied as a private house, but the old gateway remains, giving some idea of the beauty of the whole structure.

KERSAL CELL. This quaint, half-timbered building is situate on the outskirts of Manchester, in the vale of the Irwell. It is noteworthy as the birthplace of Dr. John Byrom, who wrote "Christians Awake" within its walls. That hymn was first sung around the old doorway, by the choristers from Manchester Parish Church, on Christmas Eve, 1750, under the direction of John Wainwright, the organist, who set the words to music.

Hostelry erected by Edward IV. at Fotheringhay.

NORTHBOROUGH MANOR HOUSE is situate about three miles east of Helpston station, a few miles to the north of Peterborough. It is a beautiful example of ancient domestic architecture, and is locally known as "Cromwell's Castle," because of the frequent visits thereto of Cromwell. His daughter lived within its walls, and Cromwell's widow died there, and was buried in Northborough Church. The Gate-house gives access to a quadrangle, on the south side of which is the manor house with crocketted gables and other architectural features in the Decorated Style.

"WELLBRIDGE" MANOR HOUSE is situate on the outskirts of Wool, in Dorset. It was formerly the home of the D'Urbervilles, and latterly has gained some notoriety from the fact that it is the place where "Tess of the D'Urbervilles" spent her ill-fated honeymoon with "Angel Clare," as depicted by Thomas Hardy in his realistic romance. The portraits on the staircase, which gave poor Tess such a fright are still dimly visible on the staircase. The house is now occupied as a farmhouse, but is still worthy the closest attention of the architectural student.

Wellbridge Manor House, Wool, Dorest. Where Tess of the D'Urbervilles spent her honeymoon with "Angel Clare."

ROCKINGHAM CASTLE. Access is gained to the Courtyard of Rockingham Castle through a ponderous Norman gateway. The doorway shown in our illustration is in the quadrangle and is surmounted by the shields of the Watson's. Rockingham Castle is noteworthy masmuch as it is the "Chesney Wold" of *Bleak House*. The Castle and neighboring Church are full of interest from an architectural point of view. Rockingham Station on the Rugby to Peterborough branch of the L. & N.W. is within a couple of miles of the castle.

ELTON HALL, the seat of the Earl of Carysfort, is situate on rising ground overlooking the Vale of the Nene, a few miles north-east of Oundle. The principal feature of the hall is the great doorway with its ponderous battlements.

Rockingham Castle. The "Chesney Wold" of "Bleak House."

QUAINT DOORWAYS AT OUNDLE. Both these doorways are situate in the same street within a short distance of each other. The "bonnetted" doorway is an excellent one of its style, and as will be seen from the illustration, still has the doggate in situ. The other gateway, with its elongated pinnacles, gives access to a row of almshouses.

ADLINGTON HALL is situate a few miles north of Macclesfield in the county of Cheshire. It is the ancient home of the Legh's, and is one of the best examples of the magpie style still in existence. The old doorway shown in the illustration gives access to the house from the courtyard, which is still completely surrounded by buildings, and a portion of the moat is still to be seen. Handel was a frequent visitor here, and there is good ground for believing that he composed "The Harmonious Blacksmith" within its walls.—JOURNAL OF THE SOCIETY OF ARCHITECTS, LONDON.

Elton Hall. The seat of the Earl of Carysfort.

MILL CONSTRUCTION AND CONCRETE CONSTRUCTION.---Their Comparative Merits

THE RELATIVE VALUE of what is known as slow burning mill construction and of structural steel construction when reinforced with concrete, was very interestingly discussed in detail in an address by J. H. P. Perry, recently delivered before the Modern Science Club of Brooklyn, N.Y. In part, Mr. Perry said:

"In comparing the advantages of the two methods of construction (mill and structural steel) and calculating the annual charges of insurance, interest, depreciation, maintenance, additional repairs to machinery caused by vibration vermin losses, influence of maximum light on the effectiveness of the work of the employees and the waterproof and sanitary qualities of the two buildings, it is possible to show an annual saving of from 1 to 2 per cent. by the adoption of reinforced concrete in preference to mill construction. The question of insurance rates is not by any means settled in the way it ultimately will be, as in some sections there is a tendency on the part of the insurance interests not to give concrete the benefit of the low rates that it should receive. Where it is possible, however, to bring in competition in the form of the Boston Mutual Companies, the rates on concrete buildings drop to practically nothing. On a large paper manufacturing concern's factory in Brooklyn and also on a large color works in Staten Island, both of them dangerous risks and with bad exposure hazards or with lack of adequate protection, the rate on the building is 10 cents per $100 insurance. There is one instance where rates of 6 cents on a large Chicago building have been quoted. Compare these with rates on mill buildings under similar conditions of occupancy, contents, and protection of 21 cents and 30 cents and 50 cents and it is easily seen where some of the 2 per cent. annual saving above referred to comes from. Reinforced concrete factories practically eliminate vibration under rapidly moving machinery. One large paper manufacturer in Brooklyn states that his nine-storey concrete factory saves him 20 per cent. in the amount of power required to operate his machinery as compared to a six-storey first-class mill construction building used for the same purposes. Also this concrete building saves him about $5,000 a year in the amount of repairs on his machinery. Both of these savings are due to the stability of the concrete structure. Machines once set in place and shafting once lined up remain in position as there is no vibration to cause movement. It is easily appreciated that in a monolithic concrete building there is no place for vermin of any kind. With concerns which manufacture delicate materials or which have to store fruits or vegetables or other perishable goods the question of vermin loss is often a serious one.

Doorway and Dog Gate, Oundle.

"With reference to structural steel, concrete can be put up at a saving of from 10 to 15 per cent. on the same plans. There are several cases which may be cited where bids have been received by architects for a building which could be constructed either in steel or concrete, and in every instance, for industrial purposes at least, the concrete figure has come under the structural steel figure by from thirty to forty thousand dollars on a quarter of a million dollar and larger propositions. This is owing to the expensive fireproofing of every structural member—beams, columns, girders, brackets, etc., with terra cotta, brick or concrete. The steel skeleton can be run up cheaply, but before the building is completed its cost goes over concrete most appreciably. The vibration in a steel building is liable to cause occasional trouble and there is always the question of rust and depreciation. With reinforced concrete structures, however, the steel used consists of small sized bars or wire, all of which is fully protected by concrete Baltimore and San Francisco demonstrated beyond dispute the effectiveness of the concrete protection to steel under fire action. The Prussian Government and numerous other investigators have made futile further discussion of the rusting possibilities of steel bars imbedded in concrete. Tests of blocks under water, in steam baths, in sulphur vapor, and under pressure has proved the impermeability of concrete and its consequent prevention of rusting."

Quaint Doorway at Oundle.

Adlington Hall, Cheshire. The home of the Legh family.

Suburban House of English Character. Designed by Architect Collier Stevenson.

A STUDY IN HOUSE DESIGN OF ENGLISH CHARACTER. —Planned for Suburban Life.—Construction Provided for Common Brick Walls with Rough Stucco Exterior.—Private Character of Porch a Feature.—Arrangement of Rooms Well-balanced and Compact.

AN INTERESTING STUDY of domestic architecture in which a number of splendid features have been developed both as to plan and design, is shown in the accompanying illustrations of a surburban house of English character, designed by Architect Collier Stevenson, of Hamilton.

The chief charm of this attractive little residence, and that which gives it such a strong individuality and homelike aspect, lies mainly in the exquisite treatment of the roof lines and simplicity of detail.

Its construction provides for walls of common brick, plastered in a very rough stucco finish, dull yellow in tone. The exterior woodwork is to be painted a warm brown with window sashes of cream, while the shingles are to be stained a silver grey. This pleasing combination of colors is to be further enhanced by the chimneys and underpining course, which are to be of red brick, laid up with white joints.

One of the pleasing features of the house is the private character of the verandah at the side, from which two doorways lead to the interior—one directly to the living room and the other to the hallway. The first floor throughout is admirable in its arrangement. But very small space is required for the hall, and only one stairway is provided, but that is equally easy of access from the living and service portions of the house.

The living room, which is of spacious dimensions, has a beamed ceiling and a large open fireplace, while in the dining room, in addition to the last named feature, is a sunny flower bay, and a built-in sideboard, having mullioned windows above it. Both of these rooms being continuous, practically open into one large space, thus affording ideal facilities for entertaining.

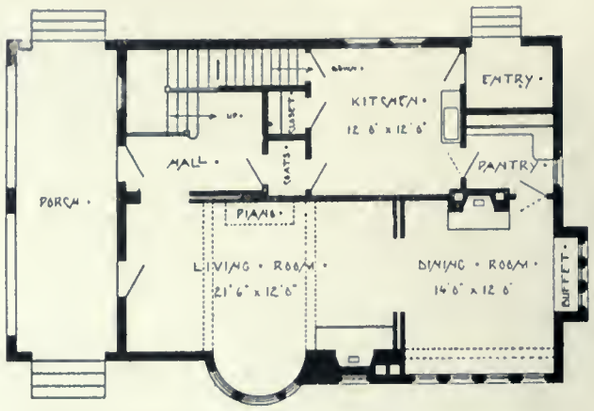
In planning the house the architect was governed at all times by the vistas to be obtained from one room to the other.

The complete isolation of the kitchen—so much to be desired in domestic work—is effected in a most simple and satisfactory manner, being separated on one side by the coat room connecting it with the entrance hall, and on the other by a large serving pantry which opens directly into the dining room. This arrangement results in a very compact and convenient grouping of the various rooms and the elimination of all waste space. Off the kitchen is a roomy closet for the storing of culinary utensils, while at the back is an entry opening onto the back of the lot.

As to interior finish, all walls on this floor are finished in grey-green stucco, with grey stucco ceilings, and the woodwork, with the exception of the kitchen and pantries, is of whitewood stained a dark brown.

Equally as pleasing a plan as that of the first floor is found on the second where the grouping of the various rooms shows a well balanced arrangement and the proper value of space. There is no unnecessary waste of room or unused corners, and the different chambers have been carefully placed so as to be in proper relation to each other.

As on the floor below, the hall, while of small proportions, is sufficiently large enough to adequately serve the various rooms. Something not usually provided in a



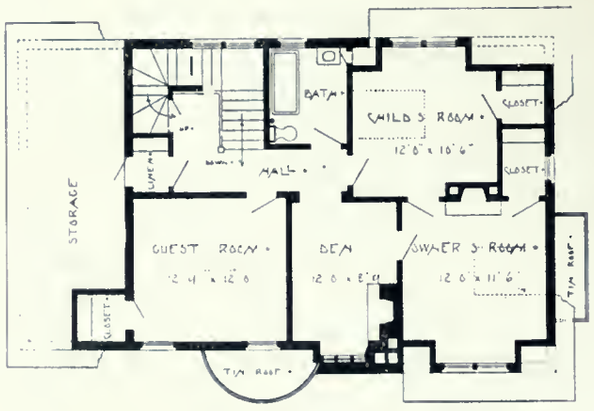
Ground floor plan, Suburban House of English character. Architect Collier Stevenson, Designer.

small house such as this one, is the owner's suite which consists of a den, overlooking the bay window, a master's room and a child's room.

In addition to these rooms there is a well lighted guest's chamber, and a bathroom which can be conveniently reached from all parts of the floors. Both the den and the master's room have open fireplaces, while all bed rooms are provided with commodious built-in clothes closets. Off the end of the hall is a large linen closet which in turn opens into a storage room utilizing the space over the verandah.

The entire woodwork on this floor is finished in white enamel with the exception of the doors which are mahogany-stained.

On the third or attic floor, the plans of which are



Second floor plan, Suburban House of English character. Architect Collier Stevenson, Designer.

not shown, are two maids' rooms finished in a similar manner to those just described. The estimated cost of this house complete according to the present market price of materials and labor is $4,500.

TEST OF REINFORCED TERRA COTTA COLUMN.

THERE WAS RECENTLY tested at Phoenixville, Pa., a reinforced terra cotta column, 21 ft. 7 1-2 in. long and 21 3-4 in. in diameter, which was subjected to a maximum load of 4,109 lb. per square inch, and, according to the report of Robert W. Hunt & Co., of Chicago, who made the test, was not injured. The column was built of special shaped, hard burned, terra cotta tile, composed by two concentric rings, the inner one of three and the outer seven tiles. The vertical reinforcement of six 3-8 in. twisted steel rods was placed in the circular joint between the inner and outer rings.

The column was built of 106 courses of tile, each approximately 2 1-4 in. thick and containing in the other ring a 1-in. circular groove, 1-4 in. deep, in which was placed a welded ring of 3-16 in. wire, 16 in. in diameter. Through the centre of the column was a 2 7-8 in. hole. The mortar in the horizontal joints was one part Owl Portland cement, one part torpedo sand and one part fine sand. In the first seven courses the mortar in the vertical joints was one part Portland cement and three parts torpedo sand. In the vertical joints of the remaining courses the mortar was of the same proportions as in the horizontal joints, with, however, the addition of 7 to 10 per cent. plaster of Paris in the outer ring, added to make a stiff and quick setting mortar. All joints were 1-4 in. thick. A cross section of the column is shown in a sketch reproduced herewith.

Samples of the materials entering the column were tested. The twisted steel samples showed elastic limits of 67,430 and 71, 390 lb. per square inch, respectively; the wire for the rings, elastic limit, 48,900 and 51,780 lb. per square inch; half tiles, crushing load, from 10,000 to 12,338 lb. per square inch; full-size tiles were tested to the capacity of the machine without crushing, amounting to 8,812 and 9,066 lb. for the two specimens.

The column was built in Chicago by the National Fire Proofing Co. and was finished Aug. 18, 1908. It was shipped to Phoenixville on an ordinary flat car in the early part of November, arrived in good condition, and was tested in a horizontal position on Nov. 10, 1908. The compression curves for loading and release are shown herewith.

THE WALLS OF JERICHO.---Masonry of Canaanite Builders Laid Bare by Excavation of German Society.

THE WALLS OF JERICHO have been partly laid bare by the excavations conducted under the direction of the German Orient Society, and it is clear from the remains that the taking of the city by the Israelites under Joshua must have been a feat of arms well meriting its prominence in history. The excavations at Troy and Jericho indicate considerable correspondence between the two fortifications. The Canaanite builders, who probably constructed the greater part of the famous walls of the city at least 1,500 years B. C., first leveled up the rock foundations with mud and rubble and then built a wall of blocks of stone nearly 18 ft. high, with a inclined outer face and vertical back. This was surmounted by a wall of mud brick about 7 1-2 ft. high. Some of the stone blocks contain considerably over a cubic yard, and some of the brick are much smaller. Within the wall at one place was a citadel having towers at the corners. It was built of mud brick with immense blocks at the corners and presents a number of features the uses of which are decidedly puzzling. The explorations show that even in those very remote days before the entrance of the Hebrews into Judaea, the art of masonry construction there had advanced to a creditable position, and we must recast our ideas concerning the nature of the cities of the Promised Land. In the report of the excavations thus far made, which is given in the "Builder," it is stated that but a very small part of the site of old Jericho, which is 1 1-2 miles from the present city, has been laid bare so the continuation of the work promises to yield as full knowledge of the old buildings of Palestine as we already possess of those of Babylon and Nineveh.—ENGINEERING RECORD.

BUDDHIST AND HINDU ARCHITECTURE OF INDIA.*—Their History, Development and Characteristic Features.—The Influence of the Former on the Latter.—Early Examples of the Dravidian and Indo-Aryan Styles.

By ARTHUR ANTHONY MACDONELL, M.A., Ph.D., F.B.A., Oxford University

THE HISTORY of Buddhist architecture in India extends over about nine centuries, and may be divided into three roughly equal periods. The earliest period reaches from 250 B.C. to 50 A.D. The monuments which survive from this period are almost exclusively the work of Buddhists, who introduced the use of stone in architecture at the commencement of this period. For some centuries before the beginning of this period, the architectural use of brick had been known, as is proved by the Stupa of Piprahwa, which probably dates from 450 B.C. But the ornamental buildings of the pre-Asokan age must have been built of wood, like the modern palaces of Burma, only the substructures being made of brick. The whole history of Indian architecture points to previous construction in wood, the stone monuments being, to a large extent, imitations of wooden models. The second, and as far as Buddhist sculpture is concerned, best period, extends roughly from 50 A.D. to 350 A.D., the third period from 350-650 A.D.

The remains of Buddhist art in India are almost entirely architectural and sculptural; sculpture practically always appears in connection with the architecture, and invariably in the service of religion.

Early Buddhist architecture may be divided into three main groups:—(1) "Stupas," or relic mounds; (2) "Chaityas," or places of worship, corresponding to our churches; and (3) "Viharas," or dwellings for the monks.

"STUPAS" OR RELIC MOUNDS.

The "Stupa" is a dome-shaped structure which was a development of the low sepulchral tumulus or mound of earth, in which baked bricks were substituted for earth with a view to durability. The purpose for which they were erected by the Buddhists was to serve as monuments enclosing relics of Buddha or of Buddhist saints, which were placed in a stone coffer, or to commemorate important events or miracles connected with the history of Buddha.

As representative of this from of structure, the large Stupa at Sanchi in Central India, which, dating in all probability from the third century B.C., is an example of the Asoka type. Upon a substructure consisting of a low circular drum a hemispherical dome was erected. This dome was surrounded by a procession path forming the upper rim of the drum. On the top of the dome was a box-like structure surmounted by an umbrella (the Indian emblem of sovereignty), and surrounded by a stone railing. This structure is usually called a tee (a Burmese word). The tee has disappeared from all the Indian Stupas, but its form can be seen from the Stupas surviving in Ceylon, as well as from stone models and sculptural representations preserved in great numbers in India.

The Stupa itself was surrounded by a massive stone railing, with gates on four sides enclosing a procession path and a sacred precinct. Both the rails and the gates were unmistakable imitations of wooden models. The gateways, which are usually called by the Sanskrit name of Torana, were introduced into China and Japan along with Buddhist architecture from India. In China, under the name of Pailoos, they are frequently still constructed in wood; when made of stone they retain down to the present day the forms and details of wooden construction (like the gateways of Sanchi). A very remarkable thing in the history of this architectural feature is that these Pailoos are still used in China as gateways to simulated tombs just as their prototypes, the Toranas, were used at Sanchi 2,000 years ago.

Buddhism was introduced into Japan by way of Korea about 600 A.D. It is probable that the Japanese Tori-i, gateways similar in form to the Indian Toranas, and always found at the entrance of Shinto temples, are descendants of the Indian Toranas. There are similar gateways in Korea.

The earliest Stupas were very low in porportion to their diameter, but as time went on the relative height increased, and later, the Stupa showed a tendency to assume the shape of a tower.

Concurrently with the elongation of the Stupa we can see an elongation taking place in the tee also. Finally, we come to the last development in China, where the tee is practically all that is left.

It would be difficult to find a more remarkable example of evolution in art. Here you have an Indian architectural ornament, consisting of a few superimposed umbrellas only a few feet high, finally transformed into a nine-roofed Chinese pagoda reaching the height of 200 feet. Fergusson, in his "History of Eastern Architecture," suggests that the Chinese pagoda is derived from the Stupa, but he nowhere tries to prove the connection, though some of the illustrations in his own work supply part of the evidence.

THE "CHAITYAS" OR PLACES OF WORSHIP.

The second class of Buddhist religious buildings, the so-called Chaityas, are the exact counterpart of Christian churches, not only in form, but inuse. The typical Chaitya consists of a naive and side aisles, terminating in an apse or semi-dome. The pillars separating the nave from the aisles are continued round the apse. Under the apse and in front of its pillars is the rock-cut Stupa, nearly in the same position as that occupied by the altar in a Christian church. The tee was doubtless usually surmounted by a wooden umbrella, but this has everywhere disappeared except at Karli, the finest Chaitya cave in India. The roof of the Chaitya is semi-circular. The door is opposite the Stupa. Over the doorway is a gallery. Above this is a large window shaped like a horse-shoe. This window is constantly repeated on the facade as an ornament.

All the most important examples of Chaityas occur at six places in Western India. As we pass from the earliest to the latest specimens, we can clearly trace progress towards stone construction on the one hand, and degeneracy of cult on the other. In the oldest of these Western caves the pillars of the nave slope inwards, as in wooden structures, to resist the thrust of a circular roof. The rafters here, as well as the screen, were made of wood, but these have long since disappeared. In later specimens, the pillars of the nave and the jambs of the door become straight, and the screen consists of rock.

The development of the Buddhist temples will show how important archaeological evidence is for the history of Indian religion as well as architecture and sculpture.

THE "VIHARAS" OR MONASTERIES.

Besides the structural Stupas or their substitutes, the rock-cut temples, there arose Viharas or monasteries, as residences for Buddhist monks. According to the rock-cut specimens, the Viharas consisted of a hall (sala), generally square, but sometimes oblong, surrounded by a number of cells or sleeping cubicles, and shaded by a verandah in front. The cubicles in the oldest caves usually contain a stone bed. There is generally only a single

*Summary of a paper read before the Indian Section of the Royal Society of Arts. From the Journal of the Society of Architects, London.

floor, but examples of two-storeyed Viharas are not wanting. The only examples of Viharas in Eastern India are found at Udayagiri, in Orissa.

All the rest are found in Western India. Probably about forty of these were excavated before the Christian era. The four most important of these occur, one each at Bhaja and Bedsa, and two at Ajanta. That at Bedsa is specially interesting because the Vihara here has an apse, which points to this being a first attempt to excavate a Vihara in rock, as it imitates the shape of a Chaitya. The interior of the Vihara at Ajanta, is adorned with seven horseshoe arches, four over the doorways of cells, while three are simply ornamental.

Nasik and Ajanta are the most interesting places for the study of Viharas, the groups of caves in both places being purely Buddhistic. One of the principal ones (No. 3) at Naisk has a verandah with Persepolitan pillars. It has a hall 40 feet square, without pillars, and contains 16 cells. In the middle of the back wall is added the new feature of a Stupa carved in relief.

There is at Nasik another and larger Vihara which has the still later addition, at the inner end, of a sanctuary with two richly carved pillars in front and containing within it a colossal seated Buddah with flying and standing attendants, doorkeepers, dwarfs and so forth, such as are not found till in the fifth century.

Ajanta has more Buddhist Viharas than any other place, the number being twenty-two. These are specially important as supplying a complete series of examples of Buddhist art, without any admixture from Hinduism or any other religion, extending from 200 B.C. to 600 A.D., and thus belonging to all three periods. As they contain many inscriptions the dates of the caves are fairly well known, and thus help to fix the chronology of other groups.

The caves of Ellora are, however, the historically most interesting with reference to the inter-relation of the three Indian religions, Buddhism, Brahmanism, and Jainism. For here we have side by side three groups of caves (altogether thirty-three), distinctly representnig those religions, while the transitions from one to the other can be clearly traced. Of the Buddhist group of twelve, eleven are Viharas. The sanctuaries of most of these contain figures of Buddha seated, but with the feet down and not folded under them. Thus, the Buddhist monastery is becoming a place of worship in which figures of Buddha are ousting the monks from their cells. These Viharas come down to about 700 A.D., at which point the earliest Brahman examples begin. There are here three two-storeyed caves which illustrate clearly the transition from Buddhism to Brahmanism. The first is entirely and unmistakably Buddhist. The second is similar in plan, and the sculptures are still all Buddhist, but these deviate sufficiently from the usual simplicity to have justified the Brahmans in appropriating this cave as belonging to their religion. The third is very similar in plan to the preceding one, but the sculptures are all unmistakably Brahman. It is evidently the earliest Brahman cave, being a close copy of the preceding Buddhist example.

HINDU ARCHITECTURE.

We have thus arrived at the beginning of the Hindu period of Indian architecture. We have seen that the Buddhists were the first builders and carvers in stone in India, beginning in the third century B.C. It is only on Buddhist monuments that we find the earliest representations of Hindu deities. Thus Lakshmi, the Hindu goddess of Fortune, worshipped by two elephants pouring water over her, appears on Buddhist sculptures from the second century B.C. onwards. But the oldest remains of independent Hindu art, either sculptural or architectural, only date from several centuries after the beginning of our era. These considerations in themselves justify the presumption that Hindu architecture is derived from the older art of the Buddhists.

The whole surface of India is covered with Hindu temples, the vast majority quite modern or comparatively modern. The number of ancient shrines is small, chiefly in consequence of the destructive religious fury of the Mohammedans, who invaded India from 1000 A.D. onwards. The oldest specimens date from about 600 A.D., and the best examples are to be found between that date and 1300 A.D. In surveying these ancient monuments we can clearly distinguish two styles, each of which shows a definite type from the beginning. The geographical distribution of these two types is, to begin with, rather interesting. For the Southern or Dravidian style of Hindu architecture is found only within the tropics, or south of the 23rd degree of northern latitude. The Northern or Indo-Aryan style, on the other hand, is found only north of the tropic of Cancer, excepting only the eastern and western extremities of its territory, which come down to the 20th degree. A historical study of these two, moreover, shows that the Hindu temples of both styles are developments of Buddhist prototypes. But the remarkable thing is that they are respectively the descendants of two entirely distinct classes of Buddhist building; for it can be shown that the Dravidian Hindu temple has been evolved from the Buddhist monastery, while the Indo-Aryan Hindu temple has been developed from one of the other two classes of Buddhist building.

The earliest representative of the Dravidian type is a temple at Mahabalipur, one of the Seven Pagodas, situated near the seashore, thirty-five miles south of Madras. It is a monolith, being hewn out of a single block of granite, and dates from about 600 A.D. It is clearly Brahmanic in origin, as is shown by the sculpture as well as the inscriptions. But it is evidently also a model of a Buddist monastry of four storeys. The plan is square the pyramidal tower representing the upper storeys containing the cells of the monks. The design of the regular structural Dravidian temple is a square base ornamented externally with pilasters, and containing the cell in which the image is kept. Over the shrine rises the sikhara, a pyramidal tower, which is always divided into storeys. This division never disappears in Dravidian temples. The tower is crowned with a small dome either circular or polygonal in shape.

The later Dravidian temples from about 1000 A.D. stand in a large court surrounded by an enclosed wall. A special feature here is the Gopuram, or great gateway, erected in front of the shrine in the wall which encloses the court around the temple. It has a storeyed tower, resembling that of the shrine itself. But it is oblong, not square, in shape, being twice as wide as it is deep. The prototype of these gateways is the oblong monolith temple at Mahabalipur, one of the Seven Pagodas. It is in storeys, with a wagon-headed top, the ridge being decorated with a row of ornamental vases. The best specimen of the structural temple in the Dravidian style is that at Tanjore, which was erected in 1025 A.D. The body of this temple is of two storeys, about 80 feet high, while the pyramidal tower rises in eleven storeys to a total height of 190 feet.

Many of the famous later temples of Southern India are architecturally a good deal spoilt by two main defects. In the first place, successive independent additions obscure the design of the original shrine, producing a sense of bewilderment in the observer, who is unable to discover any general plan or arrangement of parts. The second defect of these later temples is the fact that the gateways in the walls of the successive courts, which have subsequently been added, increase in size and height as you proceed outwards, thus entirely obscuring the tower of the central shrine.

To each of the great temples of Southern India is attached a large tank for the religious ablutions of the worshippers. Some of them are picturesque, such as that in the great temple at Srirangam, near Trichinopoly. Sacred tanks not within the precincts of a temple are also frequent in Southern India. These are called Teppa kulam, or raft tanks, with a small shrine in the centre,

to which at certain festivals the image of the god is taken across on a raft. There is a great Teppa kulam at Madura, in which the central island is adorned with a pyramidal Dravidian tower in the middle and four small pavilions at the corners.

One of the features of the Madura and other great South Indian temples are the colonnades which surround the tanks. Other South Indian temples have colonnades around their court. This is the case in the great Siva temple at Vellore, not far from Madras. It is one of the most remarkable shrines in South India. It has a Gopuram, seven-storeyed, and 100 feet high. The colonnade which runs round the enclosure, is supported by nearly 100 carved pillars. There is a remarkable stone pavilion in the left hand corner of the enclosure as you enter, the ceiling and the pillars being most exquisitely carved.

The most attractive of all the Chalukyan shrines is the great temple of Siva at Halebid, about twenty miles from Belur, delightfully situated on a terrace near the shores of a lake. It was left unfinished in the year 1270 A.D., the towers never having been added. It is one of the most remarkable monuments in India. One of the pavilions in front contain a huge image of the Bull of Siva. In the interior are some remarkable black stone pillars, which look as if they had been turned in a lathe. This temple is unmatched in the variety of its details and the exuberance of fancy shown in its ornamentation. There is, perhaps, no other temple in the world on the outside carving of which such a marvellous amount of labor has been spent. It will give some idea of the enormous amount of sculpture with which this temple is covered when it is stated that the lowest band of the frieze alone contains a procession of about 2,000 elephants, no two of which exactly resemble each other.

THE INDO-ARYAN STYLE.

There are extant side by side two of the earliest examples of the Dravidian and Indo-Aryan styles near a place called Badmai, in the Chalukyan territory. They date from the end of the sixth century A.D., and already show fully developed the characteristic features which the two styles clearly retain down to the present day. Both have a square base containing the cell, but while the Dravidian temple has a pyramidal tower, always divided horizontal storeys, the Northern tower is a curvilinear spire, not divided into horizontal storeys, but, on the contrary, having a vertical band running up each face. While the Dravidian tower is surmounted by a small round or polygonal dome, the Indo-Aryan tower is surmounted by a circular fluted ornament, somewhat flattened at the top. The Indo-Aryan, like the Dravidian shrine, has a porch nearly always added in front of the entrance to the cell, but it was evidently no essential, not being an integral part of the edifice. The shrine itself consists of two parts. The lower part containing the cell is square. It rises from a moulded plinth and ends in a cornice. There are never any pillars or pilasters (as in the lower part of the Dravidian shrine). Above this rises the spire, which is square in section, and the curve of which in the early specimens begins near the top. The central vertical band was carved, usually with a reticulated ornament composed of minute arches.

The Mandapam, or porch, is added in front of the doorway of the cell, and is square, being of the same height as the top of the shrine where the spire begins. In the earliest specimens there were no pillars, and the roofs consisted of long sloping slabs. Later, columns were introduced in groups of four, and courses of masonry were made outside to correspond to the carved conical roof inside.

The earliest representatives of the Indo-Aryan style are found in the group of deserted Hindu temples at Bhuvanesvar in Orissa, about 250 miles south of Calcutta. The older and finer specimens begin from about 600 A.D., the series coming down to about 1100 A.D. They show this style in its greatest purity, and probably furnish better material for the history of this form of Hindu art than any other temples in India.

The origin of he Indo-Aryan spire has always been a puzzle to Eastern archaeologists. Thus Fergusson, the great authority on the subject of Eastern architecture (p. 412) says:

"Neither the pyramid nor the tumulus affords any suggestion as to the origin of the form, nor the tower, either square or circular; nor does any form of civil or domestic architecture. It does not seem to be derived from any of these."

Here, then, we are faced with a fascinating problem. The Indo-Aryan Hindu spire appears fully developed in its earliest occurrence, about 600 A.D., besides the Dravidian Hindu pyramidal tower. It has clearly no connection with that tower. But it can still less be a development of the Buddhist Chaitya or church, with its wagon-headed roof and semi-circular apse at the end, which shows no suggestion of anything like a spire about it. Where then are we to look for its source? I believe the answer can be given with certainty, or at least a high degree of probability; and although I cannot here adduce all the evidence, I think I can supply enough to establish the correctness of the conclusion. I have shown how the Buddhist Stupa in the cave temples gradually developed from a plain solid dome into an elongated hollow cell containing an image of Buddha. The transition from the solid to the hollow Stupa is further illustrated by model Stupa at Bodh Gaya. Then we find near Badami an old structural Hindu temple of Vishnu dating from the seventh century A.D., containing a similar hollow cell for the image, the back of the cell being still semi-circular. In that neighborhood we find another old Hindu temple, the same in other respects, the only difference being that the cell has become square. Now, there are to be found in Northern India a number of simple Indo-Aryan shrines erected without porches. These evidently bear a strong resemblance to the transformed hollow Stupa. In place of the original round drum you have the square base, as more suitable in form for a cell. Above this rises the spire in place of the elongated dome, and still retaining the vertical curve of the latter, but modifying its circular shape by carrying the corners of the square base to the top. Thus the horizontal section of the spire becomes square also.

Finally comes the explanation of the ornament at the top of the spire. I think we may dimiss the theory that the fluting is an imitation of a certain small Indian fruit. In the earliest examples of Indo-Aryan temples there is a neck between the top of the spire and the ornament. One of the rock-cut Stupas at Ellora indicates that the neck represents the lowest part of the tee, and the ornament above represents the upper part, the fluting being a rounded modification of the vertical divisions in the tee. The curved flattened top probably represents a single umbrella. In one of the rock-cut Stupas at Ajanta, the three umbrellas carved in stone above the tee are themselves fluted. These in turn are surmounted by the vase-shaped finial which regularly appears at the top of the Indo-Aryan spire.

Thus we arrive at the remarkable conclusion that, while the Southern Hindu temple has been evolved from the Buddhist monastery, not only Buddhist temple architecture outside India, but also Hindu temple architecture throughout Northern India, is a development of the Buddhist Stupa. In the Northern Hindu temple the dome of the Stupa was elongated, while the umbrella ornament became attenuated. Outside India the dome was gradually attenuated till it finally disappeared, while the umbrella grew to such an extent that it finally became a tower 200 feet in height. With the red thread of historical study to guide us, we are thus enabled to understand clearly what otherwise presents itself as an inexplicable mass of disconnected phenomena in the domain of early Indian architecture.

MACHINERY AND TRADE

HAMILTON BRIDGE COMPANY.

A VERY HANDSOME BOOKLET—more a portfolio of interesting and instructive views of bridges and other types of structural steel work than a catalogue—has just been issued by the Hamilton Bridge Company, Limited, of Hamilton, Ont. In glancing through its pages, one is enabled to obtain a most comprehensive idea as to the many modernly designed steel bridges which have been provided within recent years to facilitate travel in every province of the Dominion.

A number of the illustrations show picturesque and rugged bits of country at points where some of these structures are located. One view in particular, in this respect, is seen in the illustration showing the large single arch bridge, built by the company, on the line of the Canadian Pacific Railway, over Stoney Creek, in the Selkirk range of the Rocky Mountains. This structure, it may be interesting to note, is one of the largest single span arch bridges in the world, being 483 feet in length, with an arch rise of 100 feet.

In addition to the large number of bridges shown, there are also a series of cuts illustrating buildings and other structures in which the company has executed the structural steel work. Among these are several mills and manufacturing plants, Drill Hall and Armouries, Hamilton; dome of St. Jean Baptiste Church, Montreal; Trader Bank Building, Toronto; Federal Life Insurance Building, Hamilton; grand stand, Toronto Exhibition grounds; and the inlet valves in use on the Welland Canal at Port Colborne.

Perhaps the best testimony as to the Hamilton Bridge Company's ability to carry out work of this kind, is the fact that up to the present time they have successfully completed over 4,000 miscellaneous contracts in the Dominion. A general view of the company's splendidly equipped plant, covering a site of eight acres, is shown in the fore part of the booklet, together with several interior views of their various departments.

The company is to be complimented on the general high tone of this admirable little publication, and it is one that will be greatly appreciated by both the architect and engineer. Over two-thirds of the booklet, which contains 150 pages, is taken up with half-tone illustrations, while the remaining portion is devoted to descriptive matter, together with data on estimates, sketches, plans, etc., which will prove to be of much benefit to anyone interested in structural steel work.

LAPRAIRIE BRICK

ONE OF THE MOST enterprising and successful firms of its kind in the Dominion, is the La Prairie Brick Company of Montreal, whose plant, located across the river from that city, both in general dimensions and equipment is second to none on the American continent.

It is claimed that this firm is the only concern in Canada which uses shale entirely, instead of common clay, in the manufacture of its products. Three grades of La Prairie bricks are manufactured, Roman, pressed, and plastic, all of which are meeting with the unqualified endorsement of architects, contractors and owners, owing to their superior strength, durability and appearance.

The plastic brick made by this company are suited to every purpose where brickwork is required, and they are especially employed to a great extent in foundation work. Owing to their impermeability, great crushing strength, and fire retardant qualities, these bricks are particularly well adapted to meet any requirement which the fire underwriter may impose.

Among the many fine buildings of recent erection in Montreal alone, in which La Prairie brick has been used for all work including the foundations, are the new Eastern Township bank, Windsor Hotel, Canadian Bank of Commerce and La Patrie Building.

The exceptionally enduring qualities of shale brick, it is said, are to be seen in the old Roman walls which have stood for centuries, and which show little or no indications of "scaling" or "disintegration."

LIME AND STONE.

THERE IS PROBABLY no firm in Canada dealing in lime and crushed stone that is better known to the trade than Christie, Henderson & Company, whose head offices are at 34 Yonge St., Toronto. Since engaging in the manufacture of grey lime stone twenty-five years ago, the business of this concern has been attended by a steady growth and an increasing patronage. In addition to the original plant, the company is now operating two white lime plants, one at Hespeler, and the other at Galt, Ont., both of which have been acquired within the past six years.

As regards crushed stone, this firm has been connected with this department of their business for the fifteen years back, and they are splendidly equipped to supply any quantity to contractors, corporations or municipalities on the shortest notice.

The facilities of the company for meeting the requirement of the trade are the very best. Direct yard services with the C.P.R. and Grand Trunk Railways enable them to make immediate shipments to all points.

Local and long distance phone orders, or written communications to their above address will receive prompt attention.

PRIVATE WATER SUPPLY.

THE PROBLEM of providing a private water supply system is one with which the average architect, especially in designing a suburban or country home, is frequently called upon to deal. Up to ten years ago, while private lighting plants, heating plants and sewage disposal plants have been developed to a high state of perfection, such apparatus as was available for a private water supply system was at its best pitifully crude, unsanitary and very often unserviceable.

Since then, however, a series of experiments have resulted in the invention of the Kewanee Pneumatic Tank, which has attained complete success in this direction. This tank is equipped with an automatic valve and an operating pump attachment designed according to conditions with which it has to meet.

One of the main features of this pneumatic system is its compactness, and the simplicity and easy way with which it is operated. It dispenses with all uncertainty and complications, is absolutely automatic, requires no attention, and can be operated by any desired power. The air supply is so regulated that it delivers the necessary amount to the height resuired.

As to purity of supply, this system lays claim to a distinctive advantage in that the water, owing to the existing compression, after becoming impregnated with the air which oxidizes or burns out every particle of foreign

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THERE is no room for doubt that a hot water system is the most hygienically and scientifically perfect method of heating houses.

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It is the most simple and cleanly system to operate—distributes healthful warmth, evenly, throughout the house—is economical of fuel, and is the easiest controlled.

The "Daisy" Boiler is manufactured under the direct supervision of expert heating engineers in the most modernly and perfectly equipped plant in the country.

Over 50,000 "Daisy" Boilers are now in active service and giving the utmost satisfaction. Into every one of these there has been put the best there is in material and expert workmanship. It is the easiest and most quickly erected boiler. The "Daisy" has won through sheer merit the position of standard of hot water boilers.

The King Radiator is made in a thoroughly modern and perfectly equipped plant that is devoted exclusively to their production.

They are designed to give the greatest possible radiating surface, yet are compact and artistic in appearance—lending themselves easily to the highest class of room decoration.

The sections are connected by a double screw nipple which makes an absolutely unleakable joint.

Every section of each King Radiator is tested to a cold water pressure of one hundred pounds. After assembling, each completed radiator is again submitted to this severe test, although, in actual use, the highest test they would be subjected to would not exceed ten pounds pressure.

Architects who are planning new houses, or remodelling old ones, have the services of our heating experts at their disposal at all times. Full information about King Radiators and Daisy Boilers cheerfully furnished by our heating salesmen. Taking advantage of this service does not obligate you in any way.

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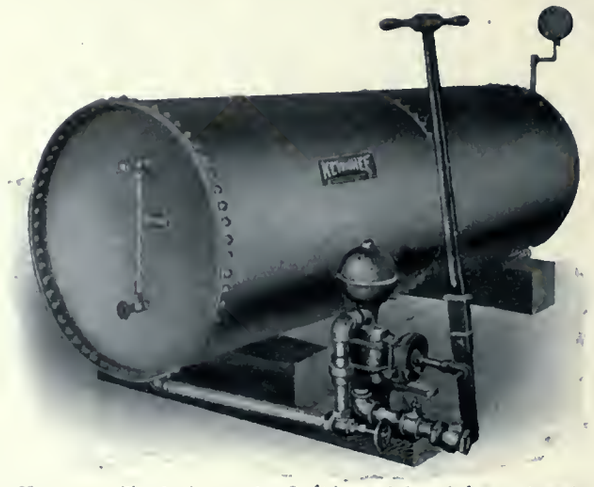
matter, is filtered through stone, thus rendering it absolutely free from all impurities and disease-breeding germs.

While the Kewanee System was at first designed for the farms and country residence, it is gradually and systematically covering the field of public buildings, hospitals, asylums, country clubs, almshouses, apartments, manufacturing plants and tall office buildings, in which it is installed for both ordinary use and fire fighting purposes. With a pneumatic water supply system of this kind situated in the basement and acting directly upon an automatic sprinkler system extending throughout the building, the fire hazard is reduced to a minimum, and the big saving thus effected in insurance rates soon pays for the cost of its installation.

Kewanee tanks can be supplied in sizes to meet any requirement whatsoever, and at prices ranging from $90



Kewanee Tank (2 1-2 by 8 ft.) and hand force pump. The capacity of this tank is 200 gallons and the pump will deliver 100 gallons in 20 minutes.

upwards. As to their adaptability to climatic conditions, it may be said that there are a number of places where their ability to withstand the rigors of a northern winter has been amply demonstrated.

The Kewanee System is supplied and installed by the Record Foundry Company, Montreal, who will gladly furnish architects and owners, additional information regarding its merits upon request.

VULCAN CEMENT.

THE FRANK B. GILBRETH COMPANY has placed with the Vulcan Portland Cement Company, through its sales agent the Wm. G. Hartranft Cement Company, Limited, of Montreal, the contract for all the cement required for the immense power development of the Grand Falls Power Company, Grand Falls, New Brunswick. The quantity is estimated to be 100,000 barrels or over, which, it is said, is the largest contract for Portland cement ever placed with a Canadian company, for a single piece of work.

BUILDING SUPPLIES.

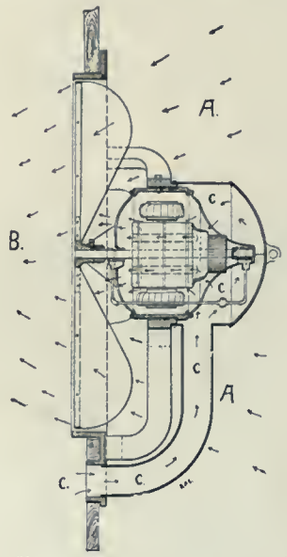
ON A RECENT VISIT to Montreal we had occasion to call on Mr. E. F. Dartnell at his office and showrooms at 157 St. James street. Mr. Dartnell has recently made extensive alterations in his place of business, and has now one of the finest displays of face brick, stone, marble, terra cotta, etc., to be seen anywhere. His extensive display comprises a great range of color and texture in brick, colors running from white to black, and in a variety of shades in red, grey, buff, brown, ironspot, mottled, etc., including the celebrated "Tapestry" brick, and the "Twin City" moss, mahogany, autumn leaf and other colors, as well as in the better known and older colors.

Mr. Dartnell has a large number of panels showing brick laid up in different styles as well as a complete display of marbles, building stones, ornamental terra cotta, terra cotta fireproofing, metal lath, damp resisting paint, "Duresco" washable water paint for tinting and other lines. For the convenience of architects, Mr. Dartnell has a fine reference library comprising high class works on brick and stonework and interior decoration.

We would draw the attention of those interested in building supplies to Mr. Dartnell's advertisement on the inside front cover, showing some of the firms he represents and the wide line of materials he is prepared to furnish the trade.

ENCLOSED TYPE MOTOR FAN.

AN ELECTRIC, direct connected, ventilating fan, in which the motor is kept cool by the fan itself, is an interesting device recently patented by The Ilg Electric Ventilating Company, of Chicago and New York, and shown in the accompanying illustration. The motor is fully enclosed as shown, and is thus protected from dust and dirt. The ventilation of the motor is accomplished by utilizing the vacuum created in front of the centre or axis of the fan to draw pure, fresh air from outside the building through a tube connecting with the motor hood, which hood completely encloses the motor on all sides, excepting that next to the fan. This cool air is drawn



The Ilg enclosed type motor fan.

through the motor and is carried away with the general exhaust.

The object in designing this fan was to overcome the difficulty experienced in the use of enclosed non-ventilated type motors, through the over heating of the armature and field coils, with a consequent decrease in the efficiency.

Messrs. Sheldons, Limited, of Galt, Ontario, have recently been appointed sole licensees and manufacturers for Canada, and architects and engineers will find it greatly to their interest to procure a copy of Bulletin No. 50, issued by this company, in which this ingenious and practical ventilating fan is fully described and illustrated.

SOMERVILLE LIMITED.

AS A CONVENIENCE to the trade, the Somerville Limited, Toronto, who recently disposed of their jobbing business to the Standard Sanitary Company, will continue to maintain a down-town sales department and show room, having opened up a suite of offices on the ground floor of the Saturday Night Building, 25-28 Adelaide Street West.

The down-town branch as heretofore will be in direct

charge of Mr. Fred Somerville who will devote his entire time in looking after the interests of the Company's customers. Mr. Somerville is one of the best informed plumbing supply men in Canada and his popularity among the trade extends from coast to coast.

The show room in addition to displaying a complete line of plumbers' and steamfitters' brass goods, will include

Mr. Fred Somerville, who is in charge of the down-town office and sales department of Somerville, Limited.

such other products of the company's factory, as closet tanks, lead pipe, traps, bends and solder.

The general offices of Somerville Limited will be continued at the Company's extensive works on St. Helens Avenue, where Lorne Somerville is in charge of the executive department.

FIREPROOF DOORS AND WINDOWS.

WHILE THE ART of the printer displays its skill in the new catalogue just issued by A .B. Ormsby Limited, Toronto and Winnipeg, the art of the metal worker is its most striking feature. For indeed are many of the fireproof doors and windows illustrated within its pages an artistic revelation. It is impossible in looking through this little publication to lose sight of the high standard of excellence the company has attained in the manufacture of their products. In design and construction, in the perfect joining of their members, and in the taut, perfectly drawn surfaces, these doors and windows are preminently in a class by themselves.

The growing popularity of the Ormsby products is due to the company's ability to consisttntly meet the requirements of the architect as regards expression of design. How well they have succeeded in this respect is to be seen in the illustrations of kalameined and copper clad entrances, windows, and elevator enclosures of various buildings shown, all of which were made according to the drawings and specifications of the architects .

In addition to these, there are a number of photographic reproductions of steel rolling doors and shutters, horizontal folding doors, Terne armored doors, corrugated iron counterbalanced freight doors, designed for mills, factories, warehouses, etc., as they are to be seen in practical use.

That Ormsby "Underwriter" doors are deserving of this affixed appellation is demonstrated in the illustrations showing the practically uninjured character of several of these doors after being subject to intense heat and fire.

The fireproof doors and windows in the new Southam Press Building, Toronto, illustrated on page 60 of this issue, were manufactured and installed by this company.

CANADA FOUNDRY CO.

UNDER THE TITLE of "Our Product," the Canada Foundry Company, Limited, Toronto, has recently issued an attractive little catalogue dealing with the various lines which this concern manufactures and handles.

Within the pages of this complete little edition, is to be found illustrations of almost every appliance and character of equipment required in the contracting business. Locomotive (steam and electric), railway supplies, steam shovels, dipper dredges, wrecking cranes, pile drivers, and boilers of various types are shown. The company is now manufacturing the Koehring mixer which can be supplied in sizes to meet all purposes from sidewalk work up to jobs in which large masses of concrete are used.

Of especial interest to architects are the illustrations showing the work of the company's Ornamental Iron Department, such as bronze doors, counter grilles, elevator enclosures, and name plates, as well as metal staircases and balconies, gates, steel columns and capitals, and barlock sidewalk, floor and skylight prism glass construction.

Other views show structural steel and steel roof work which amply demonstrates this concern's ability along this line.

For municipal work the company has a complete line of steam rollers, stone crushers and road machinery, etc., while they also design and construct bridges and asphalt plants to meet any requirement. A copy of this catalogue wil be sent to the address of any interested party upon reguest.

OUR FIRST ANNUAL HOUSE NUMBER —APPRECIATION OF DESIGN IN DOMESTIC ACHITECTURE AN IMPORTANT ELEMENT IN OUR NATIONAL DEVELOPMENT. - - - - - -

IN THIS, the eighth number of the Second Volume of "CONSTRUCTION," we present our *First Annual House Number.*

While it is true that architects, engineers, contractors and prospective builders, alike are greatly interested in the larger and more difficult problems involved in the erection of such structures as office buildings, factories, banks, churches, bridges, etc., it is also true that everybody is interested in houses, whether architect, engineer, contractor or layman. The dwelling, the home, the place of abode, is the one structure that, it is the ambition of every man and woman to build, buy or improve. It is the homes of a people, a nation, or a community that best characterize their culture, their tastes, their social and commercial welfare and ambitions.

In Canada, as in other new countries, while our forefathers built well, they, as a rule, designed badly, for two reasons: first, because sheer necessity demanded the pursuing of a course, along the lines of the least resistance; secondly, because they were too much engaged in hewing the way for the nation to be, to give the required thought and consideration of design and the science of building construction.

The results of these early conditions are altogether too evident in many of the older houses we find in our Canadian cities and towns to-day. Architects were few, because their services were very little in demand. The first consideration of the owner was not design, but construction. Artisans were called upon to both design and construct, and with their lack of training in design, the dwelling produced was in most part, four brick walls with a gable or so decorated with jig-saw scrolls and turned spindles.

We are, fortunately, passing this stage and to-day owners are becoming to realize more and more that to have a structure, to be called home, it must express to a great extent the individual tastes and ideas of the dweller. And to have these tastes and ideas carried out economically and artistically, most builders know that they must consult a trained man (an architect). There is, nevertheless, a present day tendency (that is most deplorable) toward the "ready made house," the product of the speculative builder, who erects houses after a shrewdly devised flexible plan. We say shrewdly devised plan, because it has been designed to produce the best appearing structure at a cost that will yield the greatest profit to the speculative builder.

We often find a hundred houses built after practically the same plan. The treatment of the front gabel, or the location of one or two bay windows or the shape and style of the front porch may differ in some few cases, but the block plan is the same, the interior woodwork, the hardware and the shape and size of the window and door frames are all the same.

The architect designs to meet, as best he can, with his training, the taste and requirements of each individual client, while the speculative builder builds after a carefully devised plan, a house he hopes to sell at a profit, to a man who may be induced to accept his shrewdly designed structure.

This evil does not usually exist in the case of dwellings that cost more than five thousand dollars. Owners who can afford to spend more than this amount, have ideas of their own, and realize the necessity of having a trained man carry them out. The dwellings of the masses, carry with them as much or more importance, than those of the more well to do, and it was to promote better design in cheap and moderate priced houses, that brought about our decision to issue an *Annual House Number,* in which we shall aim to deal principally with moderate priced dwellings.

It is our hope that through the publication of a large number of creditable designs from all portions of Canada, and characteristic designs from other portions of the globe, in a large *Annual House Number,* we shall be enabled to bring the architect and the home builder, closer together, and thus promote a better appreciation of design and aid in improving the residence architecture of our country.

Without apology, we beg to state that we fully realize that we have been unable to give, in many cases, just the class of design we would have wished, but when the task of getting together photos, plans, details and descriptions for a sufficiently large number of designs, to select from (especially in view of the fact that some architects are disinclined to permit their plans to be reproduced) is fully appreciated, we feel confident that this, our first *Annual House Number,* will meet with the approval of the profession and the industry generally.

We beg to submit to our readers that this number of CONSTRUCTION is larger and contains more illustrations of houses than any other individual number of a periodical ever issued in Canada, the United States, or Great Britain.

We want to make our 1910 annual still larger, better, and more representative of work in every corner of Canada, and we are prepared now to receive designs, with plans, photographs and descriptions, for next year's number.

COMMENTS ON THE FUNCTIONS OF THE MODERN DAY ARCHITECT—PRACTITIONERS MUST BE PRACTICAL MEN AS WELL AS ARTISTS. - -

THE ANTIQUATED, MUSTY IDEAS of architectural practice, held by some of the more aesthetically inclined practitioners, are gradually but surely giving place to a saner, more practical, and more scientific conception of the true functions of architecture.

It is now being realized more and more that the architect of to-day must be a thoroughly trained man, not only in the distinctive branches of architecture, but he must be practical. He must be a trained business man, with ability to use sane business judgment.

This is purely a commercial age, and, while it is true that there are many structures in which the utilitarian must be made subservient to the aesthetic, it is, nevertheless, a fact that even a monument must be erected under modern conditions, and in accordance with modern methods of construction.

The architect of to-day must be more than a designer. He must have knowledge of the scientific branch of building construction, as well as the artistic side of the profession. The more quickly this fact is realized, and architects cease to attempt to transplant the antiquated work of a thousand years ago, from European countries, to the New World, and the sooner they realize that even the profession of architecture must be influenced by modern requirements and local conditions, and the sooner they get down to terra firma, and apply themselves in studying modern requirements, economy in construction, utility of plan, adaptability of materials the sooner shall we have an architecture fitted to our commercial and social life, an architecture distinctive of our own age, and our own country, and an architecture which employs materials we, as a nation, have at hand.

The other day a New York architect, Mr. J. Stewart Barney, made a notable speech before the Architectural League, in New York. He spoke as a free thinker in the craft and frightened the prebendaries, deans, and curates of the old architectural regime. Mr. Barney expressed the idea that American architectural styles ought not to be imported, like millinery, from Paris; that they ought to grow up, indigenous, from the soil, and to suit the climatic conditions and general uses of American life.

This proposition strikes a great many of the architects of the Old School, as conceited and absurd. Mr. Whitney Warren and Mr. Francis H. Kimball, in particular, both prominent United States architects, have come forward to say that a New World style of architecture may perhaps put in an appearance in an aeon or two, but meanwhile it will be necessary to shin along as best we can, with the imported models.

Messrs. Warren and Kimball's talk about the long, slow evolution of architectural styles, is, to speak testily, the patter of pedants. It did not take long to evolve a log cabin out of the necessities of our woodsman, or a sod house out of the cattle country, an abode out of the arid plains, or an entirely characteristic American mansion house, so says a United States writer, out of the prosperity of Salem shipmen.

In commenting on this proposition of Mr. Barney's, the same writer points out that the architecture of the southern plantations or of New England villages, a century ago, was as well fitted and proper for the time and country, as the acropolis to the periclean Athens, but in the Nineteenth century, he continues, this country (the United States) went through a painful period of mental and moral confusion not unrelated to its parlous political state, and its sense and taste in buildings suffered contortions.

That was the age of the village magnates, big French-roof houses, with a cupola, and with iron dogs on the lawn. It passed, but has long left its mark upon the minds of some metropolitan architects, who go on thinking about iron dogs and cupolas, Corinthian porticos and Roman colonnades, without regard to any earthly use.

This writer believes that the distinctive American idea is that art should keep closer to science, than ever it has been before. The beauty of buildings should grow upon their utility. If men in America find dignity in their work, houses should do the same.

These comments upon the revolutionary statements of so prominent a free thinker in the profession, as Mr. Barney, by a writer who speaks as a layman, have some interesting kernels of thought, that architects will do well to take note of.

UNALTERABLE OPPOSITION OF BAND OF TORONTO ARCHITECTS AGAINST COMPULSORY ARCHITECTURAL EDUCATION. - - - - - - - - - - - - -

"FOR E'EN THOUGH vanquished he could argue still." The characteristic argumentative propensities of Oliver Goldsmith's schoolmaster seem to be the basis of the opposition to a provincial architects' license law, inaugurated by a band of architects in Toronto, who seem inclined to declare themselves against everything that may be proposed by others than those who are of them.

That the licensing of architects would do much to raise the lower strata of the profession in the province, is a fact that no fair-minded man, who knows the situation will deny.

That it would have a tendency to guarantee to the public a protection against the incompetent, which it now has not, is a fact beyond dispute.

That it would discourage the dishonest operations of speculative builders of architectural monstrosities and structurally defective shacks, is a fact that has been established.

That it would make the architect responsible to the community as well as his client, for the safe and honest planning and construction of buildings, is a fact that cannot be honestly denied.

That a licensing law has operated successfully and satisfactorily wherever it has been enacted, is purely a matter of record.

That every practical and prominent practitioner has been a friend to such a measure wherever it has been proposed, is evidenced by the enthusiasm with which the members of the profession have welcomed the law wherever agitation for its adoption has been created.

In the face of these indisputable facts, we ask why is it that there is opposition to such a measure in Ontario, the premier province of Canada. We answer that this opposition, inaugurated by a few, is not justified by the facts of the case, but, we are forced to believe, almost against our will, that it is the result of a determined organized effort to oppose the measure purely upon the principle of disliking to agree with that which has been proposed by another. To say the least such an attitude is undignified and unbecoming of reputable members of so noble a profession as architecture.

In justification of our contention, we beg to relate some of the contradictory stands taken by these opponents of compulsory education. When it was proposed to make the Ontario Association of Architects a closed corporation, their efforts were strongly opposed by the members of the, then, Eighteen Club. When the A.I.C. petitioned the Dominion Government for a charter designed to make it a closed corporation, this club rightfully opposed such legislation.

CONSTRUCTION strongly opposed this method of registration as well, and gave much space to the views of many prominent architects who were not in accord with the close corporation idea. On December 3, 1907, at the annual meeting of the Toronto Architects' Society, of which Mr. Eden Smith was president (who is generally looked upon to represent the views of the organization

that now so strongly opposes compulsory education in any shape or form) the following resolution was unanimously adopted and given to the public:

"Whereas, The question of registration of architects has been brought up by the press, and as it is a matter with which the newly formed Institute of Architects of Canada, and the Ontario Association of Architects are attempting to deal, the club wishes to put itself on record as follows: THAT THE TORONTO ARCHITECTURAL CLUB IS NOT OPPOSED TO A PROPER FORM OF REGISTRATION OF ARCHITECTS, BASED ON EDUCATION, AND UNDER DIRECT GOVERNMENT CONTROL, but it is opposed to the form or forms of registration put forth by the Institute of Architects of Canada and the Ontario Association of Architects, which would mean giving the control of the profession over into the hands of certain privileged bodies of the profession."

The position of the Toronto Architectural Society as declared in the above resolution was a most commendable one, and it appeared for a moment as though some common basis of procedure could be agreed upon whereby the Ontario Legislature could be induced to give some legal status to the profession.

Realizing this, the Ontario Association dropped their former programme and endorsed the policy of placing the conduct of examinations etc., into the hands of the Government (a policy endorsed by the Toronto Society in their resolution). Then we again have a storm of protest. Against what? Against that very thing proposed by those who now oppose it. Mr. Horwood and Mr. Eden Smith have recently written letters to CONSTRUCTION, in which they voiced the views of the Toronto Society of Architects, and in which they opposed any and all forms of compulsory education.

It has been argued that legislation would tend to demoralize the profession. Such an unwarranted contention is hardly worth consideration. Wherever the law has been in force, it has proven to have exactly the opposite effect of that outlined by its opponents in Ontario.

In England a measure of this nature is now proposed. In South Africa the Transvaal Institute of Architects has drawn up a bill to provide for registration. In New South Wales a bill has been presented by the Institute of Architects that promises to meet with success. The State of Missouri has recently enacted a law whereby the architectural profession receives legal recognition, and while the law is moderate in its provisions, its enactment serves to show that the results obtained from he licensing acts already in existence in Illinois, New Jersey and California have operated in a manner such as has recommended them to the legislature in the other states of the American Union. The Missouri Law limits architectural services to buildings of $10,000 and over, and provides for a Board of Examiners, one member of which is to be a professor of the State University. In general principles it is similar to the Illinois law at its enactment twelve years ago, and undoubtedly will eventually gain full control of the profession in the State. To give some idea of the practical working out of the Illinois law, we quote below from the last report of the Illinois State Board of Architects:

"The semi-annual spring class examination for license to practice the profession of architecture in the State of Illinois, was held at the University of Illinois, Urbana, April , 8 and 9. Thirty-four candidates appeared for examination. The Examination Committee reported at the regular meeting of the board held at Chicago on the 16th instant. Eleven candidates who had passed the examination on all subjects were awarded certificates entitling them to license. Seven others received an average of seventy and over, but received less than sixty in some topics. They were passed conditionally, and will have an opportunity to be examined again on those topics only at a future time, before license can be issued to them. Eighteen candidates who had received less than seventy marks were rejected. At the meeting held April 16, Frank Easeberg, of Chicago, was on trial for dishonest practice in using his seal to enable another party to obtain a permit from the Department of Buildings. The case was continued to the May meeting of the Board. The prosecutors of the Board reported that on April 12, Lewis H. Sturges, of Indianapolis, had been convicted for practicing architecture without a license at Kansas, Edgar County, Illinois, and on April 15, Eugene E. Rother had been convicted for practicing architecture without a license at Chicago. He was fined $25 and costs."

To those who contend that a licensing law may appear all right in principle, but that it is not effective in operation, the above report should prove more than interesting.

THE ENGINEERING RECORD recently made the following comment upon the general operation of the Illinois law:

"The Architects' License Law of Illinois has now been in force about ten years and the recent report of the State Board of Examiners of Architects gives a fairly clear view of the effect of such legislation. Since the Board was organized, 1,034 licenses have been issued and 326 have lapsed for one reason or another, leaving 708 in force. Apparently about 700 licenses are at present ample in the State, for this number has been fairly constant for some time. It is signficant that a large proportion of the architects who were licensed in 1897 without examination no longer maintain their own offices and their places have been taken by younger and betfer educated men.

"In carrying out the terms of the law during the last two years it was necessary to revoke only four licenses for cause, two of them being cases of intentional violations of the building laws of Chicago, one a case of gross recklessness in connection with a theatre in East St. Louis, and one for dishonesty in placing a license seal on the plans of a building made by an unlicensed person to secure a permit from the Chicago Building Department. During the last two years seven persons have been prosecuted and convicted for practicing architecture without a license, and four attempts to form corporations for the practice of architecture without regard to the State law were abandoned at the instance of the State Board. Two prosecutions for revoking licenses were unsuccessful owing to the apparent belief of the juries that the penalties which the municipal judges would impose would be too great for the offenders to pay. As a whole, the law seems to be working very satisfactorily."

In the face of this most convincing evidence it is hard for us to see upon what legitimate grounds a practical, unbiased architect can intelligently oppose such legislation, legislation that has operated for the benefit of the public, the contractor, the honest builder and the architect alike wherever it has been enacted.

We are not inclined to deal further with the objections to this proposed law, based solely upon theoretical or problematical argument, but we beg to assure those who do not agree with us on this question that our columns are always open for such data or argument as may be advanced that deals with any feature of the actual operation of such laws as are already in existence.

DAILY PRESS EDITOR COMMENTS UPON THE SUBJECT OF "BECOMING AN ARCHITECT." A PITIFULLY HUMOROUS SERIES OF ANSWERS TO AN UNSUSPECTING READER. - - - - -

NEWSPAPER EDITORS are supposed, by most people, to be all-wise creatures. If an argument arises between two men over some event or character in history, or some point in law, of the geographical location of a city, lake or island, they appeal to the all-knowing editor of the question and answer

column, to settle their differences. If some love sick youth wants to know what would be his proper attitude toward his young lady, under certain conditions, he writes this newspaper sage.

This fountain of knowledge gives remedies for sick cats, sick horses and sick people alike. He settles political arguments, recommends investments, suggests recipes, gives advice to ambitious young men and is the authority for what is good or bad form at all social functions.

We are not prepared to state to what extent the public is justified in accepting the advice of the daily newspaper editor, on technical subjects, generally, but judging from a statement made in "*Everybody's Column*" in the TORONTO STAR of June the 15th on the subject "*Becoming an Architect*" we are inclined to believe that this newspaper sage though he may be an authority on every other science and art under the sun, he still has much to learn about Architecture.

Judging from the reply to "An Old Subscriber," who evidently aspires to become an architect, the nine questions asked we would assume to be about as follows: 1st. What are the requirements of an architect? 2nd. What is the basis of remuneration of the architect? 3rd. What course of training would you advise? 4th. What subjects would be most valuable in the high school for a student desiring to become an architect? 5th. Is there a present demand for architects? 6th. How many architects are there in Toronto? 7th. What is the usual income of the architect? 8th. How long does it take to prepare plans for a house? 9th. Does the architect superintend as well as draw plans?

To these questions the editor of *Everybody's Column*" in the TORONTO STAR gives the following laughably ridiculous answers:

"1. An architect requires more than skill in mechanical training. One of the essentials is an eye for the original, considerable versatility, and a little bit of the inventive faculty, but these would probably all develop in time, and as the drawing end of the business is the first essential, you would probably make an architect, with sufficient application.

"2. There are different methods of estimating charges for drawing up plans. The percentage basis is in common use, while many have a fixed charge. Quite often the architect 'throws in' the plan when he gets the contract.

"3. As the practical part is the more valuable, you would probably find a course in architectural drawing, without the full S.P.S. course, more beneficial in the end. You would, under ordinary circumstances, find it necessary to take a minor position in an architect's office and work your way up, so the sooner you could take such a position the quicker you would be able to command the larger salaries.

"4. Of the High School subjects, mathematics and science could be turned to the most practical use at the School of Science.

"5. There will always be a demand for architects in Toronto as long as the building operations continue.

"6. There is in the neighborhood of seventy-five architects on the Toronto list.

"7. Rather varied. Might range from $1,000 to $10,000 a year income. Many of the best known architects are contractors as well.

"8. Time required to make plans for a house would depend on changes made. The original drawing of plans for an ordinary residence should not occupy more than a few hours.

"9. Architect would not superintend the building operations, unless he was the contractor as well. His plans would have to pass inspection. After that he is relieved of responsibility."

It is hard for us to understand how a man who is entrusted to act as the advisor of the readers of a paper of the character of the TORONTO STAR should display such dense ignorance of the basic principal of such an important profession as architecture. The statements are so obviously ridiculous that further comment would be superfluous. The real evil in the publication of such trash is that, either by design or through dense ignorance, it gives the laity (that as a rule take little interest in technical journals) a entirely erroneous impression of the real functions of the architect.

BUILDING RETURNS FROM SEVENTEEN CITIES SHOW AN AVERAGE GAIN OF 74 PER CENT. - - - - - -

ACCORDING TO AVAILABLE STATISTICS for April, the flood-tide of building prosperity is still rising, and as yet nothing seems imminent to stem the flow. Enormous increases are noted in all the provinces and the average gain for the month is 74 per cent. So far this year, the monthly high water marks of other years have been entirely submerged, and although the "intermediate or quiet season" is at hand when the force of activity in the building line usually lessens, instead of either the east or the west showing any signs of a curtailment in operations, there is every indication that the substantial and satisfactory headway that has been made up to the present time will continue throughout the summer months.

The report for the month as compiled by CONSTRUCTION includes returns from twenty representative centres throughout the Dominion, all of which reflect in a fairly accurate degree the exact condition of affairs in their respective districts. Out of this number only three have failed to equal their amount for the corresponding period of last year. Halifax shows a decrease of 46 per cent., Moose Jaw 19 per cent., and Fort William 5.26 per cent, a decline in the latter case due to a slight settling down after the preceding month, when this city recorded a mighty gain of 1.188 per cent

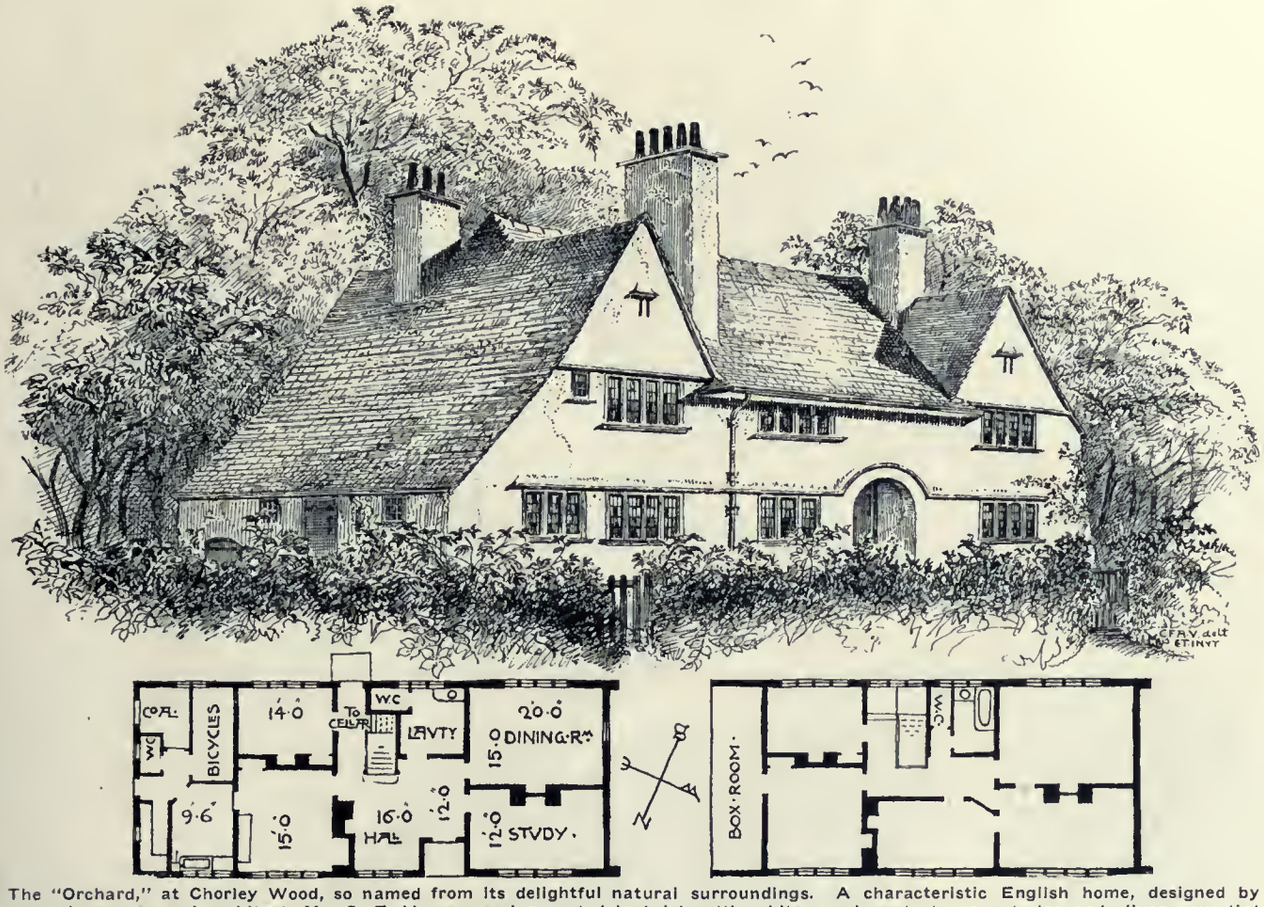
On the other hand, the increases range all the way from 8 to 564 per cent. In the Eastern section, Sydney and St. John shows an advance of 455 per cent. (the second largest increase for the month), and 79 per cent. respectively, and Montreal attaches a gain of 92 per cent. to the other substantial monthly gains she has made throughout the season. The largest increase for the month is noted in the case of Brandon, which has reached the king row with a gigantic gain of 564 per cent., while Winnipeg exceeds last year's figures for the month by 97 per cent.

Calgary and Edmonton's growth for the month was practically identical, their gains in order named being 379 per cent. and 375 per cent., which gives an idea of the forward strides that are being made in Alberta; while in Saskatchewan, despite Moose Jaw's falling off, Regina is ahead by 137 per cent. and Saskatoon has an aggregate total of $146,985, which amount is greatly in excess of that of the corresponding period of 1907.

In British Columbia everything is apparently moving along in a highly satisfactory manner, Vancouver and Victoria both showing substantial gains.

A most gratifying condition is also to be noted throughout Ontario, where all cities, except Fort William, as stated above, record material gains. Toronto issued permits for $1,887,532 worth of new building as against $1,216,982 for the same month of 1908, thus showing a gain of 55 per cent. Berlin records an increase of 190 per cent., while London and Peterboro show substantial progress by an advance of 79 per cent. and 54 per cent respectively.

	Permits for May, 1909.	Permits for May, 1908.	Increase, Per cent.	Dec., P.C.
Berlin, Ont.	50,000	17,200	190.69	....
Brandon, Man.	88,225	13,270	564.84	....
Calgary, Alta.	370,650	77,350	379.18	....
Edmonton, Alta. ...	368,005	77,362	375.69	....
Fort William, Ont...	123,650	130,520	....	5.26
Halifax, N.S.	103,447	194,215	....	46.73
London, Ont.	88,620	49,300	79.75	....
Montreal, P.Q.	1,269,504	659,580	92.47	....
Moose Jaw, Sask. .	48,700	60,200	....	19.10
Peterboro, Ont.	42,155	27,340	54.18	....
Port Arthur, Ont....	48,300	....	....	....
Regina, Sask.	90,325	37,980	137.82	....
Saskatoon, Sask. ...	146,985	....	....	....
St. John, N.B.....	22,600	12,600	79.36	....
Sydney, N.S.	22,205	4,000	455.12	....
Toronto, Ont.	1,887,532	1,216,982	55.09	....
Vancouver, B.C. ...	477,140	439,925	8.45	....
Victoria, B.C.	188,620	79,390	137.58	....
Winnipeg, Man. ...	1,286,800	652,150	97.31	....
Windsor, Ont.	25,410	....	....	....
	6,528,178	3,749,364	74.11	....



The "Orchard," at Chorley Wood, so named from its delightful natural surroundings. A characteristic English home, designed by the owner and architect, Mr. C. F. Voysey, and executed in brick with white rough-cast stucco exterior and silver grey tint slate roof. Its breadth of treatment, plain surfaces, and arrangement of roof lines, express in a charming manner the designer's idea of a home.

SMALL ENGLISH HOMES.—Notes on the Trend of Domestic Architecture in England.—Principles Governing Design.—Consideration of Site and Aspect, and Retention of Natural Features.—Some Typical Examples of Present-day Work.

By HUGH B. PHILPOTT

WHATEVER MAY BE THOUGHT of the present position of architecture in England, and there are many different opinions on the subject, there is an almost universal consensus of opinion with regard to our domestic work. It is in the home, and more especially in the country house—large and small—that English architecture is seen at its best. In this department we are hardly troubled with the "battle of the styles." The cold formality of the classic Renaissance no longer attracts us. The last grotesque remnants of the Gothic revival do indeed offend the eyes of wayfarers in our meaner suburbs, but these are the efforts generally of speculative builders, who know little and care less about architectural principles, though they have a fixed idea that a desirable villa residence must have a good deal of florid ornamentation. The architects who count have found artistic salvation, not in formal adherence to any of the styles of the past, but rather in assimilating the lessons of the old buildings and applying them to the needs of the present. The best building of to-day, so far as country houses are concerned, means the meeting of practical problems in the simplest and most obvious way. Beauty is found, not in richness of material or elaborateness of ornament, but in good proportion and the right use of materials. With these elements a worthy domestic architecture is being achieved, as is widely recognized to-day, not only in England, but on the continent and in America, where the designs of English architects are in great demand. These elements of beauty and fitness are found equally in the smallest as in the largest houses. We realize now that beauty has very little to do with cost, and some of the humblest cottages are among the most charming examples of our domestic architecture.

It would be a mistake to suggest, however, that in England all is well with domestic building. It is still true that for one good house that is built there are twenty bad ones. But the significant and hopeful things are the fact that so many of our architects have broken free from the conventions that have long kept suburban architecture at so low a level, and the increasing number of people who appreciate good work and encourage the architects to realize their ideals.

What has been happening of late years in domestic building is that there has been a universal revolt against the sober, substantial and rather depressing dullness of the Georgian and early Victorian type of house. These houses were often very well built, but they were planned to meet social conditions somewhat different from those of to-day. For example, the convention of the time demanded that Mary Ann should be kept during the daytime below stairs. She worked in a basement and slept in an attic. Now she pervades the house unless, which not seldom happens, we dispense with her altogether. And this modified relationship between mistress and servant means for one thing that kitchen and dining-room must be in convenient touch, one with the other. All possible arrangements for minimizing house work must be adopted. Stairs must be as few as possible, and as a matter of fact

it is scarcely possible nowadays to sell a house built on the basement plan.

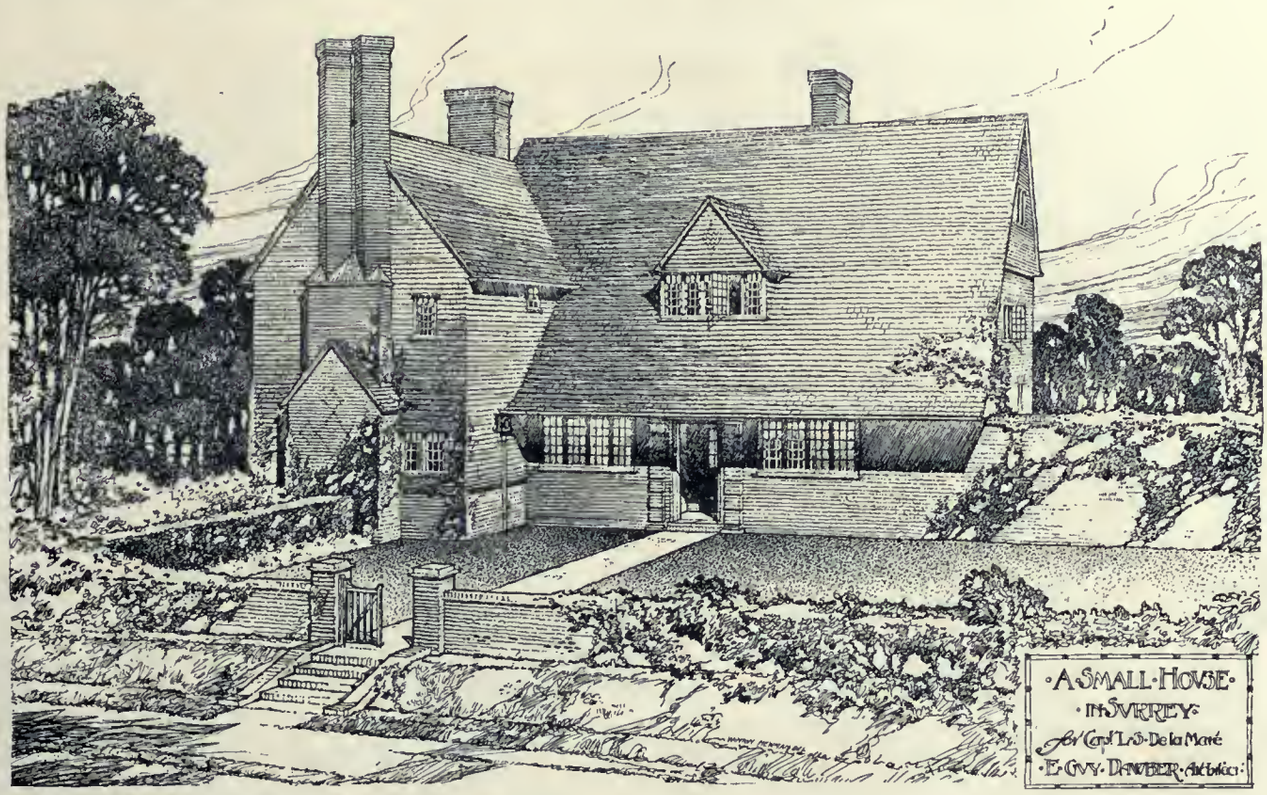
The revolt aginst the old style of house has proceeded in two directions. On the one hand, we have the jerry built products of speculative builders, painfully striving after beauty which they never achieve. Not that I would include all speculative builders in a general condemnation. Some of them do respectable work in circumstances of considerable difficulty. But it must be admitted that the work of many of them is too sad for tears. Architectural principles are quite ignored; a single plan serves for various sites, and since the convention of the suburbs demands that the living rooms shall be always at the front and the kitchens always at the back, it follows that if the houses on one side of the street are right in point of aspect, the houses on the other side are necessarily wrong. This, however, means very little in the present state of popular ignorance. If your sitting rooms face the bleak

Small House at Gray Park, Stoke Poges, built for a family of the middle class. Another example of domestic work in which a distinctive and pleasing individuality has resulted from the low, broad lines so characteristic of the work of its author, Mr. C. F. Voysey. This house has a white stucco exterior over brick and a red tile roof. Its cost complete was $5,000.

north, and your larder receives the full warmth of the sun all the day, you can console yourself with your bay windows, your tesselated fore court, and your electric bells. For these latter, judging by the auctioneers' announcements, are the features which the public mainly demand.

The other line of development is based on the beautiful domestic architecture of the seventeenth and early eighteenth centuries, of which a considerable amount still survives in different parts of England. It is true that this study and appreciation of old work sometimes leads to rather senseless copying. For example, there is a great demand just now for half timber houses. Half timber was one of the most beautiful methods of construction and a thoroughly serviceable one, but it is now impossible in most parts of England on account of the building by-laws in force. Owing to the supposed danger of fire, wooden construction is almost everywhere forbidden, consequently our modern half timber is the merest sham. In place of the stout oak timbers which formed an essential part of the construction in the old work, we have narrow strips of wood nailed to the surface of a wall, and serving no constructive purpose, but giving the quaint effect which so many demand. It is not, however, in such unintelligent imitation that the best use is being made of the domestic buildings of an earlier generation, but rather in an understanding of the basis of the excellence and charm of the old work. Our architects have enquired: "Why were the old houses so beautiful?" They have discovered certain principles which seem always to underlie the work of the old builders. They are adopting these principles in their own work, though without copying the features of old work, and are thus achieving an architecture which, though clearly related to the work of another age, is distinctive and original.

Let us consider briefly a few of these guiding principles. First, it was never forgotten by the old builders that a house is an individual thing, made to fit a particular site and no other. The question of aspects, therefore, and the best methods of utilizing the actual conditions of the site would naturally be considered. In like manner the modern architect gives much attention to the adaptation of his building to the site. Wherever possible natural features are retained, trees being preserved as much as possible, for it is realized, as Mr. C. F. A. Voysey said the other day, that we can never build anything so beautiful as a tree. Then it is realized to-day, as the old builders always realized, that the purpose of a house is to meet the needs of its occupants rather than to impress the passer-by or the visitor. "Houses are built to live in, and not to look on," said Francis Bacon long ago, and not a little of the success of our modern architects lies in their recognition of this seemingly trite and obvious truth. It is quite in

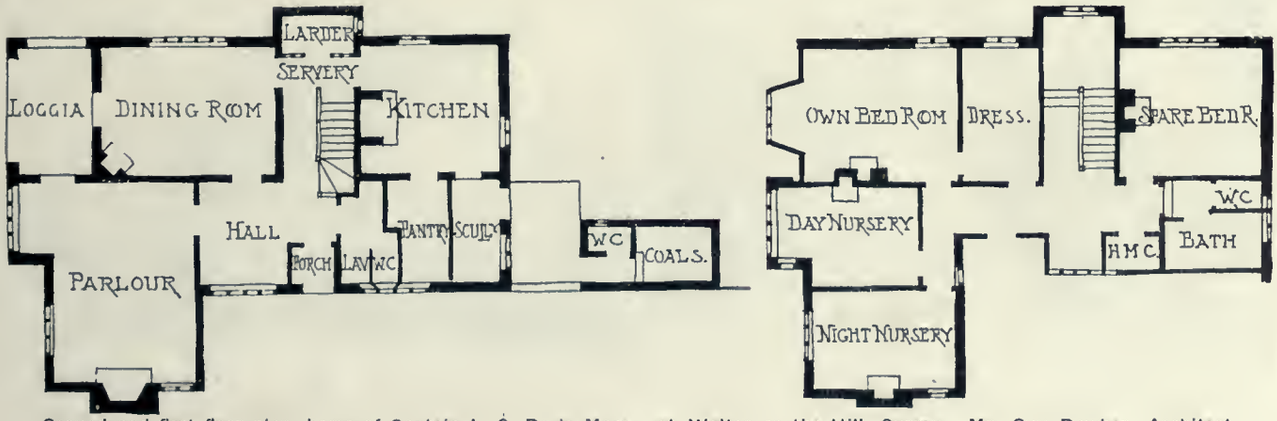


Home of Captain L. S. De la Mare at Walton-on-the-Hill, Surrey. An interesting house of the smaller type, built of red brick and covered with Kent hand-made tiles. The great sweep of the roof with its over-hanging eaves gives a pleasant sense of protection, while a simple decorative effect has been obtained on the chimney breast by means of headers of a dark color. Mr. Guy Dawber, Architect.

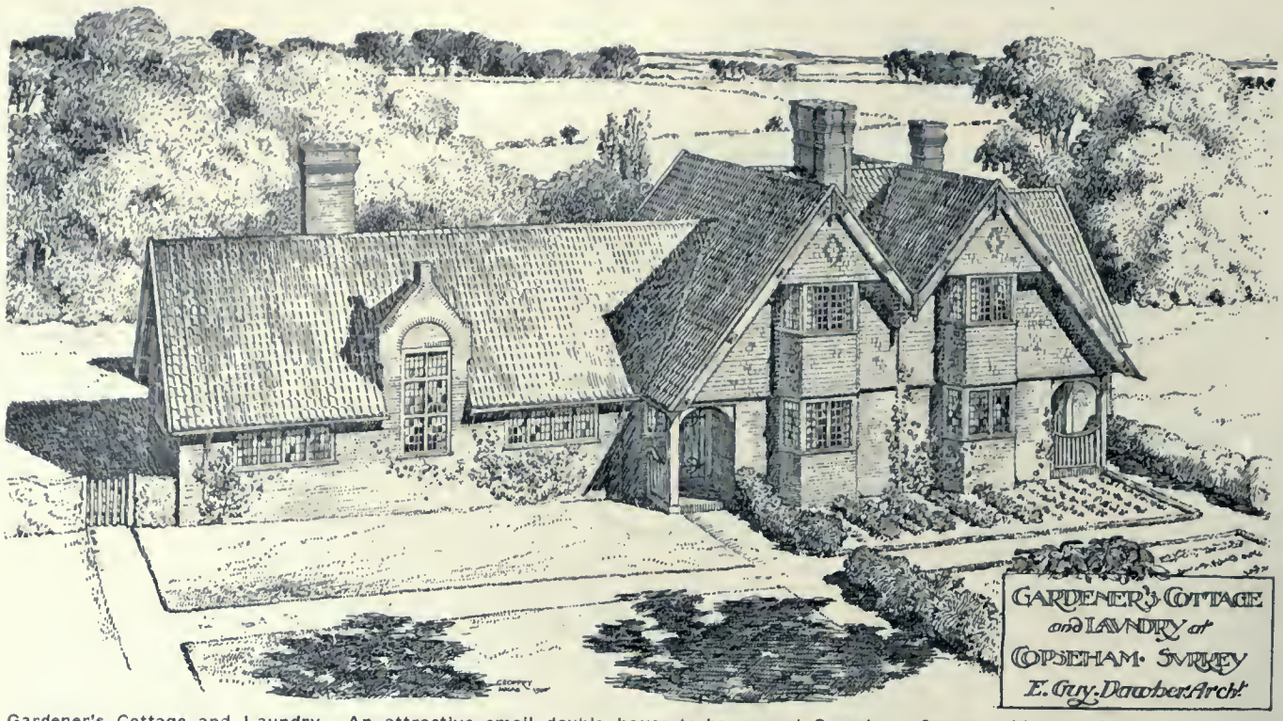
accordance with this principle that great attention is paid, in planning, to the disposition of the various rooms. There is a tendency to recover the central hall which Victorian builders of small houses had degraded into a mere three or four foot passage. As most of the plans accompanying this article show, the hall, even in small houses, is now commonly regarded as the focus of the ground plan, and not infrequently it is used as a sitting room.

Another important principle is to use, wherever possible, the local materials. The old houses were nearly always built by local men who used the materials most readily to their hand, that is to say, those in their own neighborhood. Thus houses in one district retained for generation after generation a distinctive type. In Cheshire and Worcestershire, for instance, where oak was abundant, we have the half timber houses before referred to; in East Anglia we have brick and flint building; in Surrey brick and tile building; while in Gloucestershire and the moorland districts of Yorkshire stone is mostly used. To this use of local materials is due the fact that the old houses, instead of being blots upon the landscape, so often seem to form part of it. Without the pedantic exclusion of materials not found in the neighborhood, it is still possible to pay some attention to local characteristics, and so to secure the same kind of pleasant result. There is no reason why the habitations of man should spoil the beauty of a landscape, and even the modern house need not do so if it is adapted with taste and discretion to its surroundings.

Another principle which the old builders rarely, if ever, violated, is that materials must be used in their natural way, and not tortured into shapes and uses for which they are not naturally fitted. The design of a house is largely influenced by the materials used. Slate roofs, for instance, may be of comparatively low pitch, but a thatched roof must be steep in order to throw off the rain quickly. And allied to this is the other principle upon which Ruskin so strongly insisted, that of truthfulness in building. Following this principle, and in accordance with ancient precedent, many of our architects are adopting the practice of leaving the roof beams showing internally, while they almost universally eschew such base arts as graining and marbling, the use of enamelled slate mantelpieces painted to look like marble, and other similar abominations. Of course, the modern country house is designed in the round; it has no squalid back to be hidden



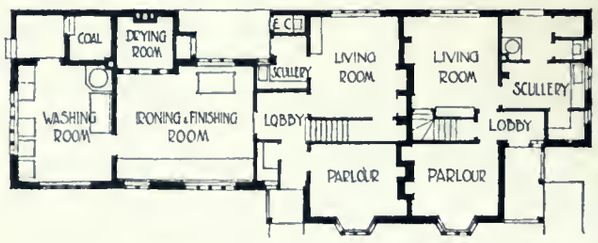
Ground and first floor plan, home of Captain L. S. De la Mare at Walton-on-the-Hill, Surrey. Mr. Guy Dawber, Architect.



Gardener's Cottage and Laundry. An attractive small double house to be seen at Copseham, Surrey, which provides living accommodations for two families and a well arranged laundry. The construction is of red brick with tiles above and a pentile covered roof, while the exterior woodwork is painted white with the exception of the barge-boards of oak, which are exposed and weathered. Mr. Guy Dawber, Architect.

out of sight, but is pleasing to the eye from every point of view.

But perhaps the principle of all others which makes for whatever is satisfactory in domestic building is the



Ground floor plan, Gardener's Cottage and Laundry, Copseham, Surrey, showing the compact and convenient arrangement of the rooms and the general lay-out of the laundry wing. Mr. Guy Dawber, Architect.

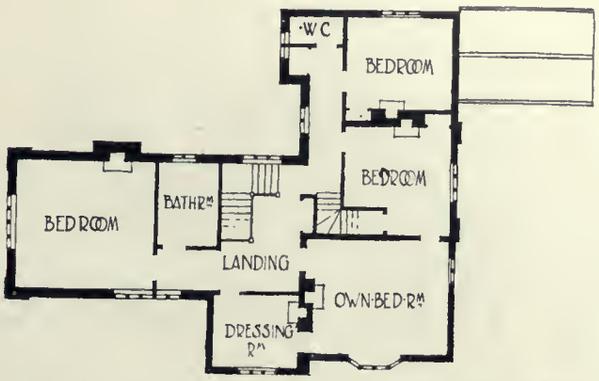
principle of repose. Everyone recognizes the reposeful effect of old English villages and old English country houses, nestling peacefully amidst their surrounding woods and fields. Something of this air of restfulness may be due to the harmonizing influence of time. Nevertheless the effect is in a great measure possible, even with a new building. The very idea of home is violated, if the house does not suggest rest and peace. This is the master principle in home building. Anything which tells against the sense of repose must be rigidly excluded. There must be no ostentations, cleverness, no striving after effect. The house must not shout at you from above the tree tops. It must not, by the use of materials foreign to the district, speak too readily of artifice and commerce. It must not have an excess of ornamentation; in fact, there are many of our best architects who gain their effects almost without the slightest use of ornament. It is found that a simple, broad treatment with good proportion gives a restful effect which would be quite lost if the walling were broken up by needless ornament. Internally, the proportions of the rooms, the size and character of the windows, the decoration of the walls and ceiling, or perhaps the absence of decoration, and the designs and fittings and furniture all minister to the same effect.

"Wynne's Parc," a delightful and interesting home located at Denbigh, North Wales, and designed in keeping with the Welsh farmhouses of the neighborhood. It stands in the heart of an old orchard, overlooking the valley, with mountains on all sides, a site to which it is especially adapted... This house, built of brick with a roughcast surface, has a stone entrance and a native slate roof of grey-green, varying in size and texture from ridge to eaves. Mr. Guy Dawber, Architect.

TYPICAL ENGLISH HOUSES.

We turn now to a more detailed consideration of a few typical English houses of moderate cost, excluding on the one hand the mansions of the wealthy and on the other the cottages of the working classes. Perhaps there is no living architect who has exercised a wider influence in this particular department of architecture than Mr. C. F. A. Voysey. His work is so distinctive in character that one might tell a Voysey house anywhere, were it not that so many of his contemporaries flatter Mr. Voysey by imitating his work. Generally, the Voysey houses are long and low, with white walls and great expanse of steep-pitched roof; both externally and internally they are simple to the verge of austerity. Two characteristic examples of Mr. Voysey's work are included in the accompanying illustrations.

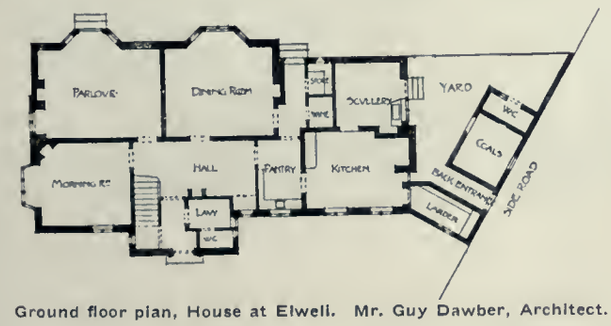
Ground floor plan, "Wynne's Parc," Denbigh, North Wales. Mr. Guy Dawber, Architect.



First floor plan, "Wynne's Parc," Denbigh, North Wales. Mr. Guy Dawber, Architect.

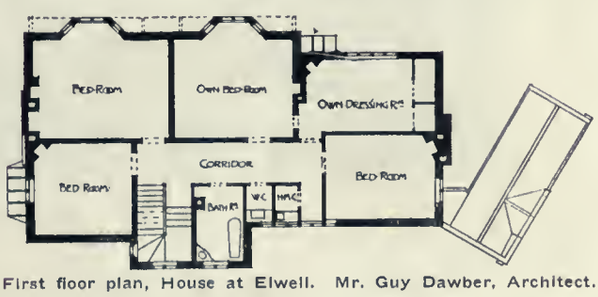
House at Elwell, looking towards the entrance. A simple, effective, brick building in which the only attempt at ornamentation is seen in the slightly emphasized quoins of the entrance bay and the arches above the windows. Mr. Guy Dawber, Architect.

House at Elwell, as seen from the garden side. This home stands on spacious grounds, in a somewhat exposed position. Note the hedge in the foreground, which is a characteristic feature of English landscape work. Mr. Guy Dawber, Architect.



Ground floor plan, House at Elwell. Mr. Guy Dawber, Architect.

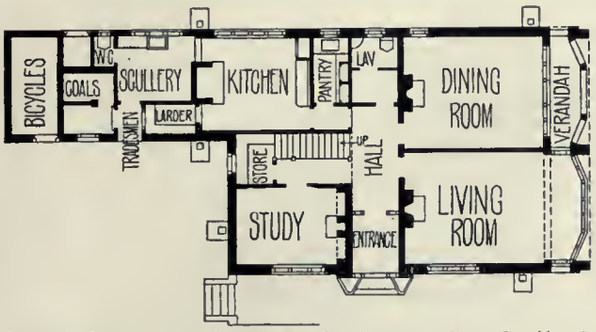
The house known as the "The Orchard" at Chorley Wood has a special interest from the fact that it was built by the architect for his own occupation. Often an architect is restricted in the carrying out of his ideas by the client who, having to pay the piper, naturally claims his right to call the tune. But when an architect builds a house for himself one is not wrong, probably, in reading in it his ideal of what a home should be. The house is delightfully situated in an old orchard of about two and a half acres in extent. The hall, which has a fireplace and a window seat, is an important feature of the plan; the room to the left, not lettered on the plan, is the kitchen with the scullery adjoining; behind this, on the sunny side of the house, is a schoolroom and playroom for the children. This room and the dining-room have wide windows which admit abundant sunshine in the early part of the day, and later in the day sunshine enters through a small circular window on the other facade of the dining-room. Some would consider that the separation between



First floor plan, House at Elwell. Mr. Guy Dawber, Architect.

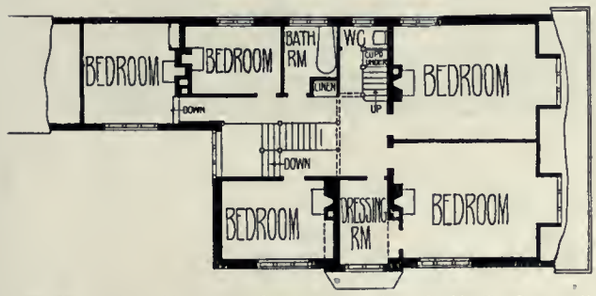
House at Camberley, as seen from the front and side. This home is built in the midst of a pine woods, a rather unusual site for an English house, but nevertheless one of a decidedly picturesque character. The building itself is a successful treatment carried out in red brick with rough-cast above, and a tile roof. One of its most striking features, and one which has greatly tended to enhance it from a viewpoint of design, is the interesting and architectural treatment of the windows and doorways. Mr. C. H. B. Quennell, Architect.

the dining-room and the kitchen, necessitating food being carried across the hall, is a drawback to this plan. All the rooms, it may be noted, are lower than is customary, being only eight feet high, but they are amply lighted by



Ground floor plan, House at Camberley. Mr. C. H. B. Quennell, Architect.

lime whitened. The windows have stone dressings and are fitted with iron casements and leaded lights. The roof is formed of slates of a silvery gray tint arranged in graduating courses. The chimney stacks are rough-cast and surmounted with tarred pots. The hall, kitchen and offices are paved with large slabs of Delabole grey slate. the wide windows, and it is quite an exploded notion that



First floor plan, House at Camberley. Mr. C. H. B. Quennell, Architect.

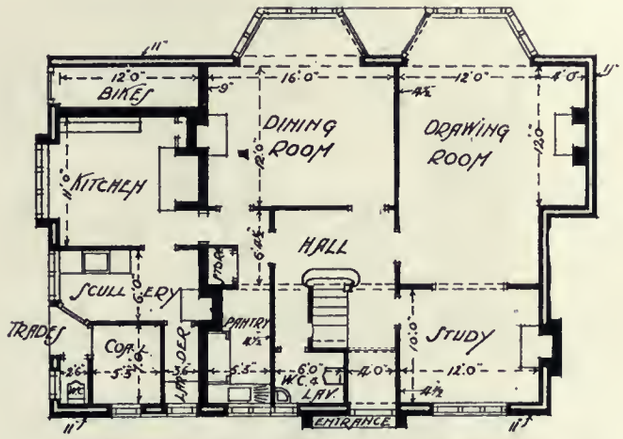
great height is necessary in order to obtain adequate ventilation for the rooms. On the first floor there are five bedrooms with boxroom, bathroom and w.c., and a hot water tank in the middle serves to warm long rows of shelves where linen is kept.

The walls of the house are of brick, rough-cast and The woodwork of the exterior is painted green and of the

Small House at Purley. A recent adaptation in domestic work, built in an exposed situation on the Downs, and executed in red brick with red tile roof and wood casements. Mr. C. H. B. Quennell, Architect.

interior white. Most of the furniture of the house is in oak, unstained and unpolished, and has been made from Mr. Voysey's designs.

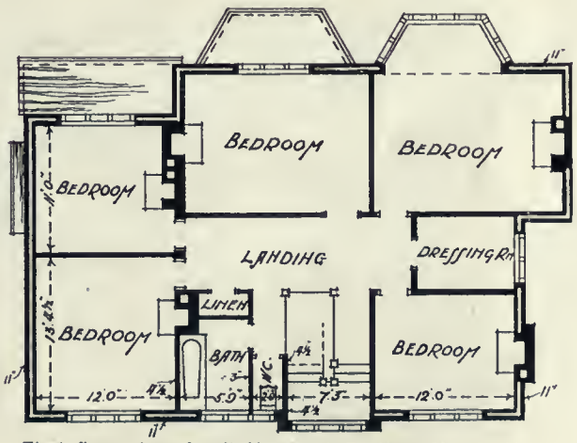
The house at Stoke Poges is an example of a smaller house by the same architect. Here we have a house with what may be regarded as the minimum accommodation for an English middle class family. This house cost about £1,100, and cannot therefore be regarded as a very cheap one, but it has been planned and built with a view to economy in the upkeep. The hall is designed to serve as a general living room, a separate entrance lobby and accommodation for coats and hats being provided. The servant's bedroom adjoins the kitchen, a convenient arrangement when the space can be spared on the ground floor. Three bedrooms and a boxroom, with bathroom and w.c. are provided on the upper floor. The external walls are of whitened rough-cast, the roof is covered with red tiles



Ground floor plan, Small House at Purley. Mr. C. H. B. Quennell, Architect.

and the windows have iron casements. All the woodwork in this house is of oak; this adds a good deal to the initial cost, as compared with deal or other cheap wood, but it gives a good appearance and obviates the need for subsequent painting.

The Small House in Surrey shown on page 53 has been built at Walton-on-the-Hill from the designs of Mr. E. Guy Dawber, F.R.I.B.A. It is a good example of the way in which modern architects are guided in the choice of materials for their buildings by the materials traditionally used in the neighborhood. Surrey is the home of brick and tile houses, and here we have a house which



First floor plan, Small House at Purley. Mr. C. H. B. Quennell, Architect.

displays tile work to the best possible advantage. The great sweep of the roof with its overhanging eaves gives a pleasant sense of protection and is very characteristic of Mr. Guy Dawber's work; there are no lead flashings or gutters to break the continuity of the roof, the valleys being formed with tiles. Kent hand-made tiles are employed in this instance, and they are used not only on the roofs but as hangings to the gables and considerable portions of the walls. The lower portion of the walls and the chimney stacks are of red brick, and a simple decorative effect is gained on the chimney breast by means of

Home of W. E. Steers, at Caterham, Surrey, as viewed from the south-west. This house demonstrates the successful results which can be obtained from plain surfaces and uniform roof lines. The only decorative work to be observed is in the skilful treatment of the windows, and it is more to its perfect symmetry and balance, than to anything else, that this dwelling owes its exquisite home-like charm and character. Messrs. Unwin and Parker, Architects.

View of Living Room, Home of W. E. Steers, at Caterham, Surrey. A most appropriately treated interior in which every appointment is in perfect consonance with the general architectural scheme. All furnishings, even to the curtains, were especially made according to the architects' design, while a unique feature is the floor, which is built of wooden blocks. Messrs. Unwin and Parker, Architects.

headers of a darker color. The plan of this house shows a small central hall, separated from the entrance porch, dining-room and a large parlor to which is attached a loggia or summer parlor. The offices are well arranged

Ground floor plan, Home of W. E. Steers, at Caterham, Surrey, showing the large private gymnasium, and the arrangement of the various rooms. The main entrance opens onto a spacious court at the south-east corner of the living room. Messrs. Unwin and Parker, Architects.

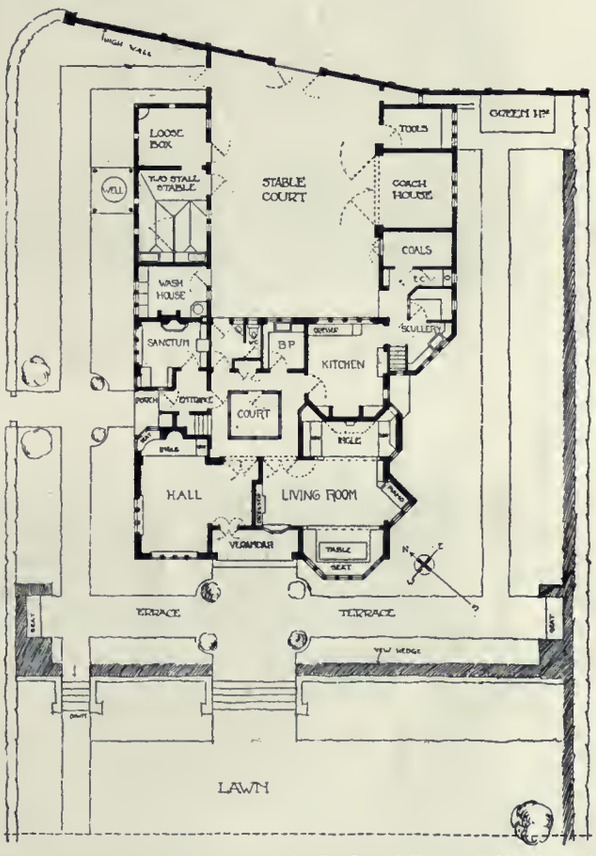
and a servery conveniently connects the kitchen and dining-room.

In the gardener's cottage and laundry at Copesham, a singularly charming group, similar materials have been used, but in this case the roofs are covered with pantiles, and both these and the tiles hung on the upper portions of the walls have been taken from old houses in the neighborhood that have been demolished. They have thus the mellow beauty which time alone can give. The bargeboards are of oak which is left untouched: the rest of the

Terraced steps and entrance, Home of C. F. Goodfellow, at Northwood, Staffordshire. Messrs. Unwin and Parker, Architects.

woodwork of the exterior is painted white and that of the interior is treated with a preservative stain.

A considerable contrast in style is presented by the house known as Wynne's Parc at Denbigh, North Wales. Here the traditional building materials are quite different, and following out a principle which no architect observes more carefully than he, Mr. Guy Dawber in this case designs a building in keeping with the Welsh farmhouses of the neighborhood. The house is built of brick and rough-cast with a black tarred base. The entrance is of old stone taken from a house in the neighborhood. This utilizing of old material pleasantly links the house with the past and with the locality in which it is built; sometimes, too, though not invariably, the practice may mean an economy in building. Wales is the land of slates, and this house is roofed with grey-green slates, which are graduated in size and texture from eaves to ridge. The house stands in an old orchard, and has a delightful outlook across a valley with mountains on all sides. The photographs show with what reverence the architect has treated the natural surroundings, and how charming and varied are the views of the house as one approaches it why it should not be more generally adopted, for though a good deal of rain is experienced even in summer, there are many days when a summer parlor would be quite the



Ground floor plan, Home of C. F. Goodfellow, at Northwood, Staffordshire, showing the court-yard at the rear. Messrs. Unwin and Parker, Architects.

pleasantest room in the house. The interior of the house from different directions. The plan shows that here, as in the Surrey house, Mr. Dawber has provided a loggia leading from the parlor. This is practically a summer parlor, a rather unusual feature in England, but there is no reason is treated simply and in excellent taste. The floors are of oak, the staircase is treated in an unconventional and effective way; and the plaster ornamentation in the drawing-room is copied from an old house in the neighborhood.

The house at Camberley by Mr. C. H. B. Quennell, F.R.I.B.A., is built in the midst of a pine wood, a somewhat unusual site for an English house. The walls to the first floor level, the angle bay and the chimney stacks are of red brick; the upper parts of the walls are roughcasted and the roofs are covered with hand-made tiles; the dormers are tile-hung and the casements have leaded lights. It is worth noting that in the work of all the best

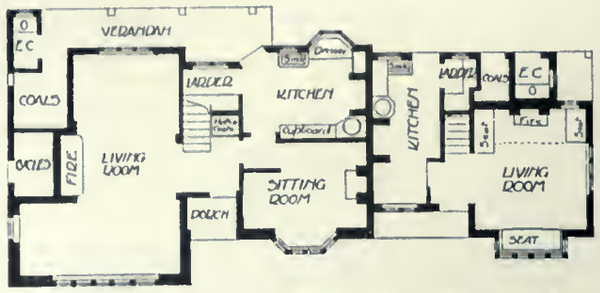
Home of C. F. Goodfellow, at Northwood, Staffordshire. A house of much distinction and character, built on a hill and commanding a fine view to the south. The shrubs and terraced wall along the front form an important part of the general architectural scheme, while the expression and charm of the exterior results solely from the admirable treatment of the doorways, bays and windows. Messrs. Unwin and Parker, Architects.

Living Room, house of C. E. Goodfellow, at Northwood, Staffordshire. Discrimination in the design and selection of the furnishings, so that every detail forms a relative part of the general architectural scheme, is conspicuously in evidence in this delightful little interior. Messrs. Unwin and Parker, Architects.

"Laneside" and "Crabby Corner," a pair of cottages at Letchworth, built on the estate of the Garden City Company Differing in elevation as they do, these cottages nevertheless form a distinctive. well-balanced and harmonious composition. The little white gables breaking the expanse of the roof have a pleasing and almost humorous quality, while the substantial brick chimneystacks give a touch of dignity which restores equipose and repose to the whole. Messrs. Unwin and Parker, Architects.

View of living room, "Laneside," the cottage to the left of the pair illustrated above. Note the delightful simplicity of this inviting little interior, with its unplastered, whitewashed brick walls, exposed ceiling joists, red brick fireplace, and the plain and severe furniture which accords so well with its surroundings. Messrs. Unwin ani Parker, Architects.

modern architects the windows are treated in some interesting and architectural way. The custom which still holds sway in the suburbs is to fill the windows with large sheets of glass, the effect of which is simply that of big holes in the wall. Leaded lights or glazing bars which



Ground floor plan of "Laneside" and "Crabby Corner," (Cottages at Letchworth) located in order named. Messrs. Unwin and Parker, Architects.

divide the openings into small panes are much more pleasing, giving the suggestion of protection without loss of lighting efficiency. The interior of this Camberley house is interesting. The staircase is simply but effectively treated, the woodwork here and throughout the interior of the house being pine, stained. The dining-room has a fireplace built in red brick, the headers being picked out to give a decorative effect; the base is of firebrick and the fire is a very effective one.

The small house at Purley by the same architect is built on the Downs in an exposed situation, and for this reason the walls are built hollow. The exterior is of red bricks with red tiled roof and wood casements. The dining-room and drawing-room are on the garden front, which is the sunny side of the house. It is, of course, a matter of constant concern amongst our architects to get as much sunshine as possible for the living rooms of the house, and this explains many of the features in the planning. The plan of this house is worth study; it is specially compact and convenient. The central hall is small and is separated from the entrance lobby. It gives access to the dining-room, drawing-room and study, the latter being connected with the drawing-room by folding doors. The offices are ample and are all under the one roof. On the first floor there are five bedrooms and dressing-room, all leading from the central landing.

A good deal of work of an interesting and distinctive character in more than one department of domestic architecture is being carried out by Messrs. Barry, Parker and Raymond Unwin. These architects have been closely identified with the Garden City movement, and they are playing a useful part in helping forward the development on the best architectural lines of the estates of the Garden City Company at Letchworth and the Hampstead Garden Suburb Trust in the pleasant London suburb of Hamp-

House at Biddenham, as seen from the approach leading to the front entrance. Mr. C. E. Mallows, Architect.

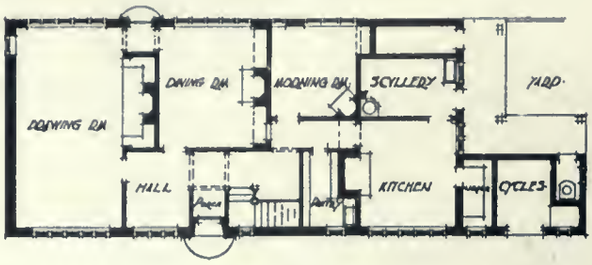
stead. They have designed many cottages and middle class houses, and in many cases have carried their work much farther than the mere designing of the building. Thus in the three typical examples here illustrated everything shown in the photographs, down to the embroidery on the cushions and such details as the lamps and the fire-irons, has been specially made from the architects' designs.

House at Biddenham, as viewed from the garden at the rear. The simple yet skillful manner in which this home is designed, has imparted to it a pronounced individual domestic character, that renders it unusually attractive. It is built of red brick, with the upper portion cement plastered, and a hand-made tile roof. Against this background, the white painted woodworks of the door and windows stand out in a pleasing contrast. Mr. C. E. Mallows, Architect.

Drawing Room, House at Biddenham. Note the design and general harmony of this interior. A splendid feature is the window over the seat at the left of the fire-place, which renders the inglenook bright and cheerful. Mr. C. E. Mallows, Architect.

Dining Room, House at Biddenham. Among the distinctive features of this interior is the extreme simplicity of the woodwork. The fire-place seats and the panelling of the walls are most unique in both design and finish, the built-in cupboards around the top of walls being a most commendable innovation. Mr. C. E. Mallows, Architect.

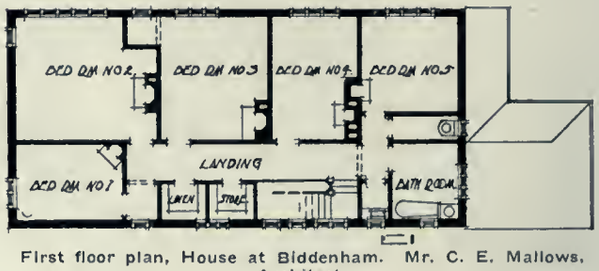
Messrs. Parker and Unwin hold that you cannot satisfactorily furnish a house with goods bought from stock. There is an appropriate treatment for every room, and



Ground floor plan, House at Biddenham. Mr. C. E. Mallows, Architect.

fittings and furniture which would look very well in one room would be terribly incongruous in another. This sounds obvious enough, but it is a principle that is almost universally neglected. Most people buy furniture, lamps and carpets, and some even such architectural features as the fireplace with very little reference to the character of the room these things are to occupy, and the result is that often the harmony of an architectural scheme is completely spoilt, and the furniture, though perhaps quite good in itself, does not give anything like the satisfaction that would be derived from simpler and less expensive pieces designed with a view to the specific purposes they are to serve and the exact positions they are to occupy. No doubt the ideal system would be a co-operation of craftsmen-designers working in general subordination to the architect. This was the method that obtained throughout the Middle Ages, and, though in diminishing degree, down to the time of Wren and his immediate successors. But only in rare instances is it possible nowadays. The next best plan is to employ an architect of taste and judgment to design everything. The outcome of a procedure is an harmonious completeness which goes far to promote that sense of repose which has been referred to as one of the chief desiderata in the home. The preparation of special designs for the furniture and fittings of great public buildings is an idea with which we have long been familiar; Messrs. Parker and Unwin have shown that it is often quite practicable to apply the same principle to houses of moderate cost.

The house of Caterham, built for Mr. W. E. Steers, is a good example of these architects' methods. The unconventional nature of the plan will be at once apparent. A single large living room takes the place of the customary hall, dining-room and drawing-room; it has outlooks on three sides and two fireplaces, each set in a large nook. This arrangement is adopted with a twofold object: first, to secure that if the sun shines at any time in the day and on any day of the year, it shall shine into the living

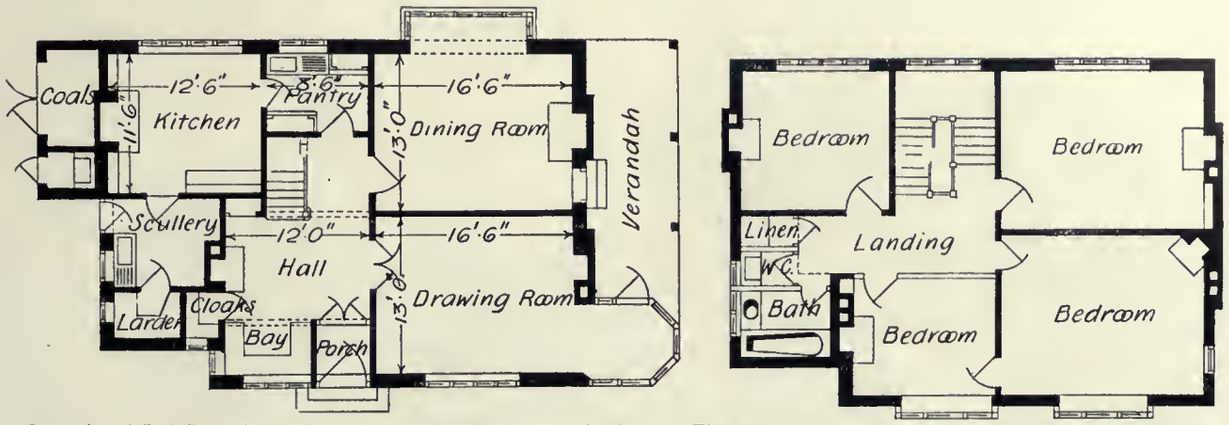


First floor plan, House at Biddenham. Mr. C. E. Mallows, Architect.

room, and second, to secure for the occupants of the living room the benefit of the extremely fine views obtainable from the site in every direction. The room is fitted

House known as "St. Ives," at Walton-on-Thames, a structure with a dignified elevation, designed to meet the requirements of an English family of the middle class. Somewhat of a pleasing feature has been effected in the external woodwork, which is painted white against the red brickwork, and stained a brown tint where the roughcast forms the background. Messrs. Nivens and Wigglesworth, Architects.

with window seats and there are fixed seats in the ingles; the round dining table is specially designed for its place in the semi-circular bay, where the sunshine on bright



Ground and first floor plans, House known as "St. Ives," at Walton-on-Thames. Messrs. Nivens and Wigglesworth, Architects.

days will add to the cheerfulness of breakfast and the midday meal; the beams of the roof are left showing and the floor is of wood blocks.

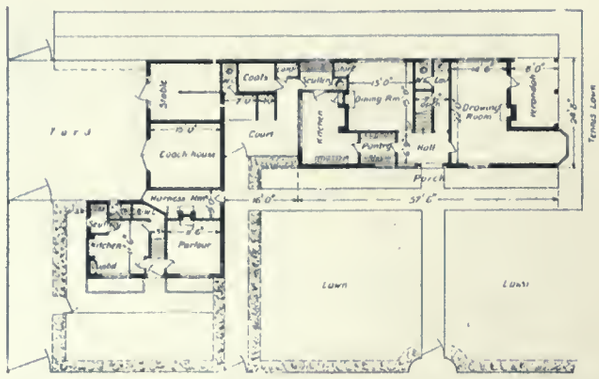
As the plan shows, a considerable portion of the ground floor is occupied by a gymnasium. This very unusual feature in a house of moderate size is due to the fact that Mr. Steers, the owner of the house, who has lived in Japan, is a great enthusiast for physical culture —more especially for ju-jitsu. He also fully appreciates the importance of fresh air, and one side, the gymnasium is composed entirely of rolling shutters and windows; thus whenever the weather makes it possible, this room is one with practically three walls only—one side being completely open to the light and air. The decoration of the gymnasium is interesting, the walls having been painted to represent woodland scenery. A dressing-room opens from the gymnasium, and a bath is fixed in a recess and hidden from sight by a curtain.

Externally this house is of rough-cast, the windows being framed in red brick and the roofs tiled.

Equally interesting is the house of Northwood, Staffordshire, which was built by the same architects for Mr. C. F. Goodfellow. The house is built on a hill, and commands fine views to the south, but on the north the hill rises higher still and shuts out any view. This fact, of course, naturally suggested the placing of the living rooms on the south or garden side of the house. But the most original and distinctive feature of this plan is the provision of a little central courtyard. This has proved in practice a most successful feature, far surpassing the hopes of the architects when planning the house. "Bringing the air and sunshine right into the midst of the house in the way it does," says Mr. Parker, "increases the cheerfulness and brightness of the house beyond anything one could imagine". It will be noted that in this case, as in the house of Mr. Steers, a large living room with a deep ingle is an important feature of the ground plan. A fixed dresser occupies a recess, and the dining table is placed in the large bay where the three-sided window admits

House at Harrietsham, Kent. The architectural lines and general treatment, together with the materials used, have combined to produce in this structure a quaint and homelike result, that is of more than passing interest. Messrs. Nivens and Wigglesworth, Architects.

whatever brightness and sunshine the day affords. Our photograph gives a fair idea of the general appearance of this fine room. The house is built of brick rough-casted, and the roof is tiled. It may be noted that the



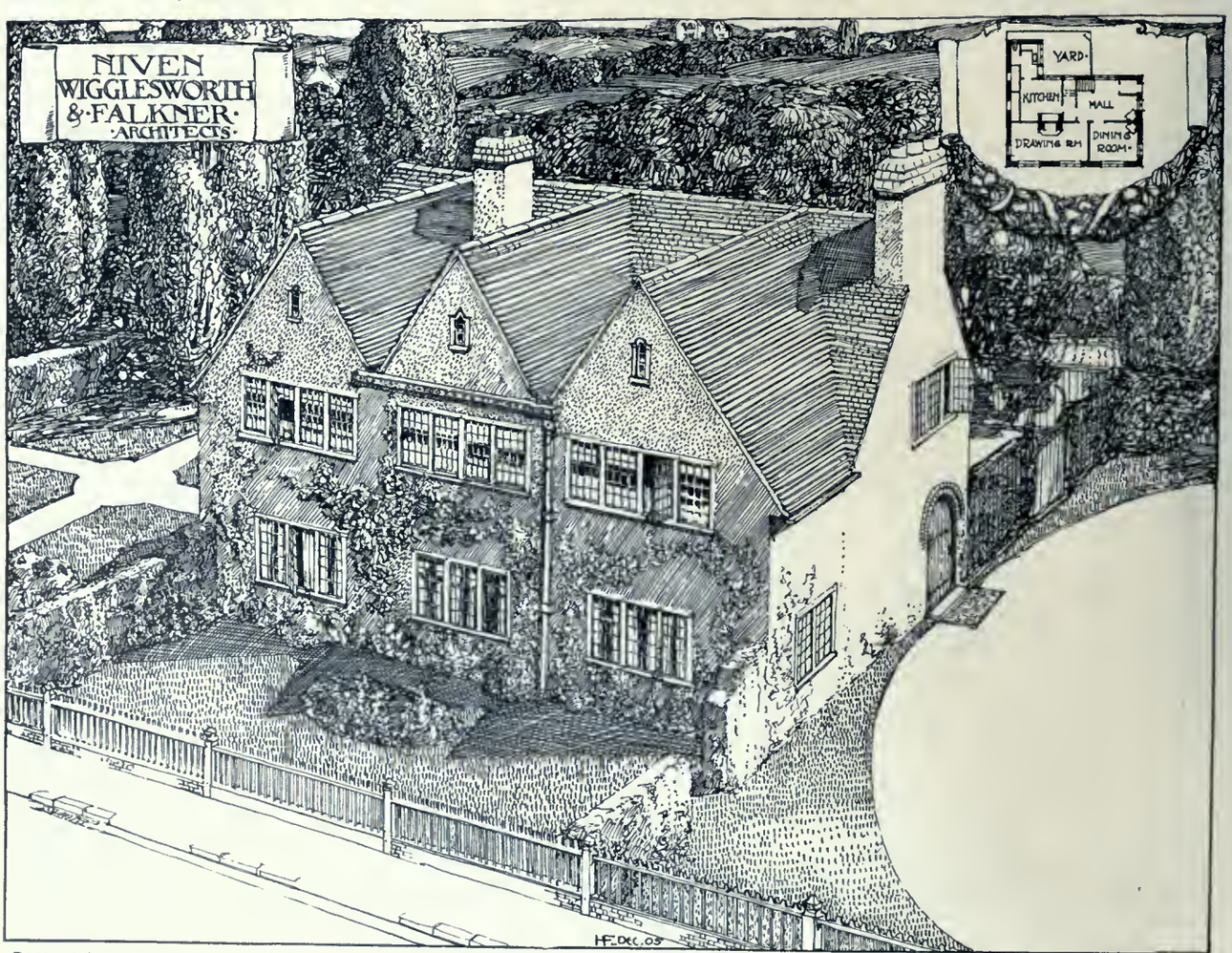
Ground floor plan, House at Harrietsham, Kent, together with stable, coach-house and coachman's cottage. Messrs. Nivens and Wigglesworth, Architects.

laying out of the garden forms a not unimportant part of the general architectural scheme. This is in accordance with a growing tendency on the part of modern architects, who are reasserting the control which the architect formerly exercised over the surroundings of a house, but which in recent times has been filched from him by the landscape gardener—with much more consequent loss of harmony and completeness.

The charming pair of cottages, "Laneside" and "Crabby Corner" at Letchworth give an example of the application of the distinctive style of Messrs. Parker and Unwin to quite small work. The two cottages, differing as they do in plan and elevation, form a pleasantly balanced and harmonious composition. The little white gables breaking the expanse of the red tiled roof have a pleasing and almost humorous quality, and the substantial brick chimneystacks give the touch of dignity and repose which restores the balance. Internally an almost barnlike simplicity prevails. The living room illustrated in the photograph is that of "Laneside," the cottage to the left of the picture. Here the brickwork of the walls is left without plaster or other covering, except whitewash, the fireplace being distinguished by red bricks; the ceiling joists are left showing and the furniture is of a simple and severe type which accords well with its surroundings.

The house at Biddenham by Mr. C. E. Mallows, F. R.I.B.A., has been built of local red bricks to the first floor level and above of common bricks covered with cement rough-cast, which is left the natural color, not whitened as in many examples. Against the dark background of red brick and rough-cast the white painted woodwork stands out in contrast. The casements are filled with leaded lights. The roof is covered with red local hand-made tiles. The woodwork in the dining room is white canary wood, which is left untouched from the bench; in the drawing room the woodwork is of pine painted white. In both rooms, as the photographs show, a feature is made of the fireplace with its ingle nook; Van Strautten tiles surround the fire in each case. The garden surrounding the house was designed by the architect. The accommodation provided may be gathered from the plans. The house was planned to cost about £750; with the addition of the stables the actual cost was £1,100.

The house known as "S. Ives" at Walton on Thames,

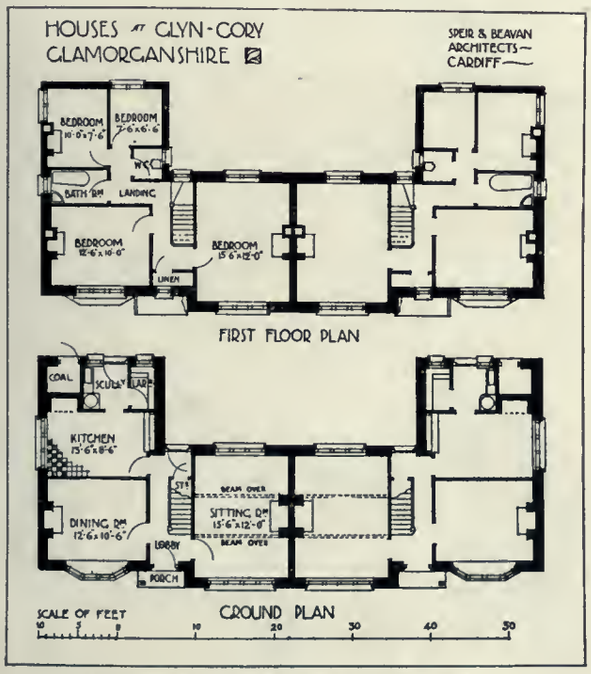


Perspective view and ground floor plan of cottage at Farnham. A study in gables, plain surfaces, and simple window design. Note the directness of the architectural lines and the resultant expression and effect. Messrs. Nivens, Wigglesworth and Falkner, Architects.

by Messrs. Niven & Wigglesworth, shows a type of plan which admirably meets the requirements of large numbers of English middle class families—a roomy central hall, separated from the entrance porch and so usable as a sitting room, two large sitting rooms leading from it, ample offices and the pantry serving as connecting link

Pair of Houses at Glen-Cory, near Peterson-super-Ely, Glamorganshire. The design of this house has much to commend it in the way of a two-family dwelling. Its walls are built of rubble-stone with a roughcast exterior, the woodwork, with the exception of the oak porch timbers, being of red pine, and the roof of red tile. Messrs. Speir and Beavan, Architects.

between dining room and kitchen; on the first floor a good sized landing gives access to four bedrooms, bathroom, etc. Two bedrooms are provided in the roof. The elevation, which is here illustrated by an admirable example of architectural drawing, is of a dignified character. The lower portion of the walls and the chimney stacks are of red brick, the upper part is of brick covered externally with whitened rough-cast. Something of a feature is made of the external woodwork; this is of deal painted



Ground and first floor plans, double house at Glen-Cory, Glamorganshire. Messrs. Speir and Beavan, Architects.

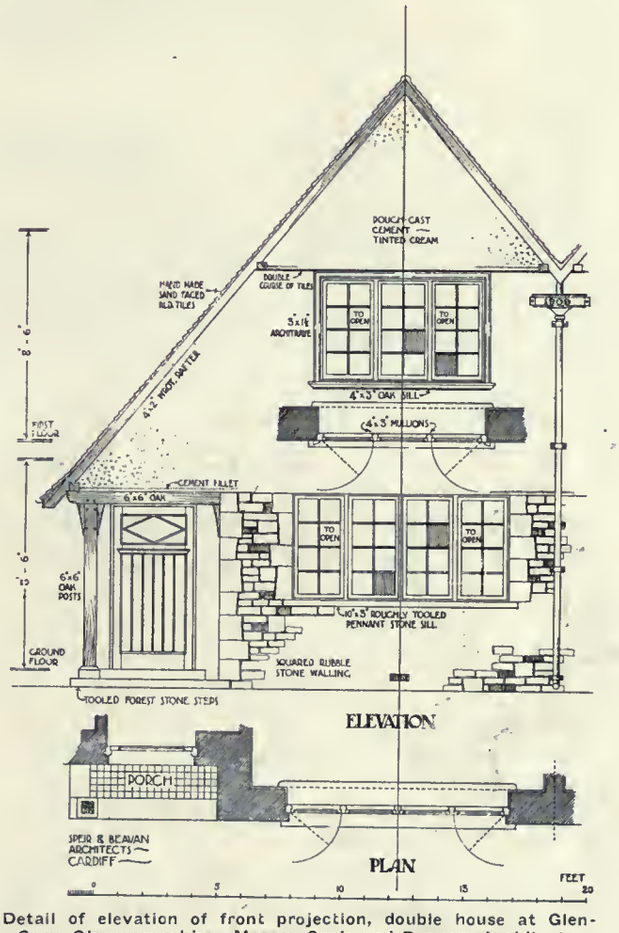
white where it has a red brick background, and stained with "carbolineum" to a brown tint where the white rough-cast forms the background.

In the house at Harrietsham, Kent, the same architects show a very different type of design. The steep-pitched roof, which on one side comes right down to form a roof for the verandah, is of local red tiles. The upper floor projects slightly after the manner of the old half timber work, but in this example the half timber is used in the modern way with a brick backing, and is only in a partial degree constructional. The exterior walls are rough-casted, the parts between the timber on the upper floor being whitened. The photograph and plan show stable, coach-house and coachman's cottage as well as the house.

The pleasant cottage at Farnham, built by the same architects in conjunction with Mr. Faulkner, is illustrated here by a bird's eye view. It is built of brick, rough-casted externally, the roofs are of red tiles.

In the house at Ewell we have an example of simple, effective brick building by Mr. E. Guy Dawber, F.R.I.B.A., a sufficient contrast to the examples already given of this distinguished architect's work. The only ornamentation of the exterior consists in a slight emphasizing of the quoins of the entrance bay and the arches above the windows. The roof is tiled and the exterior woodwork is painted white. The plan is self-explanatory.

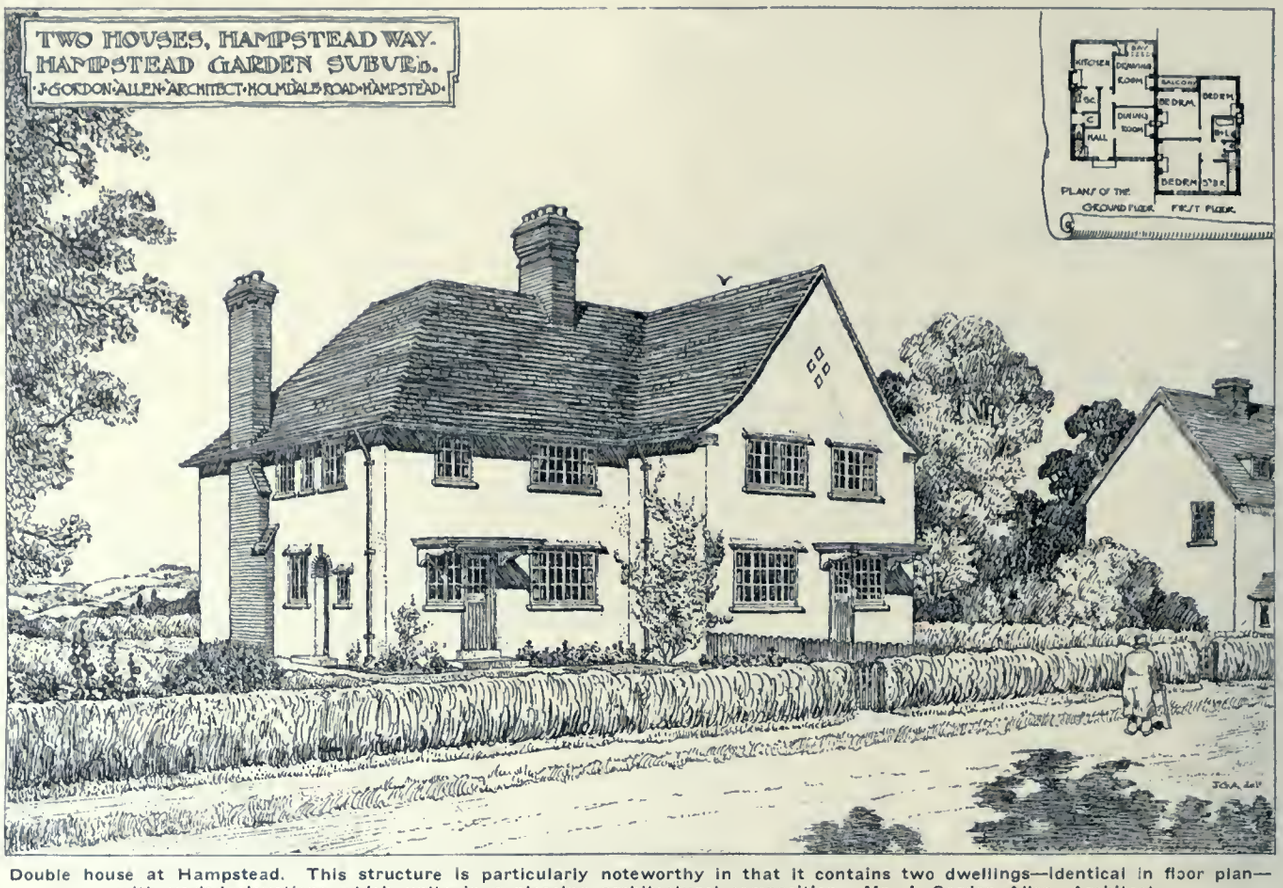
One of the latest of the "garden city" schemes is be-



Detail of elevation of front projection, double house at Glen-Cory, Glamorganshire. Messrs. Speir and Beavan, Architects.

ing carried out at Glyn-Cory, near Peterson-super-Ely, Glamorganshire. The pair of houses by Messrs. Speir and Beavan, together with another pair planned on somewhat similar lines are the first houses to be erected on the site. The site is an elevated one, the ground falling away with a gentle and almost uniform slope down to the bottom of the valley through which the River Ely runs. As fine views are obtained both at the front and rear of the houses, the principal sitting rooms have been arranged with windows commanding both aspects, as is also the case with the bedrooms above. The external walls up to the first floor level are built of squared rubble stone quarried within a mile and a half of the site; above the walls are of similar stone built in random work and finished externally with rough-cast of a creamy tint. The roofs are covered with red hand-made, sand-faced tiles. The porch timbers are of oak, other wood-

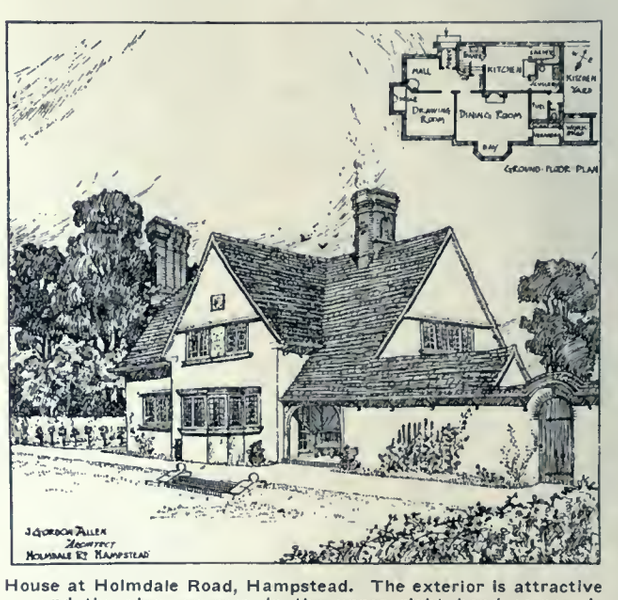
work is of red pine, the window frames being painted white. The accompanying detail on an enlarged scale of part of the front gives some particulars of the construction which may interest some readers. The details both externally and internally are of a simple nature, and in character with the traditional English cottage of the past, this being the effect which is intended to be realized in all houses erected at Glyn-Cory.



Double house at Hampstead. This structure is particularly noteworthy in that it contains two dwellings—identical in floor plan—with varied elevations which unite in a pleasing architectural composition. Mr. J. Gordon Allen, Architect.

The Garden Suburb at Hampstead has already been mentioned. This model estate, although close to London, has a decidedly rural character, and the houses have a character and variety rarely found in the suburbs. The two little houses in Hampstead Way are typical of many others. They are designed by a talented young architect, who is as yet but at the beginning of his career, Mr. J. Gordon Allen. We have here a good example of the way in which two houses of similar plan may be varied in elevation. One house has been brought forward to match a similar projection on the other side of the road, and the two houses have been united in a very pleasing architectural composition. The accommodation is rather extensive for a house of this frontage, viz., 24 ft. A good hall has been provided with two large sitting rooms, one of which measures 17 ft. 10 in. by 12 ft. and the other 14 ft. 10 in. by 12 ft. The kitchen obtains direct light and is of good size. On the first floor there are four bedrooms, one of which has a covered balcony. The roof is of red tites and the walls are of brick, rough-casted.

In the second example of Mr. Allen's work a somewhat larger house is shown. This is estimated to cost slightly over £800 to build. The plan is arranged with a view to economy as well as convenience. The sitting hall, which has a fireplace, would be comfortable and not draughty, as a porch has been provided. An ingle nook makes the drawing room interesting, and seats can be placed on either side of this feature. The dining room, which is larger—in proportion to the other rooms—than usual, has an open timber ceiling and a roomy bay window. The verandah is approached from the dining room and gives access to a small workshop, where there is a bench. The kitchen and offices are isolated from the living rooms by a pantry under the stairs. Five bedrooms are on the first floor, with bathroom, housemaid's closet, etc. The important question of aspects has been considered, and it will be seen from the plan that each room has the correct outlook for our English climate. The walls are rough-casted on brick and the roof is tiled.



House at Holmdale Road, Hampstead. The exterior is attractive and the plan, as seen in the upper right hand corner, is arranged with a view to economy, as well as convenience. Mr. J. Gordon Allen, Architect.

CONSTRUCTION

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 Toronto, June, 1909 No. 8

Current Topics

A SINGLE BRICK OF SOLID SILVER—the highest brick in the world—occupies a position of honor in the very apex of the tower of the famous Singer building, New York, which is 612 feet high.

* * *

A BUNGALOW to cost $30,000 is being erected at Argyle, Nova Scotia, by a Bostonian named Mr. Cox. Mr. Cox represents a number of families, who propose making Argyle their summer resort. They have bought a tract of some 200 acres of land and propose fitting the whole up in modern style. Some idea of the bungalow may be gleaned by the fact that there are to be seven bath rooms and ten lavatories in the building. Work will be commenced at an early date. When completed and occupied it will form quite a community, there being about seven families interested.—Ex.

* * *

THE FIRST FERRO-CONCRETE LIGHTHOUSE erected in the open sea was recently erected on One Fathom bank, Strait of Malacca, about fifteen miles from the nearest land on the Malayan coast. It takes the place of an iron screw pile lighthouse and is believed to be the first of its class constructed in the open sea in comparatively deep water (twenty feet) on a sand bank subject to tidal erosion. The focal plane of the light is ninety-two feet above high water. The seventeen foundation piles are built of steel rods laced together with steel wires and covered with concrete. The concrete was in the proportion of one of Portland cement to two and one-half parts of granite broken to pass at all angles through a three-quarter inch ring and one and one-half parts of sand. The piles are sixty-three feet long and were sunk to an average depth in the sand of twenty-six feet nine inches.

THE MAN WHO TRIES to conduct his business successfully without advertising is like a man who sits in a dark room opposite a charming girl and winks at her; he knows what he is doing but no one else does.

* * *

THE TOTAL OUTPUT OF CEMENT for 1908 in the United States, according to the advance report of the U. S. Geological Survey, amounted to 51,002,612 barrels of Portland cement; 1,621,862 barrels of Natural cement; and 151,451 barrels of Puzzolan cement, as against 48,785,390; 2,887,700, and 557,252 barrels of each respective kind in the previous year. The report says: "The average price of the entire Portland cement output in 1908 was only 85 cents a barrel—36 cents below the average price in 1907. The 1908 price is the lowest on record, the previous low point—88 cents a barrel—having been reached in 1904 as the result of business depression in that year."

* * *

A REPORT IS CURRENT in government circles that the engineers employed in designing the new Quebec bridge have so far advanced with the work, as to assure the drawing being placed before the House in the very near future. According to a statement given out, the present piers, which cost a million and a half dollars, will be utilized for the new bridge, which will have a span almost as great as the 1,800-foot span of the wrecked bridge. Instead of the single tower, which was the weakness of the first bridge, the present piers will probably be duplicated on the river side, thereby reducing the central span to about 1,600 feet. The structure will be on the cantilever principle, and built of nickel steel.

* * *

BUILDING ACTIVITY IN WELLAND, ONT., is in full swing. A large number of structures are now in course of erection and many others are in immediate prospect. The corner stone of the new Fonthill Baptist church has just been laid. The Holy Trinity church will build a handsome Guild Hall on its property, and as soon as the structure is completed the old church building will be replaced by a beautiful new edifice. Aside from this other improvement will include: Two new school buildings for which the town council has voted $17,000; a transformer house to be erected on Helen's avenue for the Falls Power Company, and the erection of a large public hall, and also a handsome brick business block on Division street by Mr. A. Griffiths. All these structures will be under way in the near future, and judging from the activity in the realty market many business and residential buildings will follow in their wake.

* * *

IN VIEW OF THE DISCUSSION now taking place in various municipalities regarding the question of adopting means for the beautifying of certain thoroughfares, and especially in Toronto anent the widening of Yonge street, it may be of interest to learn of the gigantic scheme now projected in Paris, France, where it is proposed to transform the city within the next five years at a cost of $200,000,000. The program as outlined by M. Bouvard, Chief City Engineer and Surveyor, provides for the construction of five wide streets leading directly to central markets; and also for the encircling of Paris, on the space now occupied by the city walls, with a vast circular belt of garden or park land twenty-two miles in circumference and 150 yards wide. The proposition has been endorsed by Mr. Dousset, who has been entrusted with the rendering of the annual report of the Paris municipal budget, and the amount named, it is estimated, will cover the entire expense of the work, including the reimbursement of owners, whose property will be expropriated.

A PARTNERSHIP HAS BEEN FORMED by Alexander Law and William Knowles architects, of North Vancouver, B.C. Both gentlemen are practitioners of a broad experience and they have a large amount of work in prospect to be shortly carried out at North Vancouver which is rapidly growing. The new firm will be known as Law and Knowles.

* * *

A FIRM OF MANUFACTURERS at St. Gobian, France, are now manufacturing a burglar-proof plate glass to be utilized by jewelers as a safeguard against robbery. Recent tests show that while an ordinary plate glass, such as is usually used for display purposes, was smashed to atoms by a single stroke with a metal-trimmed mallet, the same attempt to break the "dalle polie," as the new glass is known, proved entirely fruitless. Again, a large piece of cast iron hurled with considerable force succeeded only in making a small hole, measuring but a few centimeters, while several steel bullets fired from a revolver resulted in no further damage to the window than the entering of the balls into it to the depth of a few millimeters. This character of plate glass is ordinarily made of a thickness of from 20 to 25 milimeters (0.787 to 0.984 inch.); but if required, a heavier plate can be made without in the least diminishing the transparency of the glass.

* * *

A REMARKABLE DISCOVERY has recently been made at the Mexican city of Guanajuato. That city, which was founded in the year 1554, has been from an early period the centre of rich gold fields, where operations have been carried on almost without intermission until the present day. It has now been found that the gold is not confined to the surrounding hills, but that the precious metal is actually present in the house-walls of the city. A railway company, in clearing away some old houses to make room for a new station, discovered that the bricks had been made from the spoil banks of the ancient gold seekers. These primitive miners could only extract a portion of pure gold from the ore which they treated; and the bricks made from their rubbish are now found to be highly auriferous. Under treating by modern methods gold to the value of from 10s. to £4 10s. per ton is being recovered, and the demolished Mexican dwellings show a better return than many Transvaal mines. The occupants, who may have lived in poverty within these golden walls, are looking at the operations in amazement, and old property in Guanajuato has become very valuable to the fortunate owners.

* * *

THE PROBLEM OF HOUSING the laboring element in growing communities is being successfully worked out in Rio de Janeiro, the capital of Brazil, where the efforts made by the government of the federal district of that place to provide sufficient acceptable dwellings for its working classes, and which induced the municipality itself to construct a number of tenement houses a year ago, have resulted so satisfactorily, that a contract has just been let, through the minister of public works to Senor Mario Roche for the construction of the necessary supply of houses, the number provided for being a minimum of 800 houses and a maximum number of 4,000 houses, the exact number to be determined as the enterprise proceeds. Four types of houses are to be constructed. One is to accommodate three persons and to be rented for $7.50 gold per month; the second to accommodate five persons at $13.50; the third to accommodate seven persons at $18, and the fourth to accommodate ten persons at $24. The contractor will be allowed entrance free of all duty for all material covering 15 years, exemption from local taxes for the same period, the power of condemnation of private property for the sites of such houses, and similar privileges. The full complement of houses of the two smaller classes must be completed within two years.

A $6,000,000 STATION, one of the largest and finest on the American continent, is to be erected at Detroit (Mich.) by the Michigan Central Railway Company. Tentative plans for the structure were practically decided upon at a recent conference held by the officials of the road. The building will be located between Seventh street and the westerly line of the company's local yards, and it will contain the general offices of the road as well as station accommodations.

* * *

AN IMMENSE CONCRETE fireproof building, the first of its kind ever provided for a railroad, is to be erected by the Pennsylvania Lines West, probably in the Pittsburg district, to be used for the storage of reports, deeds, and other important papers. Another may be located in Philadelphia. Every year hundreds of railroad buildings in the United States are destroyed by fire, and in many instances papers of value are burned. Often such papers are stored in division buildings that are of wood and there is always danger of their destruction by fire.

* * *

DUPLICATE PLANS for any class of buildings whatsoever must now be filed with the Building Department of Vancouver, B.C., before a permit will be granted. This requirement is by no means a new ruling as a clause to that effect has always been included in the building by-law. However, up to recently, it has only been adhered to in cases of certain types of structures, but in order to more fully protect the small owner by placing a check on any deviation attempted by a contractor in carrying out constructive work, this provision will from now on become generally operative. It will also be required that before a plumbing permit is issued, the owner or his agent will have to file with the department, a drawn plan of the property showing where the plumbing connects with the drain and the direction the drain takes to the street sewer. Municipalities having such regulations should see to it that they are strictly enforced; while in places where measures of these kinds have been omitted from the building by-law, immediate steps should be taken to enact such provisions, so as to more fully safeguard the public interests by discouraging any "shady" methods that might be employed by unscrupulous builders.

* * *

A COVERED WATER RESERVOIR, the largest, it is claimed, ever built, has just been completed at Honour Oak, as an auxiliary service to London's (Eng.) waterworks system. It has a capacity of 60,000,000 gallons, and the time consumed in its construction was eleven years. All the bricks used were made on the site from clay native to the soil, and thus a large saving was effected in the eventual cost of the reservoir. Figures concerning the new reservoir of interest are given herewith: Total cost, £236,000 No. of bricks used, 16,000,000; Cement, 20,200 tons; Concrete, 95,000 cubic yds.; Clay in puddle wall, etc., 14,000 cubic yds.; Excavation 173,000 cubic yds.; Extent of reservoir, 14½ acres; Water area, 10 acres; Greatest depth, 34 feet; Thickness of walls, 6 to 16 feet; Covering arches, 4 miles; Jack arches connecting piers, 3 miles; Men employed, average, 400. The top water-level of the reservoir is situated 144 ft. above ordnance datum, and its principal use is to afford low-pressure service to the south eastern portion of the Water Board's area, although by means of mains which exist beneath the River Thames it will be possible to transfer the supply to the northern side should it at any time be necessary. The reservoir is constructed on the natural clay formation, the bottom being of concrete, and is divided into cells or bays 21 ft. 6 in. square. Two division walls at right angles to each other divide up the reservoir into four sections; these walls are cambered back to back, the space between the walls being filled in solid with concrete.

View along Chestnut Park Road, showing some of the attractive and interesting homes of Rosedale, Toronto's fashionable residential district.

DOMESTIC ARCHITECTURE IN CANADA.—The Homes of the Past and Those of To-day.—The Design and Character of Our Residential Structures.—A State of Architectural Progression Manifest.—Illustrations and Descriptions of Recent Work. ∴ ∴ ∴

IN CANADA, while we can as yet boast of no distinctive architecture of our own, there is nevertheless to be seen in the domestic work of recent years, a general and wholesome tendency which is coming to make the character of our homes one of the most commendable features of our national life. That there is a refining influence abroad in this direction is strikingly obvious, especially in our newer residential districts and suburbs. This development, coincident as it is, with the early growth of the country as a commercial and industrial power, is indeed significant, as it is the character of the homes, more than anything else, that gauge the stability of a country, and reflect the social life, tastes, and customs of its people, and the degree of culture to which they have attained.

It is not so many years back to the time when our gaze met row upon row of characterless houses—weird fancies of the early builders who sought effect rather in height than in breadth, and in the lavish use of the products of the jig-saw and the lathe. A time when our habitation was more of an abode than a home, built without consideration of its environments, poorly planned, and unsanitary. But, thanks to the awakening of the people to higher ideals, this type of structure has seen its day, and even the stately (?) mansion—the former home of the wealthy—still to be seen, with its high ceilings and formal and forbidding exterior, has come to be regarded as a domestic perversion, now only adapted to meet the need of a boarding-house, for the want of something better.

To-day, however, a general reversal of the old order of things is being brought about. We are passing through the transitory stage and emerging from a lower to a higher plane. Our social ideas are changing, and the trend of the times, the increasing wealth of the country, and the culture of the people demand something better. This condition has served to develop among us architects in whose efforts we are beginning to realize the gradual crystallization of a residential architecture more particularly adapted to meet the requirements of our social and climatic conditions.

Not that this is to be construed as meaning that all our recent domestic work is without fault. Quite the contrary. The ratio of good and bad buildings being erected is about 1 to 20. Much of the latter, however, is the work of speculative builders—the bane of the times—who build *en bloc* from one or two plans, and foist upon the unsuspecting and less cultured, a dwelling structure, inferior in design, plan and construction, and generally far beneath the equivalent of the buyer's investment. With most of these builders, architectural principles are absolutely ignored, and as a result their structures, to say the least, are totally devoid of the elements of fitness and beauty which go hand in hand to make a home what it really should be. Fortunately two forces are beginning to operate against activity in this direction, one is, the enactment of more rigid building by-laws; the other, and more hopeful one, the increasing number of people who are seeking something better, and who are encouraging the architects to realize their ideals.

What the architects are doing—at least those who can rightfully lay claim to their title—and wherein their success lies, is not so much in striving to create a distinctive style, as in studying the basic principles underlying the best work in home design the world has to offer, and in modifying and applying these principles to consistently meet our immediate architectural needs. It is not in the particular style or styles which have been adopted in the homes erected in late years, as much as it is in the manner in which they have been treated, that our designers are leaving the impress of their individuality, and thus we have come to see, peculiar as it may seem, the English domestic, Georgian, Mission style, gambrel roof and other types of houses, adjusting

Living Room, Cottage of Mr. Hepton, on Lake Joseph, Muskoka. An interior, the treatment of which is characterized by rustic simplicity. The fireplace is built of native shore stone, the ceiling beams left rough from the saw and stained a soft green, while the balustrade of the stairs is formed of small round cedar poles. Messrs. Burke and Horwood, Architects.

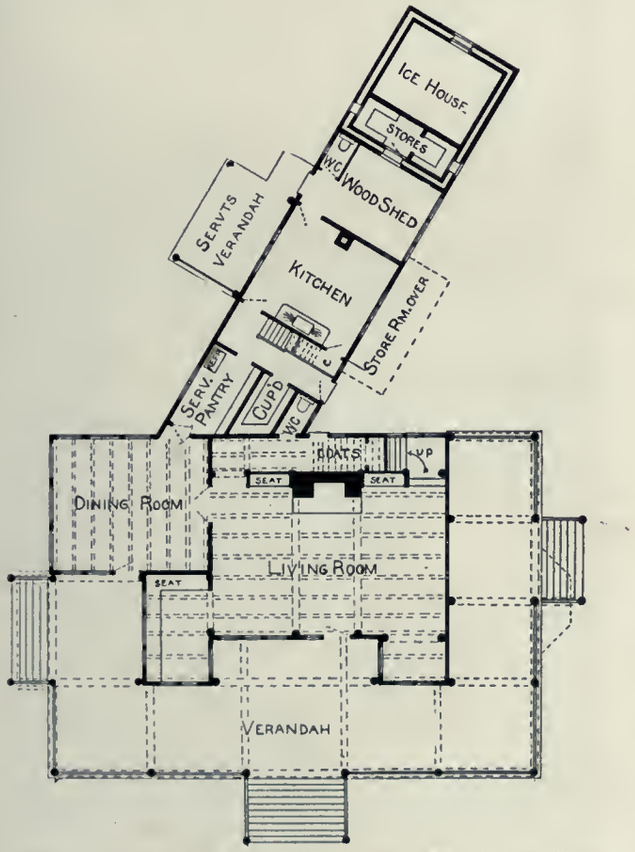
Dining Room, Cottage of Mr. Hepton, on Lake Joseph, Muskoka. This room is practically exposed on three sides, the windows sliding down into pockets, while the openings are screened with fly wire. Note the rustic design of the table and chairs, and the direct and restful lines of the woodwork. Messrs. Burke and Horwood, Architects.

Cottage of Mr. Hepton, on Lake Joseph, Muskoka. A country home in rustic design, a type of building in which there is being developed an architecture characteristically Canadian. The outside clap-board and framing, left rough from the saw and stained a brown shade, together with the barked stripped cedar posts of the verandah, serve to make the general design of this residence strikingly effective. Messrs. Burke and Horwood, Architects.

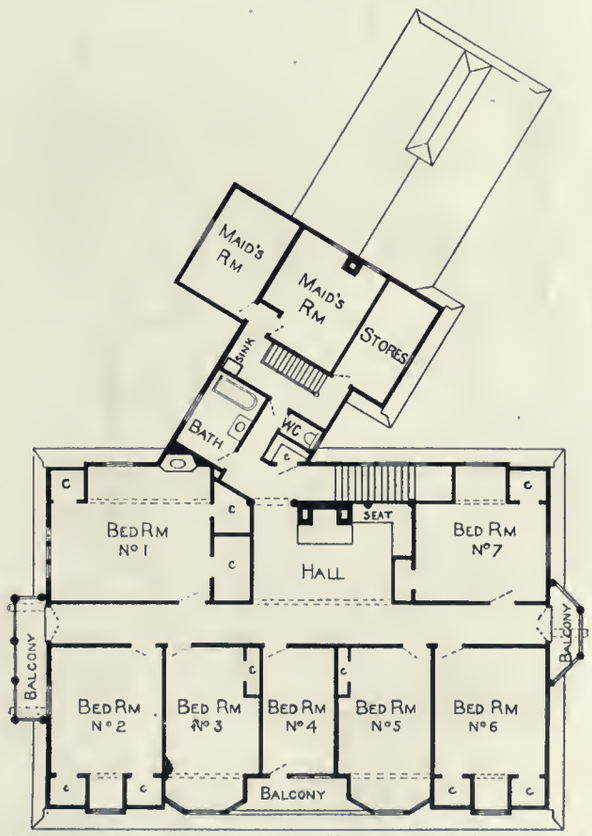
themselves to our landscape without conflict or confusion. Character and beauty in most cases, is expressed in breadth of treatment, good proportions, simply detail, and the use of the right materials; and excess of ornamentation or anything which savors of architectural filigree, is studiously eschewed. Of course there are still certain

adays to encase an incandescent bulb, but these and many other similar effects have such a rare and quaint charm as to be deemed requisite to the success of the general architectural scheme.

Possibly one of the most salient and encouraging signs of the times is the consideration manifest regard-



Ground floor plan, Cottage of Mr. Hepton, Lake Joseph, Muskoka. Messrs. Burke and Horwood, Architects.



First floor plan, Cottage of Mr. Hepton, Lake Joseph, Muskoka. Messrs. Burke and Horwood, Architects.

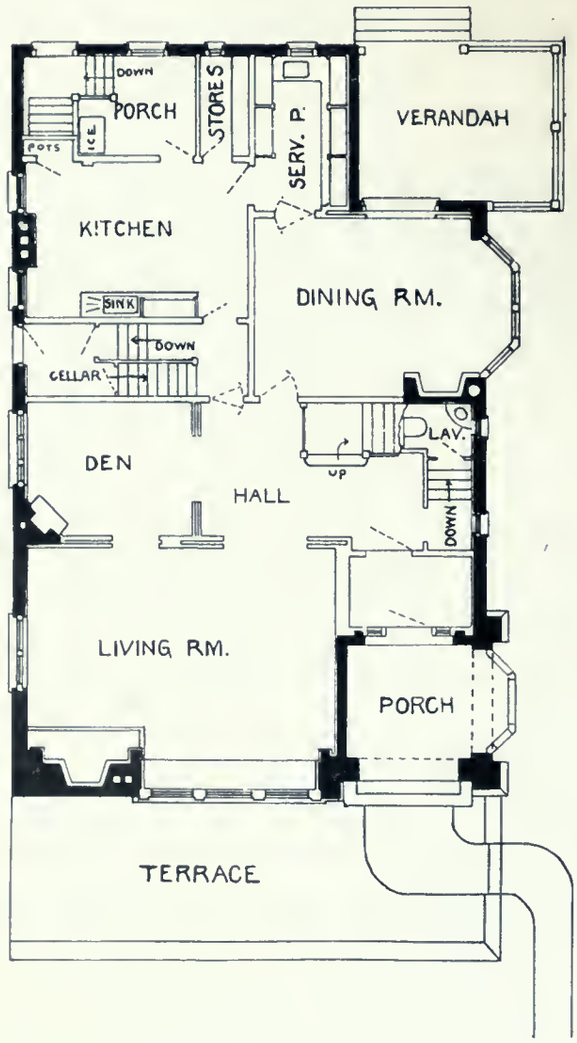
effects which modern science has practically robbed of their utilitarian value, such as the brass or iron door knocker, which the electric bell has supplanted, and the wrought iron entrance lantern which serves simply now-

ing the natural features of a site, and the thought given to the development of the landscape, so as to make a building an integral part of its surroundings. Many of the larger estates and the country houses show plainly

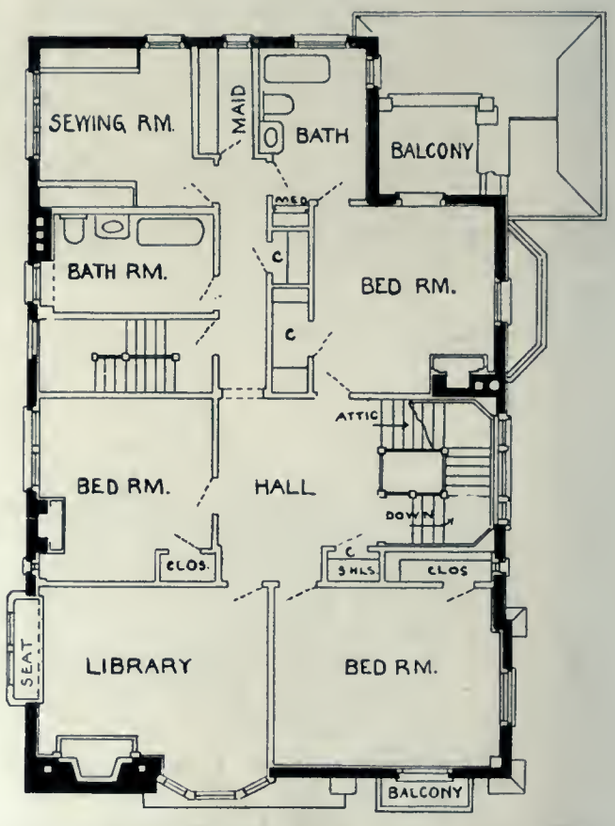
Residence of Edward Fisher, Crescent Road, Toronto. Messrs. Burke and Horwood, Architects.

the close attention the architect is paying to the question of aspect, foliage and natural advantages; while in urban districts and suburbs where the ground space is more limited, and the houses placed closer together, his handwork is to be seen in the hedge-row and other landscape effects which are worked out as a part of the general scheme, and which tends to make the whole distinctive and attractive. Another thing which is greatly tending in this direction is the agitation now taking place in Toronto and several other places, regarding the adoption of some general plan for the beautification of their respective municipalities. Whether these proposals materialize or not, the fact that they are being advocated and discussed is bound to exercise a broad and wholesome influence, not only in educating the local public to appreciate and develope the possibilities of their immediate environments, but also, and perhaps more particularly, in defining certain principles which can be modified and advantageously employed in the embryonic towns and cities of our new districts as a basis for a general scheme regarding their future development.

Unlike England and some of the older countries where practically universal building-laws militate against the use of wood as the basic material in the construction of a building, in certain sections of Canada, such as British Columbia, owing to the large timber supply and availability of lumber, frame houses are much in evidence. However, in most parts of the country, owing to our rapid growth and increasing fire hazards, the authorities are wisely demanding a more substantial type of construction. Throughout Ontario, brick is the material now chiefly employed; in Quebec and the east brick and stone; while in the more middle west and western provinces we find a more miscellaneous array of structures including a sprinkling of good residential work in concrete construction, both in blocks and in monolithic form. But whether working in brick, stone, cement stucco, or other materials we are nevertheless making architectural progress as is to be seen in much splendid recent work, in which simplicity and directness are the dominant features. Through the efforts of our best designer we are gradually being educated to the fact that success in domestic work is not the outcome of lavish expenditures



Ground floor plan, Residence of Edward Fisher, Toronto. Messrs. Burke and Horwood, Architects.



First floor plan, Residence of Edward Fisher, Toronto. Messrs. Burke and Horwood, Architects.

or elaborateness of ornamentation, but more the result of the application of certain fundamental principles. "Unless,"

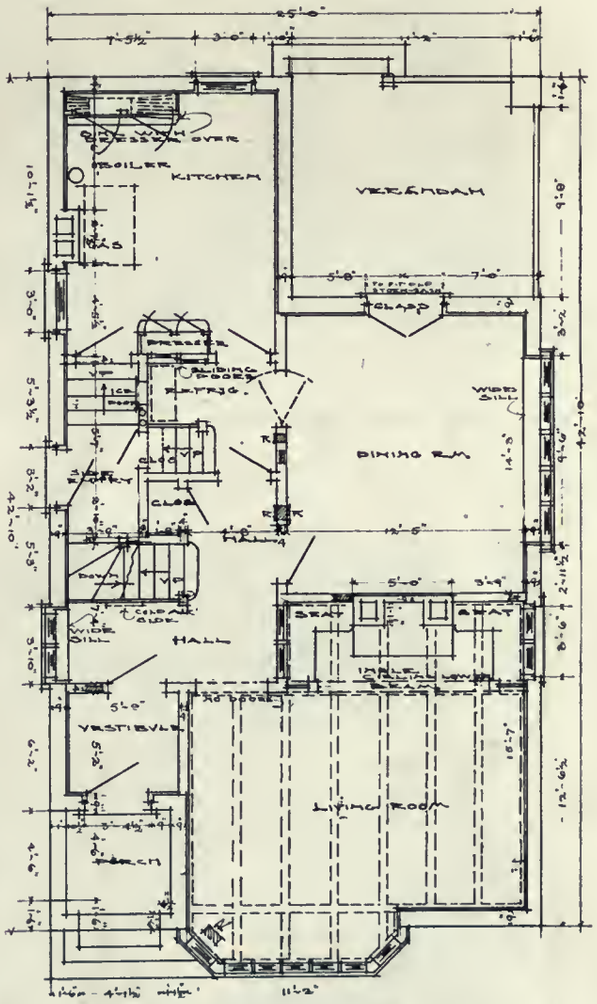
Home of W. S. Niles, Yonge Street, Toronto. The commendable treatment of this exterior suggests the possibilities of the gambrel roof design in smaller residential work. Messrs. Chadwick and Beckett, Architects.

as an English writer of authority recently expressed it, "beauty be in the very plan and structure of the house, it cannot be added afterwards." And the truth of his

Residence of C. B. Niles, Rosedale Road, Toronto. An adaptation in modern English, expressed in brick and stone, with plain surfaces, direct lines and simple detail. Messrs. Chadwick and Beckett, Architects.

statement is amply borne out in many of our more modest homes of later day work which derive their pleasing expression purely from the beauty of their lines and plans. Nowadays, far more consideration is given to the allocation of the various rooms, so as to make the interior more like what the name of "home" implies. Instead of the narrow hall and box-like rooms, once so general, everything is more *en suite*, more livable, with living and service department in proper relation to each other, and situated according to aspect and exposure. The beamed ceiling with its suggestion of strength and its quaint and home-like charm—and performing in many cases a structural service—is springing into universal popularity; the fireplace is no longer a pretense but something which serves a utilitarian purpose, and radiate warmth and cheer to those who sit around it on a winter's night, while peace, repose and domestic comfort finds expression in goods proportions, good lines and simple decoration.

It would indeed be an oversight if we failed to turn, at least briefly, to a consideration of our country houses. While country life, as it is understood in contradistinc-



Ground floor plan, Home of W. S. Niles, Yonge Street, Toronto. Messrs. Chadwick and Beckett, Architects.

tion to husbandry, is still young in Canada, it is nevertheless becoming decidedly popular with those whose means permit them to enjoy the delights it has to offer. Within the past few years many new colonies comprising some magnificent estates, have been developed, and it is in the character of the homes on these estates that we are recognizing the growth of an architecture that is in the main characteristically Canadian. Most of these houses are built chiefly of materials found in their immediate vicinity and express in their low, broad lines, a rustic naivety that makes them a very part of their natural surroundings. Modern science has done much for this class of building in the way of private water supply, lighting and sewerage disposal plants, thus giving them

Living Room, Home of W. S. Niles, Yonge Street, Toronto. The beamed ceiling and delicately stencilled border which extends around the room, at the upper extreme of the walls, renders the character of this interior refined and homelike. The fireplace with its built-in seats, is a most pleasing feature, while opposite it, at the front of the house, is a series of small leaded glass windows, placed high, which greatly tend to enhance the general scheme. Messrs. Chadwick and Beckett, Architects.

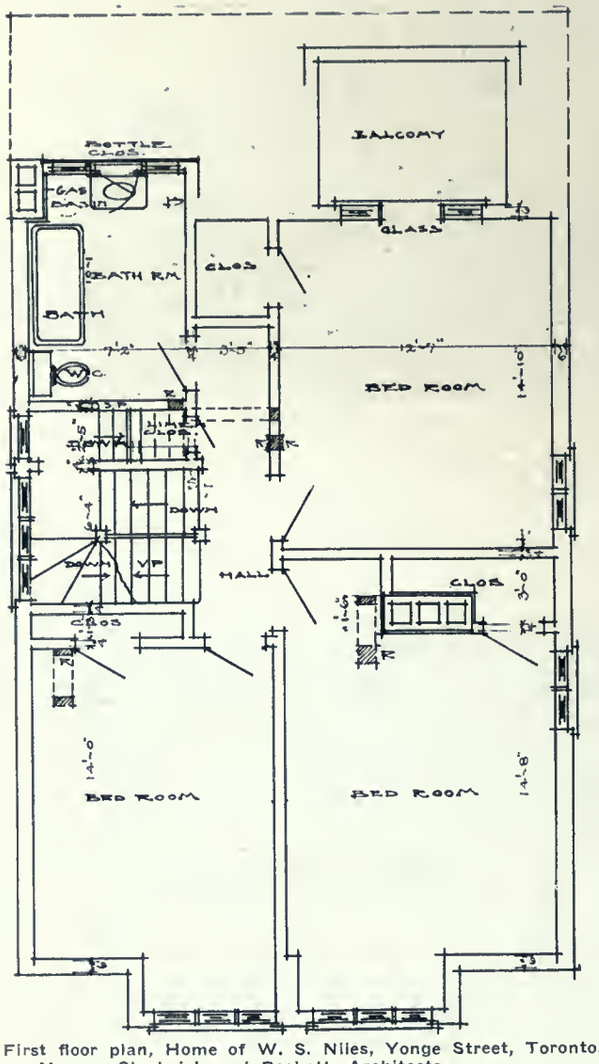
Dining Room, Home of W. S. Niles, Yonge Street, Toronto, as seen from the spacious verandah at the rear. Here the decorative effect is attained from the contrasting tones of the walls and ceiling, the pannelling of the doors and the high window arrangement along the side. Messrs. Chadwick and Beckett, Architects.

Living Room, Residence of C. B. Niles, Rosedale Road, Toronto. An appropriately appointed interior with a large grey toned Roman brick mantel, having a hammered brass hood over the fireplace. Above this feature is a verde antique panel of legendary significance, with figures in bas relief. Messrs. Chadwick and Beckett, Architects.

Dining Room, Residence of C. B. Niles, Rosedale Road, Toronto, looking from the rear verandah towards the reception-room and the entrance hall. Note the effective panelling of the high wainscotting and the rich character of the decorated border above. Messrs. Chadwick and Beckett, Architects.

every facility for comfort and sanitation, and in many instances in the districts lying within a limited radius of our commercial centres, where the steam and electric railways afford a quick service, the country home has become a habitation which is occupied the year around.

There is, however, despite the progress that has been made as regards the design and plan of modern homes, very often a pronounced lack of discrimination shown in the selection of the furniture and interior fittings. Especially is this to be observed in a large number of town and surburban dwellings in which we to often see bad taste displayed in a promiscuous choice of furniture that completed spoils the lines and architectural treatment of an otherwise beautiful interior. With many of us it is still necessary to learn that architecture is a composite art in which properly designed furniture, hangings and decorations are essential elements, and that the

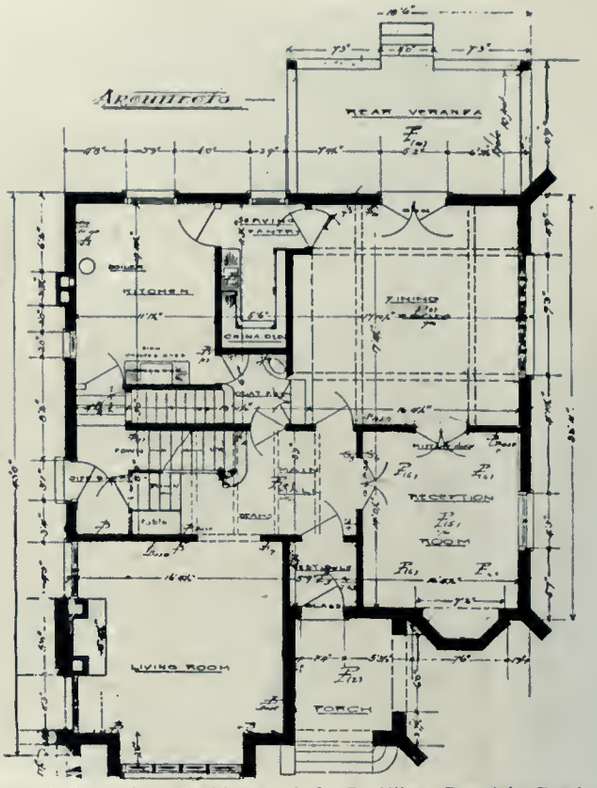


First floor plan, Home of W. S. Niles, Yonge Street, Toronto. Messrs. Chadwick and Beckett, Architects.

service or advice of the architect in their selection, is extremely important. This is a condition to be greatly deplored, as a discrepancy in the character of the furnishing, shows that we are wanting in that degree of culture which is otherwise manifest. Simple furniture and simple decorations or the absence of decorations often produce the greatest degree of harmony and give the most pleasing and consistent effect, and the greatest fault in many instances has been a lack of appreciation of this fact. Happily, however, as regards domestic work, we are gradually coming into our own, and it is quite probably within the next few years our homes, externally and internally, will be something of which we can be justly proud.

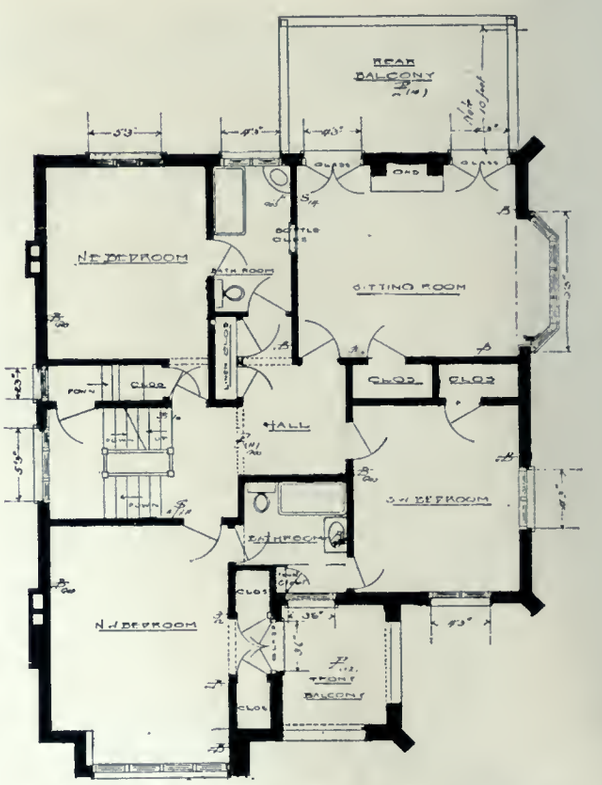
EXAMPLES OF RECENT DOMESTIC WORK.

In the accompanying illustration, of which we herewith give a brief description, CONSTRUCTION presents a number of interesting dwelling structures which display



Ground floor plan, Residence of C. B. Niles, Rosedale Road, Toronto. Messrs. Chadwick and Beckett, Architects.

a wide variety in design, and which in the greatest part, represent the recent efforts of some of our best designers in domestic work. The first subject shown, that of the cottage of Mr. Hepton, on Loon Island, Lake Joseph, Muskoka, is an interesting little summer residence, de-

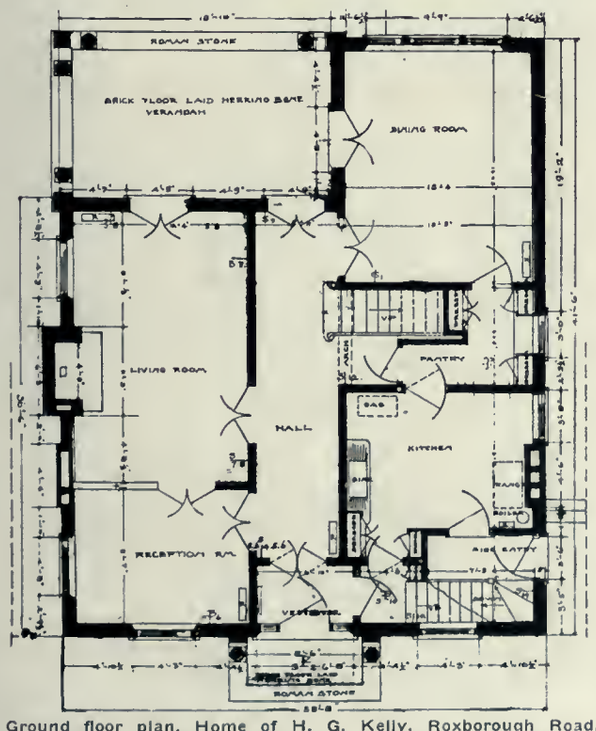


First floor plan, Residence of C. B. Niles, Rosedale Road, Toronto. Messrs. Chadwick and Beckett, Architects.

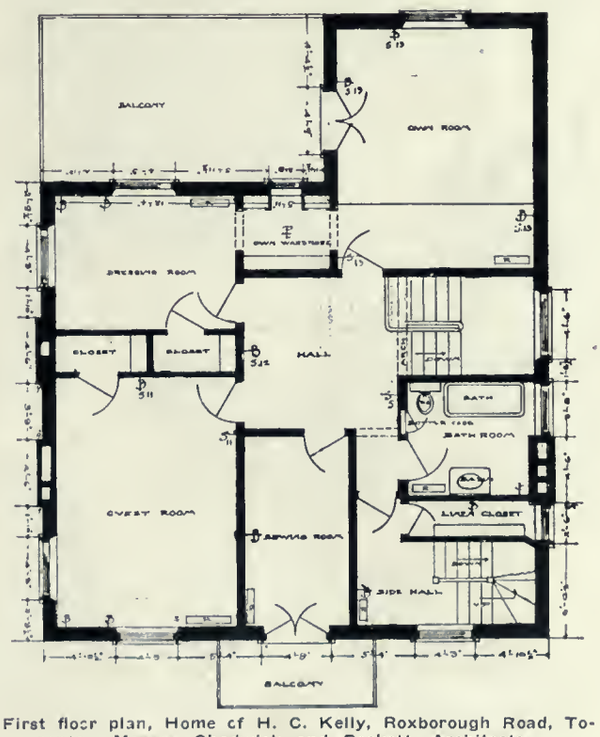
signed by Messrs Burke and Horwood, a firm which has been eminently successful in residential work and es-

pecially so in the designing of country homes. In this particular cottage they have displayed much originality both in the general architectural treatment and selection of materials. Both externally and internally the building is kept as rustic in design as possible, the lines are low and broad, and the outside clap-boarding and framing are left rough from the saw and stained a brown shade. The upper portion of the cottage is of the mansard type, shingled, and having a low central gable at the front with a dormer window on either side. It projects at the front and both ends over a spacious verandah extending on three sides, the columns of which, consisting of cedar posts stripped of their bark and having all knotty excrescences removed, form its support at the outer extremes. Around the outer edge of the verandah, and flanking the steps which lead up to it, is a

Front and rear views, Home of H. G. Kelly, Roxborough Street, Toronto. Aside from its pleasing architectural lines, there is a peculiar interest attached to the design of this house, in that the structure was especially planned and built around some very rare old Colonial furniture, so that the general exterior and interior scheme would be consistent in character. Messrs. Chadwick and Beckett, Architects.



Ground floor plan, Home of H. G. Kelly, Roxborough Road, Toronto. Messrs. Chadwick and Beckett, Architects.



First floor plan, Home of H. C. Kelly, Roxborough Road, Toronto. Messrs. Chadwick and Beckett, Architects.

railing fashioned from small cedar poles, which gives very pleasing and simple decorative effect. The lower front portion of the house is set back several feet from either end, at the centre, and this in turn has developed two recess projections or cozy-corners at the front of the living room. With the exception of the service department which occupies the wing at the back, the entire ground floor is taken up by a large living room and dining room. In the living room the beams supporting the ceiling are left rough from the saw and stained a soft green. Opposite the entrance from the verandah, is a large fireplace built of rocks taken off the shore, while the balustrade of the stairs, to its right, is formed from small round cedar poles.

The dining room is arranged so as to be practically open on three sides, the windows sliding down into pockets while the apertures are screened with fly wire. The lines of the woodwork are direct and restful,, and in keeping with the whole is the rustic design of the table and chairs. Upstairs are seven bed rooms, grouped around a central hall, the bath room, two maids'

Hallway, Home of H. G. Kelly, Roxborough Road, Toronto, showing the lower part of the staircase. The upper portion of the front entrance door, at end of view, is swung open, while the lower portion is fastened. This type of door, while characteristic of many old Colonial houses, is now being adopted to some extent, in other styles of domestic structures. Messrs. Chadwick and Beckett, Architects.

rooms and a place for stores being located in the rear wing over the service department. All the rooms have built-in wardrobes and are finished in clear basswood without paint or oil of any description.

The residence of Edward Fisher, Crescent Road, Toronto, is an example of a city residence by the same architects. The walls of this house are of dark red brick. The exterior woodwork is painted white, and the shingles of the roof are stained a dark green. Internally the first floor rooms are grouped about a central hall, the living room being at the front and the dining room and kitchen at the rear. The same style of arrangement practically obtain upstairs, where there are in addition to three bed rooms, a library, sewing room, and two bath-rooms.

The home of W. S. Niles, Yonge street, Toronto, is a small house of the gambrel-roof type, marked by a strong individuality and character in design. It is a

Living room, Home of H. G. Kelly, Roxborough Road, Toronto, looking towards the music room, and showing the large brick fireplace. Note the perfect degree of harmony which exists between the general architectural treatment and the furniture. Messrs. Chadwick and Beckett, Architects.

Chadwick and Beckett house, and a Chadwick and Beckett house is always interesting. This dwelling stands

Home of R. L. Cowan, Rowanwood Avenue, Toronto. A clinker-brick residence of attractive design, which derives its chief charm from the variegated surface of its walls, and the simply decorative effect imparted by its doors and windows. Messrs. Chadwick and Beckett, Architects.

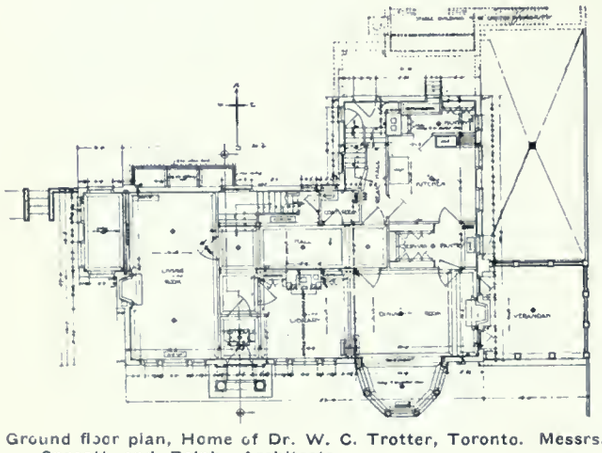
back on its lot about thirty feet, being enclosed across the front at the street line by a brick garden wall. Much

Living Room, Home of R. L. Cowan, Rowanwood Avenue, Toronto. A most commendable interior, that is select in its design and various appointments. Messrs. Chadwick and Beckett, Architects.

Dining Room, Home of R. L. Cowan, Toronto, looking towards the living room, and showing the effective wall panelling and beamed ceiling. The rear of this room opens on to a verandah. Messrs. Chadwick and Beckett, Architects.

Home of Dr. W. C. Trotter on Dunvegan Road, near Upper Canada College, Toronto. This house, which faces the south, is built on spacious grounds and from its elevated site commands a splendid view of the surrounding country, on all sides. Aside from the excellence of its general design, a pleasing feature is the covered verandah which opens off the dining room at the end. Messrs. Sproatt and Rolph, Architects.

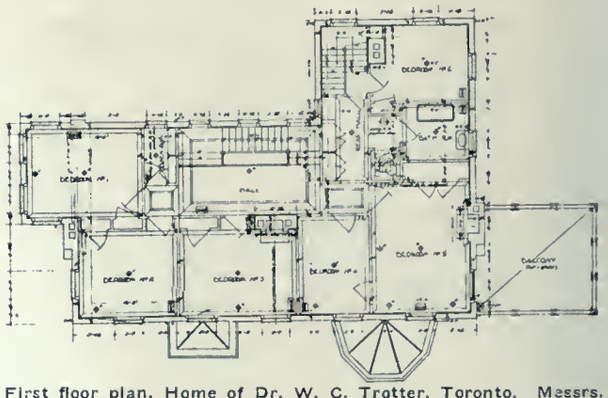
of its individuality is derived from the location of the entrance at the side and the simple arrangement of the windows. The walls of the house are of red brick, the shingles stained a soft green, and the exterior woodwork painted white. The entrance hall gives direct access to the living room and dining room, and also to the upstairs. The living room has a beamed ceiling and a brick fireplace with a built-in seat on either side; the walls are light grey in tone pannelled with wooden strips, and finished at the top with a delicately stenciled border on a white background. These colors harmonize effectively with the brown stain of the woodwork, while enhancing the general scheme are the small leaded glass windows at the front, which are placed high and



Ground floor plan, Home of Dr. W. C. Trotter, Toronto. Messrs. Sproatt and Rolph, Architects.

give the room a decided private and home-like character. The decorative effect of the dining room is obtained simply from the contrasting tones of the wall and ceiling, the pannelling of the doors and the high window arrangement along the side. This room opens onto a large verandah at the rear, and connects directly with the kitchen, which can also be reached from the entrance hall. Upstairs are three large bed rooms with built-in closet and a bath room.

Differing radically in design from the home of W. S. Niles, is the residence of C. B. Niles, Rosedale Road, Toronto, an adaptation of the modern English style by



First floor plan, Home of Dr. W. C. Trotter, Toronto. Messrs. Sproatt and Rolph, Architects.

the same architects, which affords an interesting study in plain surfaces, direct lines, and simple detail. The walls are of red brick laid up with white mortar joints; the trimmings of the entrance and windows are of limestone, and the roof is of slate. A low hedge which extends across the front of the lawn, together with the foliage of the trees, serves to give the house a most attractive setting. Off the porch on entering is the main hall, having a beamed ceiling and pannelled walls of stained oak, around which the different rooms are focused. The various openings are so arranged as to afford a pleasing vista from one room to the other. The living and reception rooms are at the front, being placed on the left and right of the hall, on entering, respectively. In the former room is a large grey-toned Roman brick mantel having a hammered brass hood over the fireplace. Above the mantel is a verde antique pannel of legendary significance, with the figures in bas relief.

The four oblong windows at the front are of good proportions, and the hangings and other appointments are in complete accordance with the general decorative scheme.

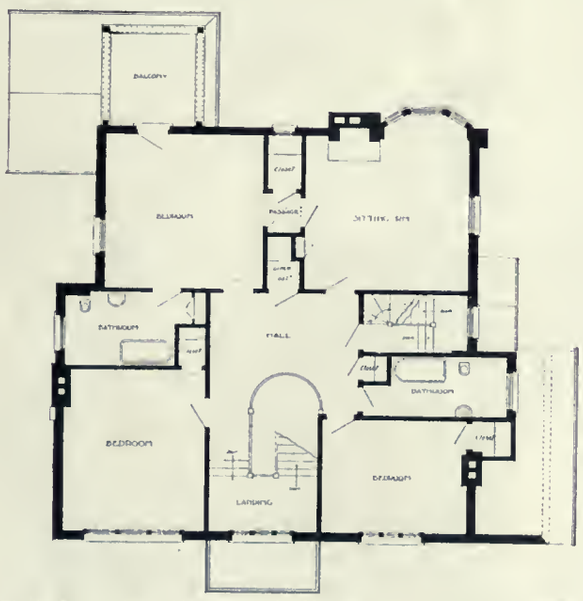
central hall and two bath rooms. On the third or attic floor are additional bed rooms, and a large front room that is suitable for a billiard hall.

"Altmover," home of J. McLenehan, Lamport Avenue, Toronto. A residence of noteworthy design, built of red brick for the first story, with cement stucco above. At the back it overlooks a deep ravine, and takes in a fine perspective of the picturesque bit of country stretching out toward the north beyond. Messrs. Wickson and Gregg, Architects.

In the dining room, the walls consists of high, richly finished, pannelled wainscotting, above which is a very effective decorated border. The ceiling is crossed by four heavy beams, and the furniture has been selected so as to be consistent with the architectural treatment. At the rear the room opens onto a large verandah, which overlooks a spacious lawn sloping slightly at its distant point, and having a display of flowers on either

In the home of H. G. Kelly, Roxborough Road, Toronto, another Chadwick and Beckett house characterized by pleasing architectural lines, there is a peculiar interest attached, in that this house was especially planned and built around some very valuable old Colonial furniture so as to produce a structure that would fully reflect the character of its interior in its outer lines.

Ground floor plans, Home of J. McLenehan, Toronto. Messrs. Wickson and Gregg, Architects.



First floor plan, Home of J. McLenehan, Toronto. Messrs. Wickson and Gregg, Architects.

side. The second floor has been most excellently planned, the rooms being arranged *en suite*. There are four bed rooms, all of which have select wall hangings, a

In developing this idea the architects have succeeded admirably. Like most colonial dwellings this little home is built of red brick which together with the white mor-

Home of Mr. Frank Wickson, of the firm of Wickson and Gregg, Architects, on Forrest Hill Road, Toronto. Graceful lines, simple detail, and the contrast of the red of the brick and the white of the mortar joints and woodwork, serve to make this adaptation in modern English design, a most successful domestic creation.

tar joints, the white paint of the exterior woodwork and the green of the shutters, form the conventional exterior color scheme. The fasteners used to hold back the shutters, are unpainted and rusted, while the door knobs throughout are either of glass or brass. The entrance shows a happy consideration in its detail. The door is designed so that it can be either opened as a unit, or the upper portion swung back independent of the lower half. This style of door is typical of many of the old Colonial homes. Another pleasing feature is the old fashioned colonial door knockers, although in view of the fact that the house is equipped with modern push button and electric bell, it serves no utilitarian purpose. The entrance hall extends through the house to a large verandah at the rear. A music room connected by a square arched opening with a large living room at its rear, is on the right, while on the left is the kitchen, situated at the front of the house, from which direct access is obtained by a service pantry to the dining-room at the rear. In the living room is a large brick fireplace, having a high mantel shelf and extending practically to the ceiling. The upstairs provides two bedrooms, dressing room, sewing room, a large wardrobe, linen closet, and bathroom. The treatment of the rooms on both floors is purely Colonial, the general color scheme being white.

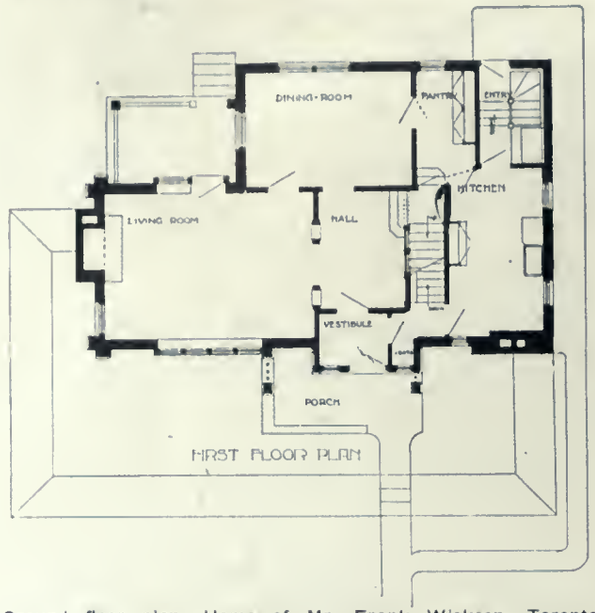
The home of R. S. Cowan, Rowanwood avenue, Toronto, was also designed by Messrs. Chadwick and Beckett. It is a clinker brick residence of attractive design, which derives an individual and pleasing expression from the equipose of its lines, the variegated tone of its walls, and the simple decorative effect imparted by its doors and windows. The steps of the entrance are of dressed stone, as is also the coping of the low brick wall flanking them on either side. Over the doorway is a round arched hood projection, while to the right and left of the entrance, are large bay windows, both of which are identical in treatment and painted white in accordance with the other woodwork of the exterior. At the centre of the roof, which has a well graduated deflection toward the front of the house, is a dormer window of octagonal shape, and at both ends of house, on a line with the ridge, is a rectangular chimney rising to an agreeable height. The interior, the plan of which is not shown, is ideal in its layout, detail, and finish. An excellent idea of the splendid character of the rooms and their select furnishings, can be gathered from the accompanying illustrations of the living room and dining room, both of

Residence of S. Lorne, Clarendon Avenue, Toronto. A rendering in modern domestic design, the plan of which is particularly interesting. Mr. Henry Simpson, Architect.

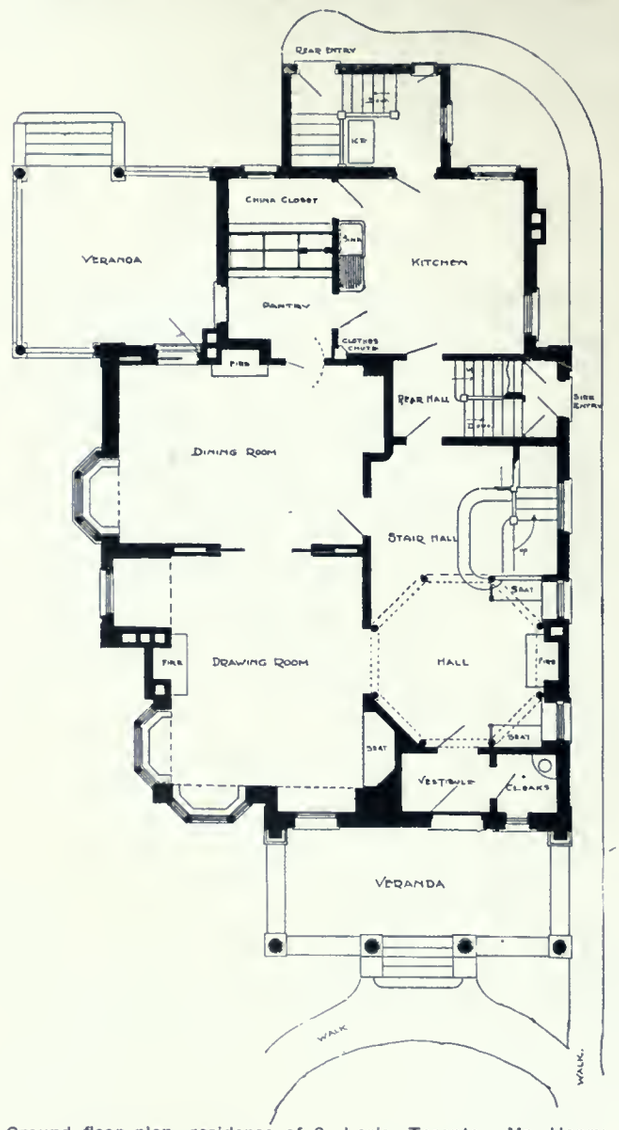
Living room, Home of Mr. Frank Wickson, Toronto, showing the detail of the panelling and unique treatment of the brick fireplace. Messrs. Wickson and Gregg, Architects.

Reception Hall, Residence of S. Lorie, Toronto, looking towards drawing room. This room, which is octagonal in shape, has a large open fireplace directly opposite the drawing room door. The general plan of the house, as seen on the following page, has a number of noteworthy features. Mr. Henry Simpson, Architect.

which have beamed ceiling. In the former is a brick fireplace with wrought iron firedog, while in the dining room



Ground floor plan, Home of Mr. Frank Wickson, Toronto. Messrs. Wickson and Gregg, Architects.



Ground floor plan, residence of S. Loric, Toronto. Mr. Henry Simpson, Architect.

is an effectively panelled, high, wood wainscotting, having a simple plate rail at the top.

The home of Dr. W. C. Trotter on Dunvegan Road, near Upper Canada College, is a modern adaptation of

First floor plan, home of Mr. Frank Wickson, Toronto. Messrs. Wickson & Gregg, Architects.

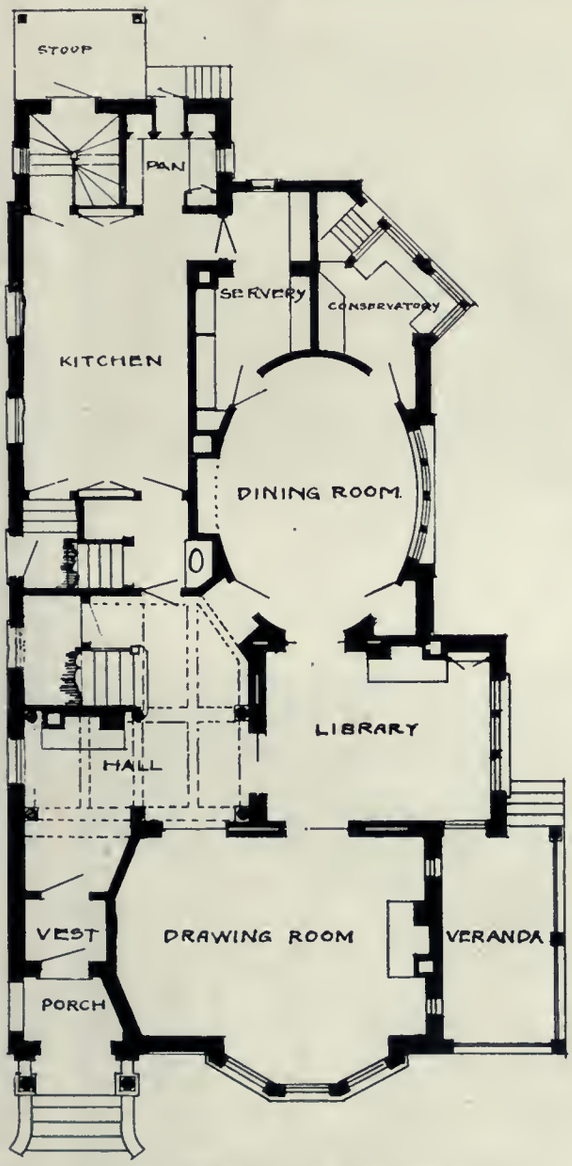
the Georgian Period, by Messrs. Sproatt and Rolph. This firm is doing much excellent work in all departments of architecture, but in no direction do they show a greater appreciation of the "eternal fitness of things" than in domestic work. As with all buildings of this style, the exterior scheme of color, is white painted woodwork and green window shutters against a background of red brick. Here, however, the house is given a unique "personality" by an octagonal bay window placed to one side, an unusual feature in this type of dwelling and one which would probably upset its equi-

First floor plan, residence of S. Loric, Toronto. Mr. Henry Simpson, Architect.

pose were it not for the counterbalancing effect produced in the location and treatment of the entrance. An-

other pretty feature is the covered verandah off the dining room at the side of the building, the upper portion of which forms a balcony at the second floor. The house is built on spacious grounds—the front facing the south—and from its elevated site commands a splendid view, on all sides of the surrounding country. The lower floor is taken up by the large living room, library, dining room, and kitchen—the latter being directly behind the dining room and connected to it by a servery. The upstairs provides for six bed rooms—grouped about a central hall—and a large bath room.

"Altmover," the home of J. McLenehan, Lamport avenue, Toronto, designed by Architects Wickson and Gregg, is a recent residential acquisition to "Rosedale"—

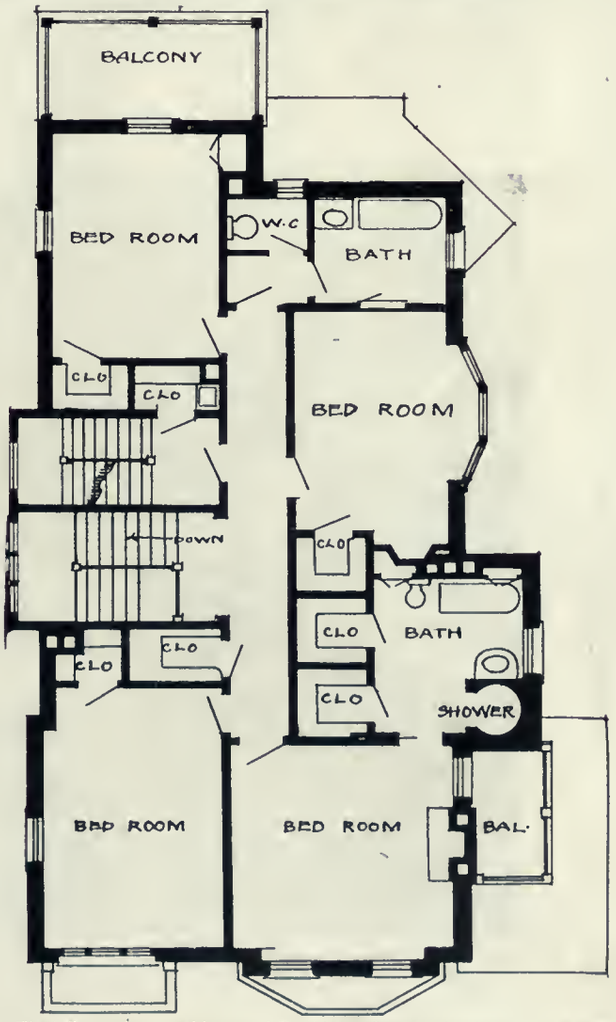


Ground floor plan, residence of Architect George Goulnlock, Walmer Road, Toronto.

as the district in which it is located is known—that has a decided domestic character, both externally and on the interior. Inside the entrances is a hall of good dimensions which leads directly to different rooms, and also gives access to the upstairs. Immediately to the left is the parlor, having an open fire-place opposite the doorway, and a bay window at the front. The library and the dining-room are in the rear of the house where they overlook the deep ravine to the north and enjoy a delightful vista of the picturesque stretch of country beyond. In view of this arrangement, the kitchen has been placed at the front of the house on the same side as the dining-room, thus keeping the service department intact.

Residence of Architect George Goulnlock, Walmer Road, Toronto.

On the second floor the hall forms the axis of the various rooms, which consist of three chambers, sitting-room, wardrobes, and two bath-rooms. The house is built of

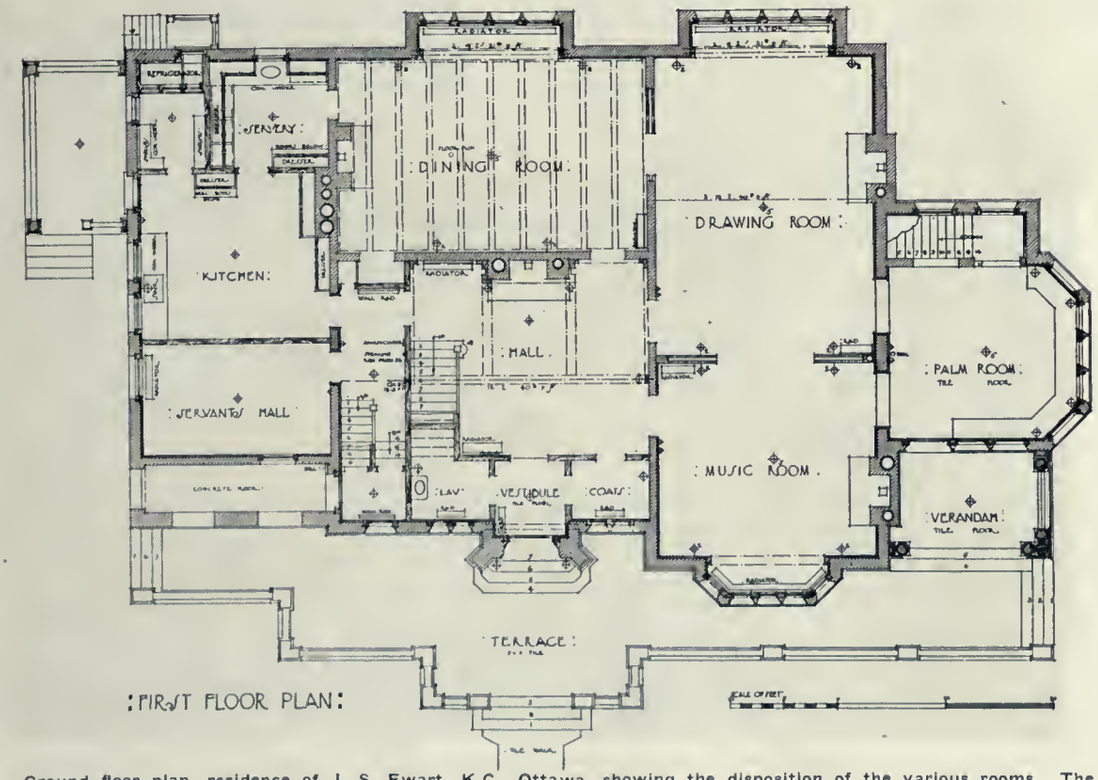


First floor plan, residence of Architect George Goulnlock, Walmer Road, Toronto.

Library, residence of Architect George Gouinlock, Toronto. Note the consistency and harmony of the general scheme. A splendid feature is the built-in bookcases on either side of the fireplace.

Dining Room, residence of Architect George Gouinlock, Toronto. A dignified and interesting treatment in oval design, with appropriate furniture and decorations. A study of the floor plan on the preceding page shows how this feature has been evolved without sacrifice in the economy of floor space.

Residence of J. S. Ewart, K.C., Wilbrod Street, Ottawa. This building is designed with a modern English feeling, and simplicity in treatment has been observed. The terrace across the front prevents the building from having the high basement effect, which often spoils an otherwise pleasing structure. Mr. C. P. Meredith, Architect.



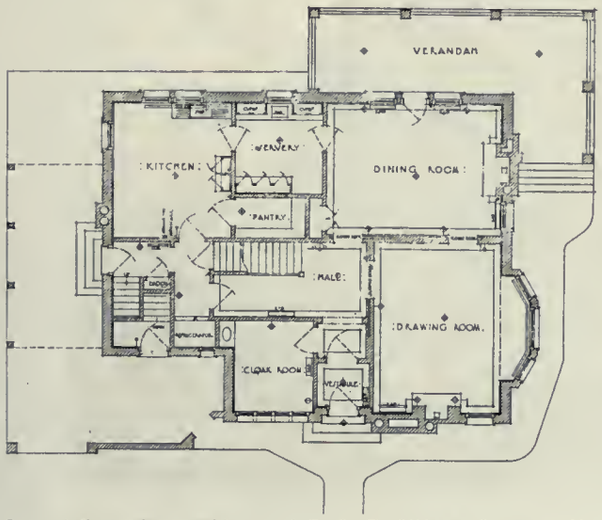
Ground floor plan, residence of J. S. Ewart, K.C., Ottawa, showing the disposition of the various rooms. The drawing room and openings of the other rooms are so arranged as to give a pleasing vista to and from the palm room. Mr. C. P. Meredith, Architect.

Residence of F. C. T. O'Hara, Wurtemberg Street, Ottawa. This house, which is situated on the high bank of the Rideau River, is built of common red brick, with white joints, limestone trimmings and half timbered gables. The large main chimney in the position it is placed suggests solitude and comfort, as well as adding interest to the whole scheme. Mr. C. P. Meredith, Architect.

Home of the Misses McLeod Clark, a small suburban residence situated in Rockcliffe Park, Ottawa. The natural surroundings and rustic fence in the foreground contributes materially to accentuate the pleasing lines of this delightful little abode. Mr. C. P. Meredith, Architect.

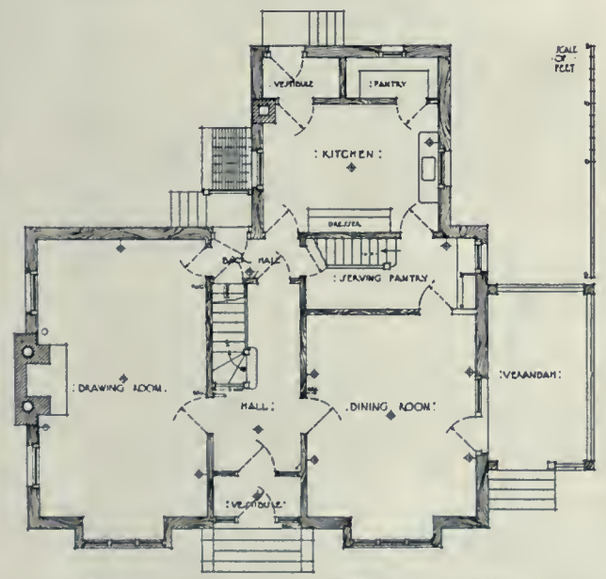
red brick, the upper portion having a rough-cast plastered surface. The roof—having a dormer with six small windows—takes a low pitch towards the front, and on the right from a small gable projection it sweeps gracefully down over the brick enclosed verandah which opens off the kitchen. On the left, the second story extends slightly over the bay windows, being supported by a pleasingly fashioned twin corbel at the end. All the exterior woodwork is painted white, and the treatment of the window and the entrance is direct and effective.

In the rapidly growing residential district west of Avenue road, Toronto, Mr. Wickson has built for himself a charming little home of modern English design.



Ground floor plan, residence of F. C. T. O'Hara, Ottawa. Mr. C. P. Meredith, Architect.

The walls of red brick, laid up with white mortar joints and excellently built, are direct in their lines, buttressed at the ends and exquisitely surfaced. The slate roof having corbelled eaves, pitches toward the front and back of the house, while at the right, rising slightly higher than the main ridge and falling away rapidly to the outer edge, is a transverse gable arrangement, having three small windows in its ends. At either end of the house is a substantially built chimney, effectively treated, and greatly adding to general design. Over the entrance is a straight projecting roof, while the verandah is sur-



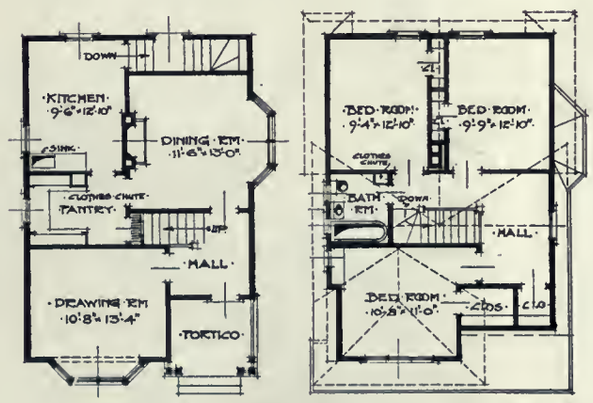
Ground floor plan, home of the Misses McLeod Clark, Ottawa. Mr. C. P. Meredith, Architect.

rounded by a low brick wall. All the exterior woodwork is painted white, and the lines of the windows and entrance are exceptionally good. To the left of the hallway on entering is a large living-room with beamed ceiling, and a brick fireplace characterized by much individuality of treatment. This room practically occupies the entire left portion of the floor, and has a large verandah at the rear, which also adjoins the dining-room

Frame cottage, Welland Avenue, St. Catharines, Ont., a small house with exceptionally good lines. Mr. C. E. Nicholson, Architect.

situated directly at the back. The portion at the right of the hallway is taken up by the service department, the kitchen being placed at the front, and having a serving pantry at the back opening into the dining-room. The second floor has a large hallway, three bed-rooms with built-in wardrobes, a linen closet, and bath-room.

The residence of S. Lorie, Clarendon avenue, Toronto, designed by Architect Henry Simpson, now senior member of the firm of Simpson and Young, is a domestic structure which shows a strong modern feeling in its exterior. The walls are of red brick, the woodwork white and the roof of slate. The roof, arranged transversely with pleasingly detailed chimneys at either end, has a gable projection coming to the front at the right, and a similar arrangement extending slightly out and sheltering with its broad eaves the bay windows on the side at the



Ground and first floor plans, frame cottage, Welland St., St. Catharines, Ont. Mr. A. E. Nicholson, Architect.

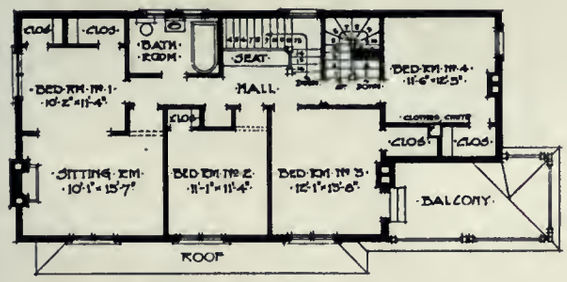
rear. Situated beneath the gable at the front is a deep porch of brick, the columns of which support a balcony of equal dimensions at the second floor, while at the left of the verandah are two bay windows placed on either side of the corner of the drawing-room. Inside the vestibule is a spacious reception hall, with a large open staircase and ideal appointments, giving direct access to all parts of the house. All the woodwork is oak with a dull dark wax finish. The ceiling beams form an octagon which is supported by eight columns, having Corinthian caps, and placed at the points of angle. Opposite the drawing-room door is an open hearth with a built-in seat on either side, above which are leaded opaque glass win-

Rectory, St. Thomas' Church, St. Catharines, Ont. The directness of the general architectural lines, the simple treatment of the windows, together with the red brick walls, with their white joints and rustic base course, combine to give this house a strong homelike individuality. Mr. A. E. Nicholson, Architect.

Semi-detached residence, cor. Ontario and Lake Streets, St. Catharines, Ont. While the exterior and interior of each dwelling apartment varies in elevation and plan, the whole unites into a most successful architectural composition in a two-family dwelling. Mr. A. E. Nicholson, Architect.

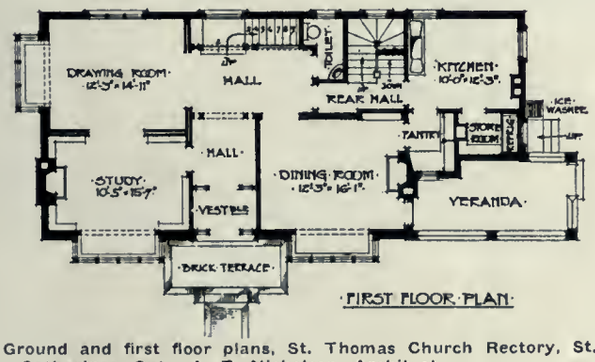
dows of a slightly mottled tint, through which the outside light filters, giving the interior a subdued and restful effect. The other rooms are quite in keeping with the character of the reception-hall. The drawing and the dining-room are connected by a square-arched opening with sliding door. Both rooms have fireplaces, and the latter adjoins the kitchen, and also opens onto a large rear verandah. The second floor provides four bed-rooms with built-in closets, two bathrooms, and a good sized hall.

Situated on Walmer road, Toronto, in a district of many fine dwellings, is a residence of the larger type, the home of Architect George Gouinlock. President of the Ontario Association of Architects, which is not only interesting because of the dignity of its exterior lines, but more particularly so owing to the general arrangement of the various rooms and the select character of its interior appointments. The house itself is practically three storey's high, with dark red brick walls, limestone trimmings, slate roof, and a half-timbered effect beyond a point of the brick work on the sides. At the front, projecting from the living-room, is a large bay window with a rough-faced stone base, to the left of which is the entrance porch with a semi-circular hood supported by two columns flanking the steps. Beyond the line of the eaves, the brick work forms a sort of pointed parapet, with the line of angle broken on either side by two steps; this effect also being carried out on a similar scale, at the roof line over the entrance. To the right of the bay window, at the side of the house, is a large verandah, the upper portion forming a balcony at the second floor.



SECOND FLOOR PLAN

ST. THOMAS' CHURCH RECTORY
A. E. NICHOLSON ARCHITECT
ST. CATHARINES ONTARIO

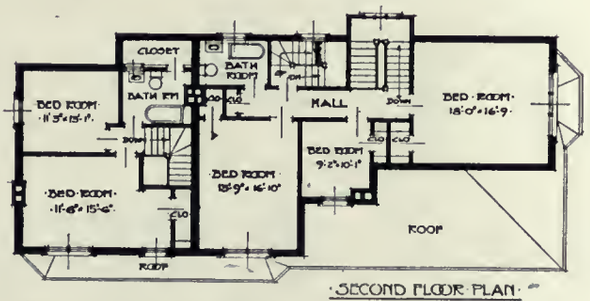


FIRST FLOOR PLAN

Ground and first floor plans, St. Thomas Church Rectory, St. Catharines, Ont. A. E. Nicholson, Architect.

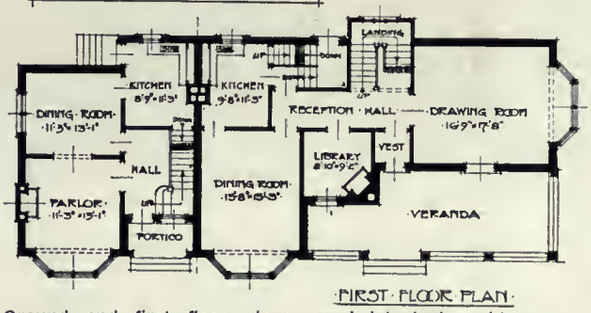
Inside the entrance vestibule is the hall with beamed ceiling and panelled walls of dark finished oak. To the front of the hall is the drawing-room, while immediately at the side are the library and dining-room. The library has a Roman brick fireplace, with a tapestry hung above the mantel, and exquisitely designed book-cases on either side. The walls and ceiling tones are in harmony, and the hanging and furniture are consistent with the general scheme. A splendid feature is the dining-room which is oval in shape, the ceiling having an effectively panelled-covered border conforming with the contour of the walls. The wainscotting and doors have a mahogany finish, the carpet was made to especially fit the room, and the furniture is of appropriate design. The sideboard sets in a recess directly opposite the windows, and at the rear are two doors, one leading into the flower conservatory and the other to the kitchen.

The residence of J. S. Ewart, K.C., Wilbrod street, Ottawa, was designed by Mr. C. P. Meredith, who is doing some most excellent work along architectural lines in and about the Capital. The design of this house shows a strong modern English domestic feeling, in which simplicity of treatment has been carefully observed. Across the front is a terrace, which prevents the building from having the high basement effect that so often spoils an otherwise pleasing structure. This terrace, as well as the large verandah at the side and the palm-room, are tiled



SECOND FLOOR PLAN

SEMI-DETACHED RESIDENCE
A. E. NICHOLSON OAA ARCHT.
ST. CATHARINES ONTARIO



FIRST FLOOR PLAN

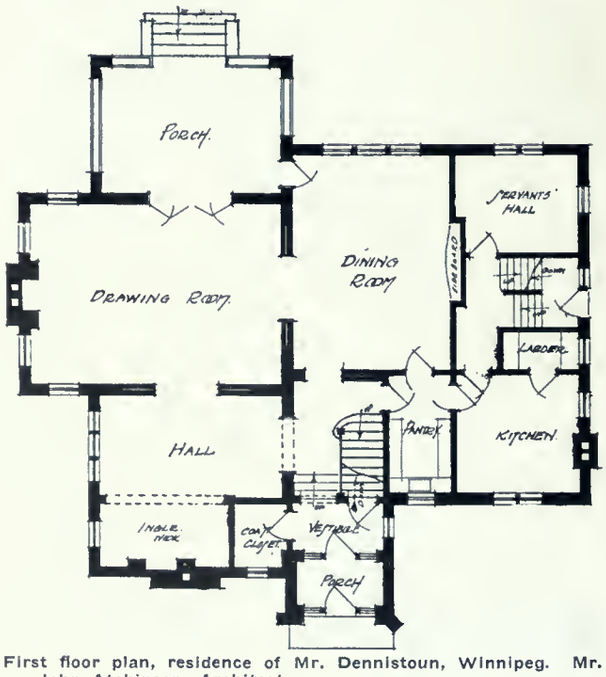
Ground and first floor plans, semi-detached residence, cor. Ontario and Lake Streets, St. Catharines, Ont. A. E. Nicholson, Architect.

with large red tiles. The exterior walls are of rough La Prairie shade brick, laid up with large joints of white mortar, and all the trimming, mullions and transoms, are executed in Indiana lime-stone. The main entrance hall is panelled and beamed in oak, the dining-room finished similarly in mahogany, and the opening from the rooms and halls have been arranged so as to give a pleasing vista to and from the palm-room. A stairs leading from the palm-room to the ballroom, which opens into a billiard-room, and from which access can be had to the side stairs, makes the basement suitable for entertaining. The service entrance, which is from the side, leads into the back hall, and back staircase by which the servants can pass through from the servants' quarters to their rooms in the attic, without passing through the portion of the house occupied by the family.

Another example of Mr. Meredith's work is the residence of F. C. T. O'Hara, Wurtemburg street, Ottawa. This home is situated on a delightful site overlooking the Rideau River, and the plan is so arranged as to take advantage of this natural view, the kitchen and service entrance being placed on the side instead of the rear. The walls of the buildings are of common red brick with white mortar joints and lime-stone trimmings. The lines of the roof are symmetrical and pleasing in their arrangement, and the gable ends are of half-timber with cement plastered panels. At one side extending around the corner of the house and opening off the dining-room is a large verandah with brick columns supporting a balcony above, while the large main chimney in the position it is placed suggests solitude and comfort, and greatly adds interest

Residence of Mr. Dennistoun, Roslyn Road, Winnipeg. A recent example of the English half-timbered house, built according to modern methods of construction. Mr. John Atchinson, Architect.

to the general scheme. All basement windows have been omitted from the front and placed at the sides and rear only, advantage having been taken of the natural grade. The interior arrangement has been carefully considered.



First floor plan, residence of Mr. Dennistoun, Winnipeg. Mr. John Atchinson, Architect.

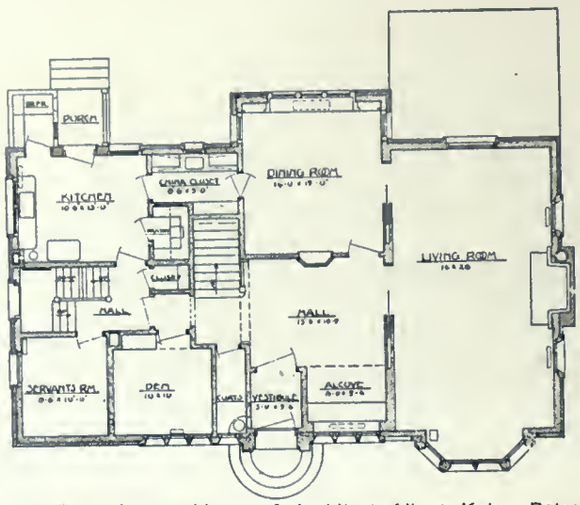
The service department is kept well together; the drawing-room and the dining-room have open fire-places, and the general appointments are home-like in character.

The home of the Misses McLeod Clark, Ottawa, was also designed by Mr. Meredith. It is situated in Rockliffe Park, and is a small suburban residence of the gambrel roof type. The lower story is finished in roughcast plaster, and the gable ends and whole roof are covered with singles. At the side is a rustic rail-fence which, together with the trees and shrubs, gives the house a very picturesque setting. The front entrance is at the centre with a window on either side and two dormers relatively situated directly above. The lines are low, direct, and simple, and the whole has a most delightful home-like charm. The hallway separates the drawing-room and dining-room, and provides a staircase leading to the second floor. In the drawing-room is a large fireplace, while at the side of the house off the dining-room is a good-sized covered verandah. The kitchen is located in a wing at the back, and connects directly to the dining-room through a serving pantry.

It is not so much the cost, size or richness of materials that make a home a success. Sometimes we find a choice bit of domestic architecture of modest dimensions and appropriate materials and color scheme which has an irresistible home-like aspect expressed purely in the beauty of its simple lines. Such a structure is the frame cottage on Welland avenue, St. Catharines, Ont., designed by Architect A. E. Nicholson. Mr. Nicholson is a product of the Ontario Association of Architect's system of training, and he is most enthusiastic and profuse in his praise of the organization and thoroughness of the Association's classes in mathematics. This little home, which is but one of a number of attractive residential structures which Mr. Nicholson has designed, stands on a lot 40 by 100 feet. The foundation is of stone, the frame siding of the lower walls painted white, and the shingles which cover the upper walls, roof and gable are stained a dark brown.

Front and side views, residence of Architect Albert Kahn, cor. Rowena and John's Streets, Detroit (Mich.). A thoroughly fireproof building that is not only commendable in design, but exceedingly interesting from a constructive standpoint. It is built in skeleton form, the structural frame being reinforced concrete, and the floors and walls a combination of reinforced concrete and hollow tile.

The roof, having and effective dormer with three windows, pitches gracefully to the front, its broad eaves giving a pleasant sense of protection to the bay window and portico of the entrance on its right. At the side, projecting from the dining-room, is another bay arrangement; while extending from the back of the house, and screening the rear garden, is a latticed fence with color tones corresponding to those of the house. The hall is entered from the portico. Directly in front is the dining-room, which is finished in wood panelling, stained and waxed, with sand finished coved ceiling. The drawing-room is finished in white enamel with tinted walls. A pantry leads off the dining-room to the kitchen, and a stair leads from the kitchen to the grade entrance and basement where there is a laundry, larder and furnace room. On the second floor are three bedrooms with closets, a bathroom and

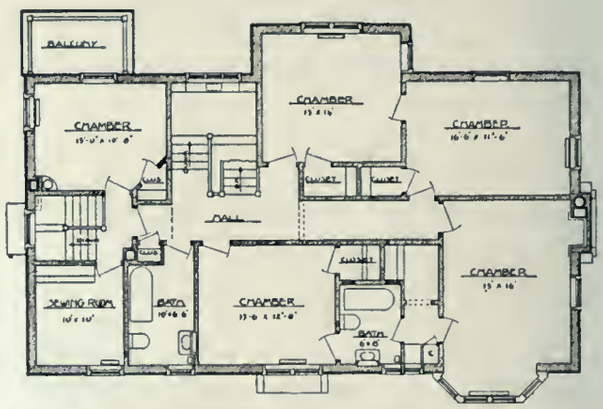


First floor plan, residence of Architect Albert Kahn, Detroit, Mich.

linen closet. A clothes chute and medicine cabinet are among the conveniences provided. The walls are tinted and the wood work finished in white. The total cost of this house was $2,500.

Of equally interesting design, though larger and of a different type of construction, is the rectory of St. Thomas' church, St. Catharines, by the same architect. Externally the house has a leaning towards the Georgian. It faces Church and Ontario streets, and has a south-west exposure. The walls are of common red brick with white mortar joints, the windows are painted white with a brown sash, and the shutters and shingles of the roof are green in tone. The base course of the walls is local ashlar grey-stone breaking the line of the brick work and producing rather a rustic and novel effect. Flanking the entrance, which has a brick terrace and a brick walk leading up to it, are the two square bays of the study and the dining-room, while at end, to the right and opening off the dining-room, is a large combination verandah and balcony. The study, which is finished in oak and having a fireplace and built-in bookcases on all sides, opens off the entrance hall at the left. It connects by a square arch doorway with the drawing-room, finished in white enamel, which also opens into the main hall at the rear. This arrangement secures privacy for the main hall and living rooms. The main hall (which has a convenient toilet room opening off it) and the staircase are finished in oak, as is also the dining-room, which has a serving pantry connecting it with the kitchen placed at the rear of the verandah. The kitchen has all necessary conveniences, and off of it is the store room with the refrigerator, which is supplied with ice from the outside. A service stair leads up to second floor and also down to grade entrance and basement, where there is a large laundry, larder and boiler room. On the second floor are four bedrooms with closets, a bathroom and linen closet. A clothes chute to the basement is provided in one of the bedrooms. On the third floor are two store rooms and a maid's room. The interior walls throughout are tinted with muresco, and the floors are of oak. The building is heated with hot water and provided with combination electric light and gas fixtures. The total cost of house was $5,200.

As a two-family dwelling, the semi-detached residence at the corner of Ontario and Lake streets, St. Catharines —another of Mr. Nicholson's houses—is a most commendable structure of this type which shows much originality in both design and plan. In the average semi-detached residence there is invariably a striking similarity between both portions and a monotony of treatment that leaves it utterly lacking in individuality. Here, however, the size, elevation, and plan of both dwellings vary, and yet combine to produce a most successful architectural composition. This building is situated on a corner lot and faces the public park. It contains a five and a seven-room residence. The exterior scheme is local red brick, green stained shingle roof, white painted woodwork, and dark green sash. The larger house has a verandah overlooking the park. The drawing-room opens to the right off the hall, and has a bay window looking on to Ontario street. To the left of the vestibule is the library with a fireplace, and alongside is the dining-room with bay window facing the park. A service stair leads to the second floor, also to the grade entrance, where there is large furnace room and larder. On the second floor are three bedrooms with closets, bathroom and linen closet. The five-roomed house is entered from a portico. Off the hall are the drawing-room and dining-room, and adjoining the kitchen at the rear, which has a back entrance and stair leading to the



Second floor plan, residence of Architect Albert Kahn, Detroit, Mich.

cellar. On the second floor are two bedrooms and a bathroom, with closets. White woodwork and tinted walls form the decorative scheme in the two houses, both of which are heated with hot air and lighted with electricity The cost of both houses complete was $4,500.

The rapidly increasing appreciation of the economic features of fireproof construction is to-day by no means confined to builders of office buildings, banks, schools and factories, but home builders, especially in the United States, are commencing to recognize the advisability of the adoption of non-combustible and fireproof materials in their dwellings. Canadian architects have not up to this time shown a very strong inclination toward the adoption of fireproof construction in their residences, while in the United States we find this type of construction used in houses in almost every city. With the rapidly increasing popularity of fireproofing systems it is a foregone conclusion that the residence will not escape. One of the most notable of recent examples of fireproof construction as applied to residences is that of Mr. Albert Kahn at Detroit, Mich., which we herewith illustrate. This was one of the first fireproof residences erected in Detroit, and its construction is especially interesting in that it includes reinforced concrete, hollow tile, paving brick and bereah

stone. The design is good, the paving brick and shingled gables forming a pleasing contrast with the cement finish of the upper story and the stone trimmings of the windows. The foundation walls are of concrete lined with hollow terra cotta tile. The building is built in skeleton form, the structural frame being reinforced concrete. The floors are a combination of reinforced concrete and hollow tile, Kahn system of reinforced concrete having been used throughout. The ground floor walls between the structural members, consist of hollow tile faced with four inches of paving brick, window trim being bereah stone. In the upper floor, the space between the structural frame consists of hollow tile plastered with cement plaster. On account of the construction, the building has proven itself exceptionally warm and free from moisture. The building is in the zone of one of the many public heating plants in the city of Detroit, and consequently is heated by steam supplied by this public plant, the temperature being regulated by means of electro thermostats. The plan of the house may be considered rather novel. The entire west end of the house is taken up by the living room, which has north, south and west exposures. The dining-room faces the south, the hall and main entrance being to the north. The east end of the house is entirely taken up by the kitchen, side entrance and servants' rooms, the space between this portion and the main part of the house being taken up by the pantries, closets, stairs and den. The general treatment of the ground floor is an exceptionally good one. The treatment of the second floor is also quite successful, there being practically no waste space, and the amount of space taken up by the hall is very small in proportion to the size of the house. The space under the roof forms the third floor and provides for three very acceptable rooms and bath. The dividing partitions are all of hollow terra cotta. The finish and trim throughout is carefully detailed and in keeping with the general plan.

For several reasons cement stucco construction for residences has not developed to the same extent in Canada as it has in the United States. The main cause of this seems to be the fact that in Canada our fathers developed rough cast construction to a far greater extent than it was developed elsewhere on the continent. Rough cast construction has long been regarded as outside of the pale of respectable architecture, and at first glance cement stucco resembles rough cast. The differences, however, are great. Rough cast is made of lime mortar on wood strips, and cement stucco is made with cement mortar on metallic lath. The wood strips used in the older type of construction warped and swelled with changes of atmospheric condition, and in time broke the adhesion between the wood and plaster. As a result the plaster scaled off, exposing the wood work, and the house took on what might be described as a "dissected" look. This does not take place with cement stucco. The mortar used is too strong to be easily injured, and the metal lath not being influenced by atmospheric conditions, does not warp and crack the plaster.

Probably another reason for the lack of the general development of cement stucco in Canada is due to the fact that it is so extensively developed in California and other warmer portions of the States, and for this reason architects have assumed that it is not suitable for the Canadian climate. The experience with rough cast houses is, however, sufficient to answer this objection.

As indisputable proof of the fact that the cement stucco house may be successfully built to suit any climate, we illustrate herewith the residence of Mr. Dennistoun, Roslyn road, Winnipeg, designed by Mr. John Atchison, of Winnipeg. This we consider an excellent example of English half beam construction in cement stucco. The walls of the first story are constructed of red pressed brick with stone trimmings, and the stained timbers on the gray cement stucco on the upper story, complete a very excellent color scheme, and present on the whole a very commendable architectural effect.

The beams are imitated by means of rough sawed boards attached to the outside of herringbone lath before the plaster is applied. The ground floor plan has several interesting features. It will be noted that arrangement has been made for the servants' hall in the same section of the house as is located the kitchen and larder, whereby it is cut off completely from the remainder of the house. The large double doors between the hall, the drawing-room and the dining-room allow all these three rooms to be thrown into one when so desired. The large inglenook off the hall, with its three windows at one end, renders this an exceptionally well appointed reception hall.

FASHIONS IN BRICKS.

NOTHING IS MORE COMMON or prosaic than bricks which have served utilitarian ends for untold centuries, and anything like a fashion in them one would scarcely expect to find, yet such is the case. Twenty years ago, and even more recently, the finest fronts were constructed of red pressed bricks, carefully gauged to size and shaded to one even color. These were laid in running bond with the narrowest possible mortar joint. This was usually of a red color to match the bricks, the effect produced being a surface so uniform as to produce the appearance of a pointed and ruled wall.

The discovery some years ago of clays that would burn brown, old gold, buff, grey and other light colors and the rapid and satisfactory development of a great industry engaged in manufacturing bricks of this character, brought them into wide use. One color has succeeded another in popularity until now the prospective builder has a wide range of color to select from, almost every shade being at his command, even green and blue being obtained by the use of glazed or semi-glazed surfaces.

With the departure from the even red color came rapid development in the matter of the thickness, color and texture of the mortar joint, and in the style of bonding the face bricks to the backing-up wall, so that the construction of a brick facade to-day is a highly artistic proposition, capable of the best results only in the hands of a skilled architect.

Many owners and builders still adhere to the old pointed effect, but these may be said not to have a realising sense of the beauty of artistic brickwork. This is particularly true of the speculative operator, but even here a change may be noted, and this will doubtless spread until bricks of artistic color are generally employed even in this class of construction. The architects of the country have come to realize as a class, what the best of them knew long ago, that to be interesting, to say nothing of being attractive, a brick wall must have "life" and "texture," and that this can best be secured by the use of bricks that vary considerably in color. It has further come to be understood that they must be laid with a wire mortar joint and preferably with header bricks, forming a true bond into the main wall, the whole being a frank expression of true brickwork.

This change of fashion is one of the strongest proofs that bricks will continue in favor as a building material, concrete and other valuable available substitutes notwithstanding. Our buildings constantly are assuming more artistic forms and colors, and bricks are now being made that meet all the requirements of the architect. Red bricks, however, are still preferred for the stately conservative mansions, where dignity and elegance are desired.

SELECTED DESIGNS FOR COTTAGES AND BUNGALOWS. —Dwellings in Which Economy in Plan and Construction Are Combined with Artistic Beauty of Design —Built in Furniture a Feature.

IT IS THE ARCHITECT who can produce an economical, consistent, artistic design for a home for the average man with limited means, that renders to his client and the community the greatest service and who does most to promote the better appreciation of art in architecture generally in a community.

With an abundant supply of funds, the problem of producing a house of acceptable design and appointments is a simple one, for the average architect. It is when the sum, with which the architect is permitted to work, is small, that his real ability as a designer is brought to the test.

It may be argued, that the architect seldom gets an opportunity to design the cheaper or moderate priced dwelling. This we allow to be true, but this condition is greatly the fault of the architect himself: first, because he is not inclined, very often, to give the required care and study to the small job; and, secondly, because the owner, very often, finds he can get little more individuality in an architect's design, than he may get from some stock design offered him by the speculative builder.

The, apparently, increasing tendency of builders of moderate priced dwellings to call upon speculative builders as their consultants, is most unfortunate, in that it promotes the "ready made house" idea. It promotes the erection of dwellings that are designed more for money making purposes than for individuality and character in design.

Another unfortunate feature of many of our moderate priced dwellings, is that, while much care may have been given to the general design and plan, no studied arrangement has been outlined for the interior decoration and furnishing of the rooms.

Very often, we find an excellent decorative scheme ruined by badly selected furniture and vulgar designs of wall paper. The architect should go as far as possible in inducing his client to carry out a well defined decorative scheme.

Design No. 1,.—An eight-roomed cement house, suitable for a town, village or country. It is designed on simple lines, that harmonize with almost any surroundings. The walls are constructed of vitrified terra cotta blocks, directly upon which the plaster is applied, both outside and inside. The foundation is of field-stone, laid in black cement.

There is, however, happily, now an increasing popular tendency towards the development of a well studied, plain, simple and utilitarian type of moderate priced dwelling, known as the "craftsman" house.

The "craftsman" house might be called the "new world production of the English cottage"; a sort of "halfway" between the simple cottage and the rustic bungalow with its often studied effects.

This type of house is rapidly gaining favor in the United States, and is characterized by its simple, homelike features, its straight lines, built-in furniture and its lack of meaningless attempts at jig saw and lathe decoration.

The CRAFTSMAN has done much to popularize this character of house and has published a large number of creditable designs, and we reproduce herewith several designs, with plans, that should prove most interesting.

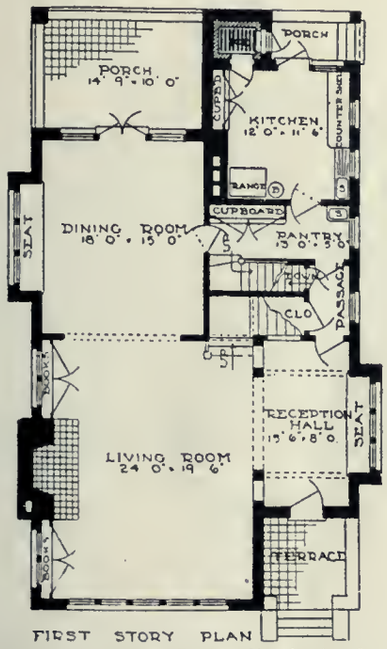
DESIGN NUMBER 1.

Design No. 1 is a large cement house suitable for town, village, or country, as it is designed on simple lines that harmonize with almost any surroundings. The walls are constructed of vitrified terra cotta blocks, the plastering being laid directly on the blocks both outside and inside. The foundation and parapet of the little terrace are of field stone laid up in black cement.

Entrance hall and staircase of Design No. 1, as seen from the living room, showing the high wainscots used throughout the reception hall, living room and dining room, and the structural effect of the division between rooms and of the staircase.

The design of the entrance is especially good. It is placed at the corner of the house where the living room projects beyond the reception hall; the corner thus left is filled by

the terrace, which is left open to the sky. Above the entrance door the wall runs up straight to the second story, where it terminates in a shallow balcony. Provision is made here for a flower box, as the severity of the wall seems to demand the relief in color and line afforded by a cluster



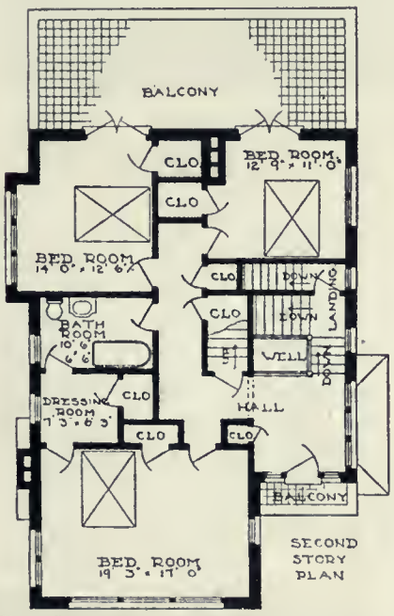
Ground floor plan, Design No. 1, showing the suggested division between the reception hall, living room and dining room, also the built-in bookcases and wide window seats.

of plants and drooping vines. At the back of the house is a similar construction, for in place of a roof above the dining porch and part of the kitchen, a large open balcony, which may be used as a sleeping porch, opens from two of the bedrooms. This balcony is partially shielded by the cement parapet, but otherwise is open to the weather.

The roof, which has a wide overhang, is covered with rough heavy slates supported on strong beams and girders which are frankly revealed. The charm of the type of slates used on the roof is that they are rough surfaced and uneven at the edges, looking more like slabs of split stone than like the small neat lozenges we have been accustomed to associating with the name of slate. They are laid rather small and thin at the ridge pole, increasing in size and weight as they go down until at the eaves they are large, broad, massive looking slabs as well suited to cement construction as tiles. The lines of the big roof are necessarily simple, as the slates are much better adapted to broad unbroken surfaces than they are to the more conventional style of roof. The little roof over the bay window in the reception hall is also covered with slates and serves to break the straight, severe line of the wall. All the windows are casements and their grouping forms one of the distinctly decorative features of the construction.

The floor plans give the best idea of the way in which the interior is arranged. As is usual with this type of house, the divisions between the reception hall, living room and dining room are only suggested, and the dining room opens with double French doors upon the porch at the back of the house, which may be left open or screened in summer and closed in winter for a dining porch or sun room. Built-in bookcases and wide, inviting window seats add to the comfort and convenience as well as to the structural interest of these rooms, and a big fireplace in the living room serves as a centre of attraction.

The kitchen arrangements are compact and convenient and not an inch of space is wasted. The same advantage appears—the arrangement of the bedrooms, bathroom and closets on



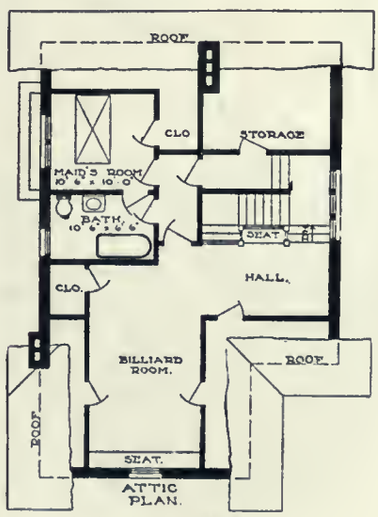
First floor plan, Design No. 1, showing balcony and excellent closet arrangements.

the second floor and the little hall that opens out upon the balcony is admirably adapted for use as an upstairs sitting room. On the third floor are the billiard room and bedroom for the maid.

High wainscots are used throughout the reception hall, living room and dining room in this house, and the structural effect of the divisions between rooms and of the staircase and landing is typical of the craftsman house. The woodwork in all these rooms is of course the same, and the choice and treatment of it gives the keynote to the whole decorative scheme. The wainscot is all made of fairly wide boards V-jointed —a device that is much less troublesome and expensive than paneling, and in a house of this character is quite as effective. The wainscoting should be made of one of the darker and stronger woods, such as oak, chestnut or cypress.

DESIGN NUMBER 2.

Design No. 2 is decidedly a farmhouse. It is one that imperatively demands the environment either of the open country or of a village where there is sufficient space to give plenty of grass and trees as its immediate surroundings. The walls are sheathed with rived cypress shingles, chemically darkened to a brown weathered tint. The foundation is of field stone sunk low into a site that has not been too carefully leveled off. Not only does this irregularity of the ground add to the attractiveness of the house, in emphasizing its relation to the soil upon which it stands, but it is utilized in a very practical way; the slope at the back being sufficient to allow space for the cellar windows, while at the front it is high enough to bring the cement floor of the porch almost upon a level with the lawn. Instead of parapets, the spaces between the pillars of this porch are occupied by long flower boxes, which serve the double purpose of screening the porch to some degree and of adding much to the color effect of the house. The broad roof extends sufficiently to shelter the porch, which thus has the appearance of being recessed under the wide-spreading eaves, and the sweep of it is broken by the dormer, with its group of casements which give light to both bedrooms and the sewing room on the second floor. The windows in the rest of the house are in groups of three with a double-hung window in the centre and a casement of the same height on either side.



Attic plan of Design No. 1.

The arrangement of this house is especially comfortable and convenient. The entrance door from the corner of the porch opens directly into a little nook from the living room, which is termed by courtesy the entrance hall. Directly opposite

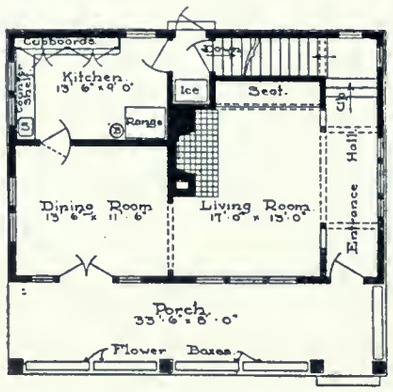
the door is the staircase, which runs up three steps to a square landing and then turns and goes out of sight behind the wainscoted wall of the living room. The whole wall on this side is taken up by the long fireside seat of which the high wainscot forms

DESIGN NUMBER 3.

Design No. 3 is a plaster house that is desirable for building either on an ordinary lot in a town or village, or in the open country, as the case may be.

Design No. 2.—Excellent design for an inexpensive farm house, which demands the environment either of the open country or of a village where there is sufficient space to give plenty of grass and trees as its immediate surroundings. The walls are sheathed with rived cypress shingles, chemically darkened to a brown weathered tint. The foundation is of field-stone.

the back. The chimneypiece, which is at right angles to it, is a massive affair of split field stone which occupies all the space between the wall and the opening that leads into the dining room. The stone of the chimney-piece extends only to the



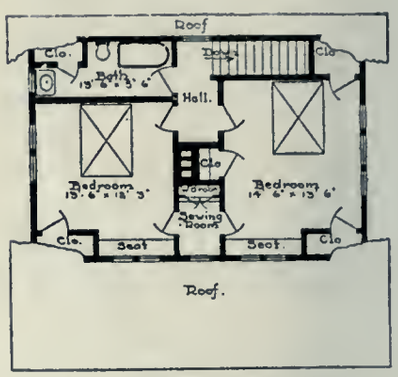
Ground floor plan of Design No. 2, showing how the large fireplace and fireplace seat occupy the larger portion of two sides of the room.

plate rail which runs around the top of the wainscoting, thus preserving an unbroken line around the room. A plain frieze of sand-finished plaster above is all that is shown of the wall, and a ceiling of the same rough plaster is crossed by heavy beams.

Back of the dining room is a small, conveniently arranged kitchen provided with counter shelf and cupboards instead of a pantry. Upstairs are two bedrooms, a tiny sewing room, bath room and stair hall.

This house has plastered or stuccoed walls and a foundation of field stone. The design, however, lends itself quite as readily to shingled or clap-boarded walls, should these be desired. And of course any coloring may be chosen that is found in harmony with the surroundings. If the plaster walls are used, some surroundings might demand a warm tone of cream or biscuit color verging on the buff, with a roof of dull red; or a dull green pigment brushed over the rough surface and then wiped off so that the effect is that of irregular lights and shades instead of smooth solid color, might be more attractive where a cool color scheme is permissible. In this case the shingles of the roof would better be oiled and left to weather to a natural brown tone.

The front porch is very simple in design and is almost on a level with the ground. If it should be decided to use shingles or clapboards instead of plaster for the walls, the square pillars of split field stone would naturally be replaced by heavy round pillars of wood, either left in the color of the other exterior woodwork or painted white. In a plastered house the beams, window frames, etc., would be best in a wood brown tone; but if the walls are shingled or clapboarded, the woodwork would naturally harmonize in tone, care be-



First floor plan of Design No. 2.

ing taken to have it dark enough to give the needed accent to the color scheme of the house.

The outside kitchen at the back is recommended only in the event of the house being built in the country, because in town it would hardly be needed. In a farm house such an outside kitchen is most convenient, as it affords an outdoor place for such work as washing and ironing, canning, preserving and other tasks which are much less wearisome if done in the open air. The position of the chimney at the back of the house makes it possible for a stove to be placed upon this porch for the

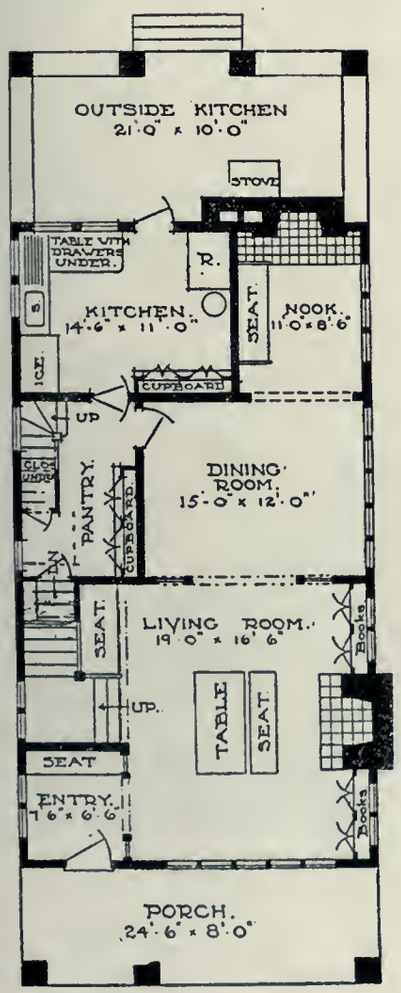
Chimney-piece and fireplace in living room of Design No. 2. The fireplace is built of split field-stone, which runs up only as high as the plate rail. The ceiling is of rough plaster, crossed by heavy beams.

uses mentioned. The porch might also be glassed in for winter use, because an outside kitchen is almost as desirable in winter as in summer. Or, if it were not needed as an outside kitchen, it could be used with advantage as a cool-room or milk room. The house is so designed that this outside kitchen may be added to it or omitted, as desired, without making any difference to the plan as a whole.

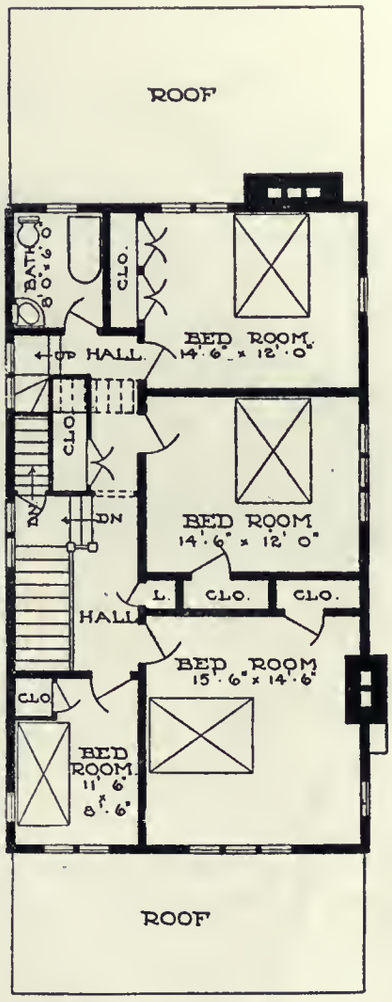
The entrance door opens into a small entry, screened by heavy portieres from the living room, so that no draught from the front door is felt inside. On the outside wall of the living room is the arrangement of fireplace and bookcases, as shown in the detail illustration. The chimney-piece is built of field stone laid up in black cement and runs clear to the ceiling, preserving its massive square form to the top. A bookcase is built in on either side and above each one of these are two small double-hung windows. The tops of the bookcases serve admirably as shelves for plants.

In the center of the room is a large table with a settle of exactly the same length placed back to it and facing the fire, so that it affords an ideal arrangement for anyone who wishes to sit facing the fire with the light from a reading lamp falling over the shoulder. The back of the seat would be on a level or a little below the top of the table so that the two seem almost to be one piece of furniture. This is usually found to be a pleasant and comfortable arrangement, and whatever other chairs or built-in seats there may be in the room, this fireside seat is sure to be the favorite.

Design No. 3.—A plaster house, suitable for ordinary lot in town or village, or in the open country. It has plastered stucco walls, and its foundation, porch piers and chimneys are of field-stone. It is also adapted to shingle or clapboard walls.



Ground floor plan of Design No. 3.

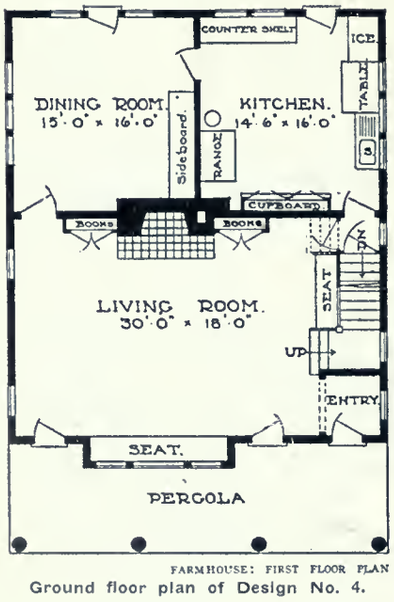


First floor plan of Design No. 3.

Fireplace and bookcases in living room of Design No. 3. This fireplace is built of field-stone, laid in black cement, and runs clear to the ceiling. Note the bookcases built in on either side of the fireplace, above which are two small double-hung windows.

Another broad seat is built into the nook formed by the staircase, the square landing of which is directly opposite the fireplace. The arrangement of this stairway is most convenient, for above the upper landing the front and back stairs merge into one, as will be seen by a little study of the floor plan. The front stairway runs from the landing in the living room to an upper landing, where it turns again at right angles and goes up three steps into the upper hall. The back stairway also runs up from the pantry to this upper landing, from which it is divided by a door, so that the three steps leading from this landing to the upper hall are utilized both from the front and the back of the house. The cellar stairs open from the pantry, going down directly beneath the front stairs, so that no space is wasted.

Design No. 4.—Front view of an unusually graceful design for a suburban house. The walls are covered with shingles or clapboards; the roof shingled; the terrace of cement or vitrified brick. The pergola, which is shown in this view, is of a rustic character.



FARMHOUSE: FIRST FLOOR PLAN

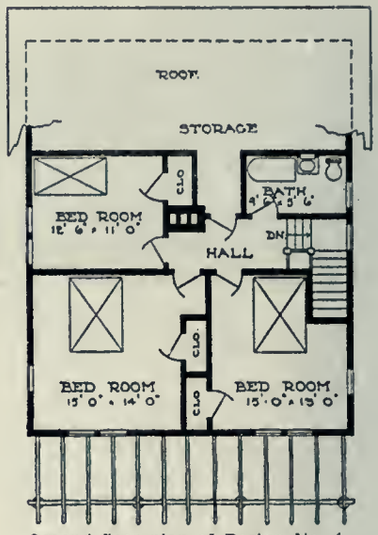
Ground floor plan of Design No. 4.

The dining room is simply a continuation of the living room, from which it is divided only by posts and panels with open spaces in the upper part, as shown in the illustration of the fireplace. Beyond this dining room again is a nook, the end of which is completely filled by a large fireplace which uses the same flue as the kitchen range and the stove in the outside kitchen. The seat in this nook is not built in, but a broad bench or settle would be very comfortable if placed as suggested in the plan.

The kitchen has a built-in cupboard on the side next the dining room and a broad work-table with drawers below at right angles to the drain board of the sink. It is not a large kitchen, but is so compactly arranged that there is plenty of room for all the work that is to be done—which work is greatly simplified by the small space and convenient arrangement. Upstairs there is the same economy of space and an arrangement that results in plenty of closet room without any apparent diminishing of the size of the bedrooms.

DESIGN NUMBER 4.

The farmhouse (Design No. 4) is an exceptionally good one, not only because the building, simple as it is, is unusually graceful in line and proportion, but because the interior is so arranged as to simplify greatly the work of the household and to give a great deal of room within a comparatively small compass.

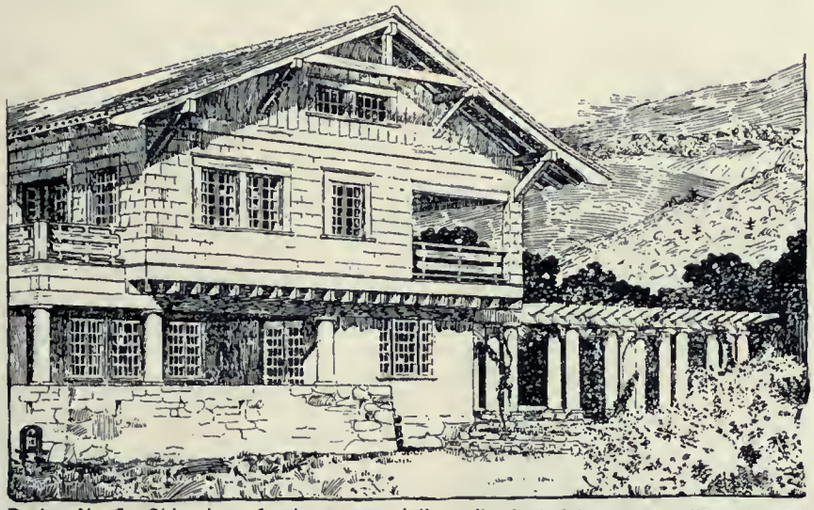


Second floor plan of Design No. 4.

The plan is distinctly and definitely that of a farmhouse, and in this frank expression of its character and use lies the chief charm of the dwelling. The walls are covered with shingles or clapboards, according to the taste or means of the owner. The roof, of course, would be shingled, and for the sake of durability, would be paini-

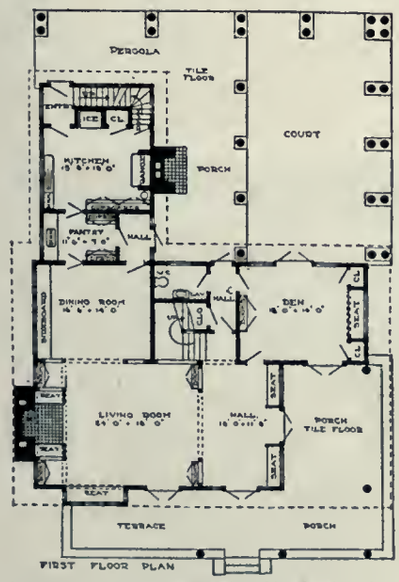
Rear view of Design No. 4 of suburban house, showing the broad sweep of roof. Note the slight projection in the shingled wall that forms a cap over each window or group of windows. This not only affords protection, but is a very interesting feature of the construction.

ed rather than stained. As the construction of the house in front is such that a veranda would be rather a disfigurement, a terrace covered with a pergola has been arranged for in its



Design No. 5.—Side view of a house especially well adapted for country life, where it is possible to live out of doors for a great portion of the year. The features of this design are the terrace, court, pergolas and porches, in addition to a large outdoor sleeping room.

stead. The terrace, of course, would be of cement or vitrified brick, and the construction of the pergola would naturally be rustic in character, especially in the case of a shingled house. One great advantage of the pergola is that the vines which cover it afford sufficient shade in summer, while in winter there is nothing to interfere with the air and sunlight which should be admitted as freely



Ground floor plan of Design No. 5, showing the large surfaces allotted to pergolas, porches, terrace and court.

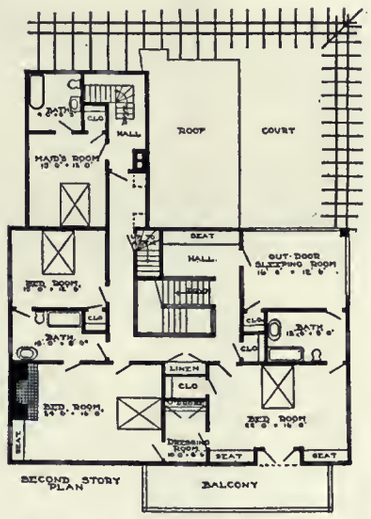
as possible to the house. The roof comes down in an unbroken sweep toward the back because of the beauty and unusualness of this long roof line as compared with the usual square form of a house with the lower roof of a porch or lean-to at the back. Furthermore, by this device there is considerable space for storage left over the kitchen and dining room.

The slight projection in the shingled wall that forms a cap over each window, or group of windows, not only affords protection, but is a very interesting feature of the construction.

The entry opens into the living room very much as it does in the other house, and the arrangement of the stairs is much the same excepting that there is only one staircase for the whole house instead of front and back stairs, as in the other. The big chimney being in the middle of the house, the fireplace in the living room is connected with it on one side and the kitchen range on the other. The fireplace has a bookcase built in on either side, and these bookcases with the two built-in seats form the nucleus of the furnishings.

The dining room is separated from the living room by a door of the usual width. A built-in sideboard is the chief piece of furniture in this room; and a door communicates directly with the kitchen. This kitchen is fitted not only with a counter-shelf that serves as a work-table, but also with a large cupboard counter-shelf which serves the purpose of storeroom and pantry, so that there is every convenience combined with the greatest economy of space.

On the second story the arrangement is as convenient and economical as it is below. The upper hall that communicates with all three of the bedrooms, bathroom and the storage place under the roof is made small, so that all the space possible may be



First floor plan of Design No. 5, showing location of outdoor sleeping room.

utilized for the rooms. The big sweep of the roof at the back affords a large place for storage, though the walls are not high enough to permit of its being used for any other purpose.

These floor plans are well worth study by anyone who has it in mind to build a farm home, for the arrangement of space is at once convenient and economical. There is absolutely not one inch of wasted room in the whole house and it is all

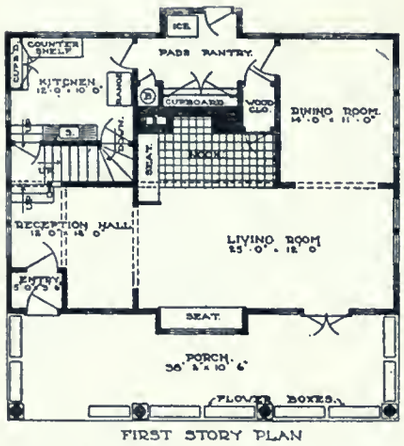
Front view of Design No. 5. This design is suitable for cement or brick, or wood construction, and the roof is equally well adapted to tiles, slates or shingles.

so arranged as to make the construction good, yet as inexpensive as possible.

DESIGN NUMBER 5.

Design No. 5 is especially adapted to country life, where it is possible to live out of doors, for a good part of the ground space is taken up with the terrace, court, pergolas and porches, and in addition to these the house is provided with a large outdoor sleeping room that is intended for use during the greater part of the year.

Design No. 6.—An inexpensive cottage, suitable for country or suburban site. The design provides for clapboard or shingle walls, and is noteworthy for its sheltering roof, the straight sweep of which is broken by a larger dormer on either side.



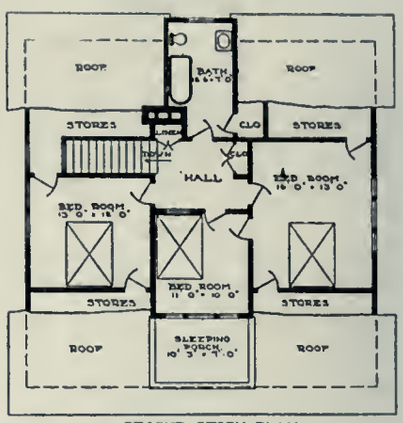
FIRST STORY PLAN

Ground floor plan of Design No. 6, showing the slightly suggested partition between the reception hall and long living room.

The walls of the lower story are to be built of cement or of stucco on metal lath. The upper walls are shingled. The roof is of red tile and the foundation and parapets are of field stone. The material used, however, is entirely optional and can be varied according to the taste of the owner or the requirements of the locality, as the building would look quite as well if constructed entirely of cement or of brick. If a wooden house is perferred, the walls could be either shingled or sheathed with clapboards, while the roof is equally well adapted to tiles, slates, or shingles.

The first of the perspective drawings shows the side of the house instead of the front, as by taking this view it is possible to include both porch and court and also to show the balcony and sleeping room on the upper story. The second drawing gives a view of the whole house as seen from the rear, the viewpoint being from a corner diagonally opposite. A broad terrace runs across the front of the house and continues around the side, where it forms a porch which is meant to be used as an outdoor living room. The entrance door opens from this porch into a hall that forms one end of the living room, from which it is separated only by the two built-in bookcases. The wide opening thus left is directly opposite the fireplace nook with its built-in seats and tiled hearth, and below the high casement windows on either side of the chimney-piece are two more bookcases. A square bay window at the side is filled with a low broad window seat, and two other seats placed on either side of the front door offer rest and welcome to whoever enters the house. The dining room is, to all intents and purposes, another division of the living room; but the den is definitely shut off, so that it may be used for a work room where seclusion is needed.

The wing at the back of the house is occupied by the kitchen and pantry, and the range backs up against a large fire-place on the back porch. This porch, which has a tiled floor, leads to the paved court that is surrounded on two sides by the pergola, so that all degrees of shade and sunlight are at hand, as well as the comfort and cheer of a crackling log fire on a spring or autumn evening, when it is too beautiful to go indoors and just a little too chilly to stay out. The divisions of the upper floor are explained by the plan.



SECOND STORY PLAN.

First floor plan of Design No. 6.

A corner in the sitting room of the suburban cottage, in Design No. 6. The liberal use of wood in the form of beams and wainscots gives a delightfully friendly and homelike effect.

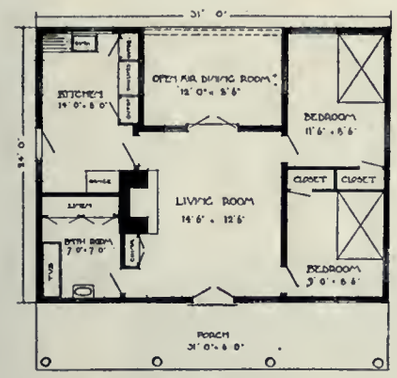
DESIGN NUMBER 6.

Design No. 6 is a farmhouse with simple lines, clapboard or shingled

walls and a broad sheltering roof, the straight sweep of which is broken by a large dormer on either side. The

Design No. 7.—A craftsman bungalow, sheathed with boards 8 x 10 inches wide, 7/8 of an inch thick, laid like clapboards. Note the truss of hewn timber in the gable, which not only forms a decorative feature, but gives added support to the roof.

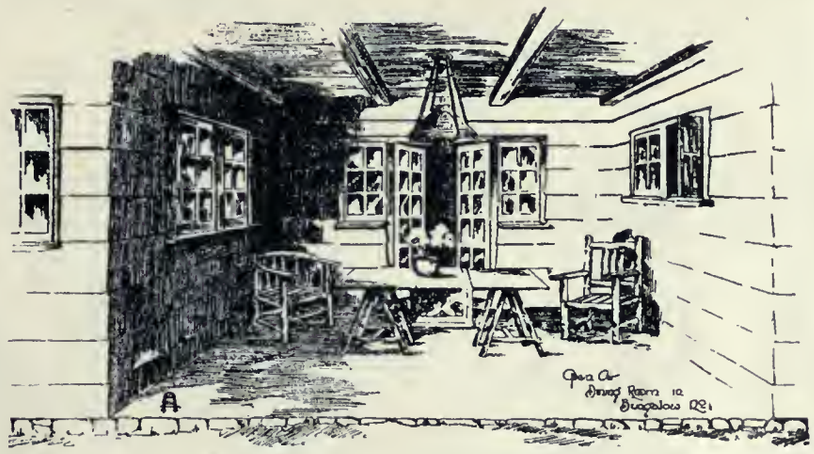
interior arrangement is very simple, as there is hardly anything to mark a division between what is called by courtesy the reception hall, the long



Floor plan of Bungalow Design No. 7.

living room with its fireplace nook and the dining room. The arrange-

The upper floor, which is divided into three bedrooms with a bathroom in the dormer at the back, is arranged with a view to the greatest possible economy of space, and there is plenty of store room and closet room under



Open air dining room of bungalow design No. 7.

the slope of the roof. The sleeping porch in front is sheltered by the parapets and is open to the sky, so that believers in the efficacy of outdoor sleeping will be able to get the full benefit of the breeze, without being exposed to the view of people passing in the street. Opening as it does from a bedroom, it can be used even in the severest weather, as all dressing is of course done indoors.

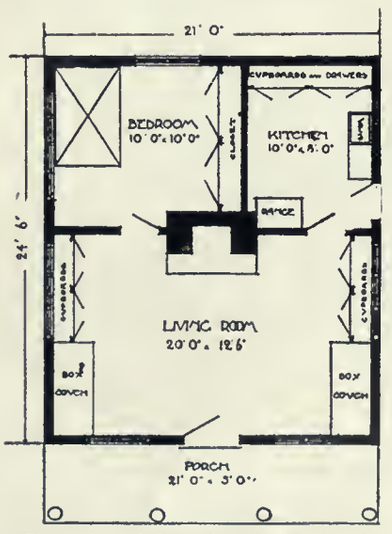
THREE BUNGALOWS.

Three little craftsman bungalows are shown. These cottages are so arranged that it will be easy to heat them to the point of comfort in the severest winter weather, but they are built primarily for summer homes.

Of course, any one of the plans would serve perfectly well for a tiny cottage for two or three people to live in, but the design and general character of the buildings is hardly adapted to the ordinary town lot and would not be so effective in conventional surroundings as in the open country.

These cottages are meant first of all to live in and next to serve as

Design No. 8.—A craftsman bungalow with walls covered with cypress shingles, split or rived instead of sawn. The weight of the gable over the porch is supported by four heavy rustic pillars. The foundation and chimney are of field-stone.



Floor plan of Bungalow Design No. 8.

ment of space avoids all sense of bareness, and if wood in the form of

examples of a variety of practical plans for small moderate-priced dwellings designed on the general order

of the bungalow. They are built of stone, brick, or any one of a number of native woods suitable for such construction and are comfortable, beautiful and interesting.

DESIGN NUMBER 7.

In design No. 7 the walls are sheathed with boards eight or ten inches wide and seven-eighths of an inch thick. These are laid like clapboards, but, owing to the thickness of the boards, it was necessary to put a little triangular strip between each board and joist to which it is nailed, as the wood would be liable to warp or split if the clapboards were nailed to the joist without any support between. One thing should be remembered, in the use of wood that is not oiled or stained, but merely left to weather,—the nail heads that are exposed should be slightly countersunk and puttied, or the rust from the nail will streak the wood. The putty for this purpose should be one-third white lead; where a stain or other protection for the surface of the wood is used this precaution is not necessary.

Design No. 9.—A craftsman bungalow with walls of field-stone. Note the usual bungalow roof, low pitched, square in line and widely overhanging. It extends in front, without a break, over the porch, and is supported by rustic pillars.

Detail of entrance to Bungalow Design No. 9.

An interesting structural decoration of this first bungalow is the truss of hewn timber in each gable. This truss projects a foot and a half from the face of the wall and not only gives added support to the roof, but forms a decorative feature that relieves the extreme simplicity of the construction.

The casement windows are all hung so that they will swing outward and are mostly small and set rather high in the wall. At the ends of the building these casements are protected by simple shutters, each one made of two wide boards with either circular or heart shaped piercing. The primitive look of these solid shutters is in entire accordance with the general character of the cottage, and they have a definite usefulness, both in the shelter that they provide in severe weather and also in the security afforded when the house is locked up and left alone for the winter.

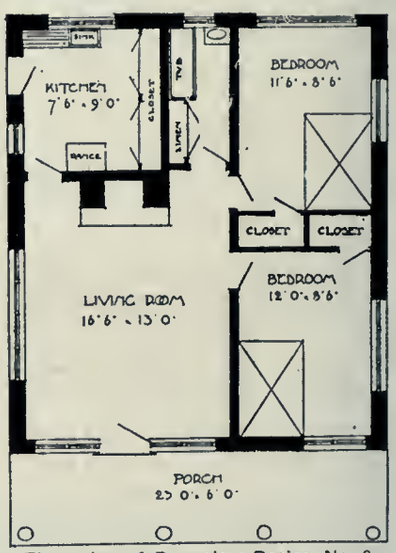
DESIGN NUMBER 8.

The walls of the bungalow shown in Design No. 8 are covered with cypress shingles, split or rived instead of sawn. These rived shingles cost twice as much as the others, but are well worth the extra outlay because they are so much more beautiful in effect. The sawn shingle is apt to get a dingy, weather-beaten look under the action of sun and wind, unless some treatment such as oil or stain is given to it in the beginning. But the rived shingle has exactly the surface of the growing tree from which the bark has been peeled, or, to be more exact, of the split surface of a trunk from which a bough has been torn, leaving the wood exposed. This smooth natural surface takes on a beautiful color quality under the action of the weather, as the color of the wood itself deepens and shows as an undertone below the smooth, silvery sheen of the surface, an effect which is entirely lost when this natural glint is covered with the "fuzz" left by the saw. The shingles used for this particular bungalow were seven inches wide by twenty-four inches long and were laid seven and one-half inches to the weather. These shingles generally sell at the lumber yards for about twenty-four dollars a dozen, or just double the price asked for sawn shingles of the same wood and size.

This second bungalow is even simpler in design than the one first shown. The entrance is at the end, where a little recessed porch, floored like the others with red cement extends the whole width of the house. The weight of the gable is supported by four of the heavy rustic pillars already described. The foundation and chimneys of these two cottages are of field stone and the floors are kept as near to the level of the ground as possible. An excavation of two feet clear is left under each building, but the exterior effect that is sought is that of the closest possible relation between the house and ground, therefore from the porch one steps directly off into the green grass. From the porch there are one or two steps up to the floor level of the house—according to the contour of the ground. For example, in the case of a decided rise toward the back of the house, there would be two, or perhaps even three, steps from the floor down to the porch, while if the house were set on more level ground, there would be but one. In each case these details should be made to conform to the site chosen, as its character largely determines that of the house placed upon it.

DESIGN NUMBER 9.

Design No. 9 cottage has walls of field stone and the regular bungalow roof, low pitched, square in line and widely overhanging; in the front of the house it extends without a break over the porch and is supported by the rustic pillars that belong so definitely to the form and construction of all these cottages.



Floor plan of Bungalow Design No. 9.

The interior of these three bungalows has been finished and arranged with one central idea in view—harmony with the general character of the house. Beyond that it can be done in any way to suit individual taste or fancy. Southern pine was the wood selected for finishing the interior of all three of these particular cottages, the pine having been treated by the application of a certain chemical process which brings out a beautiful color in the wood—a very soft light brown, showing a warm gray tone in the softer parts of the grain and a clear light golden brown in the hard parts.

The Boiler and Radiator That Make the Perfect Heating System.....

Some years ago the Canadian public were reluctant to drop stoves as a means of heating their homes, and take up the hot air furnace because of the increased cost of the plant. But the change paid, because the hot air furnace was an improvement on the old method.

Then came the hot water system of heating, and it is such a vast improvement over hot air that even though its initial cost is a little greater, it is rapidly taking the place of all other methods.

Daisy Hot Water Boiler & King Radiators

The Hot Water System is recognized, by all who have made a study of the subject, as hygienically and scientifically superior to all other means of house heating.

The acme of perfection in hot water heating is found in the system comprised of a Daisy Hot Water Boiler and King Radiators.

There are 50,000 Daisy Boilers in use in Canada today—seventy per cent. of all hot water boilers in use for house heating. There is good and sufficient reason for this, and it will be found in the excellent service that each one of these Daisy Boilers is giving. Some have been working twenty years, others but a few weeks, but all are giving absolute satisfaction.

King Radiators are designed to give the greatest possible radiating surface, yet are compact and artistic in appearance—lending themselves readily to the highest class of interior decoration.

Every section of each King Radiator, and again each assembled radiator, is subjected to a test of one hundred pounds cold water pressure before they are passed.

Architects and builders may avail themselves of the services of our heating experts at any time. We will gladly give full information about Daisy Boilers and King Radiators on request. Write for our booklet, "Comfortable Homes."

The KING Radiator Co., Limited

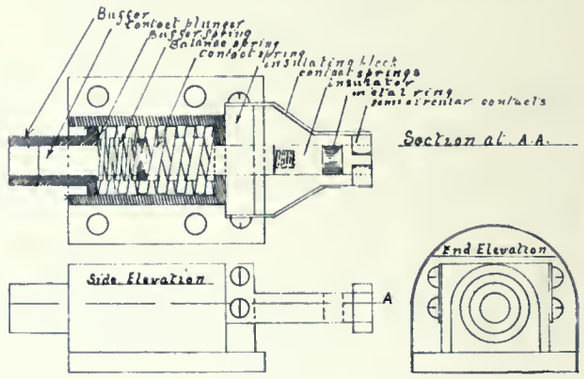
St. Helen's Ave., near Bloor St., TORONTO

Showrooms and Sales Office:
21-27 Lombard St., TORONTO

NEW ELEVATOR PROTECTIVE DEVICE.

A MOST UNIQUE and praticable device, designed to prevent cars of elevators being moved until the doors or gates are locked has just been put on the market. As most people who use elevators, and especially those who are responsible for their safe working, will appreciate something which makes impossible accidents due to the car starting before the door is closed, this apparatus will undoubtedly fill a long felt want.

The device in question is the invention of James Ruddick of Montreal, and is applicable to electrical and



Elevator Protective Device, Fig. I.

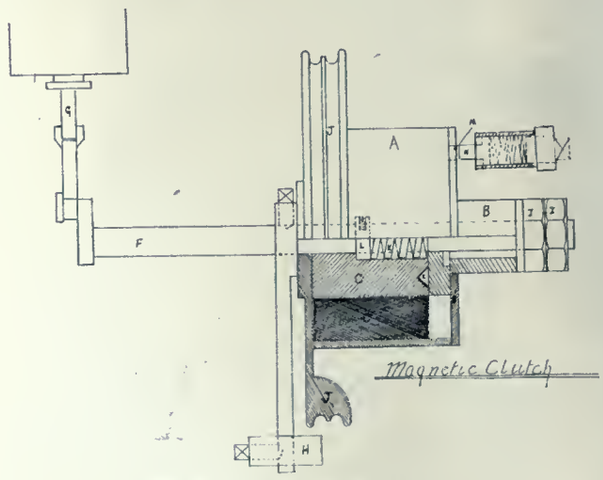
hydraulic elevators. The main features of this appliance are its simplicity and strength. In case of electrical elevators, the device consists of a specially designed switch which, it is claimed, will stand inevitable rough usage to which all elevator doors are subjected through attendants slamming them, etc. The sketch herewith shown (Fig. 1.) will give some idea as to the construction of the switch as applied to electrical elevators. It consists of a brass body to which is attached a block of fibre for carrying the contact springs, which make and break the operating circuit as the door is closed or opened, this being fixed in some convenient position near the door. The part marked buffer is made of case-hardened steel and has a powerful spring behind it, which takes the first thrust of the door when it is closed. It moves about three-eighths of an inch before it comes in contact with the contact plunger, the latter being forced backwards so that the metal ring comes in between the two contactors, thus closing the operating circuit and allowing the car to be moved by the controller as usual. The several parts of this switch are marked in the sketch, and explain themselves. It is obvious that unless the door is locked, the buffer will force the door slightly open, and will not permit the contact plunger to be forced back through the contacts, thus making it essential that the door be locked before the car can be moved.

In the case of hydraulic elevators, additional apparatus is, of course, necessary. The accompanying sketch will give some idea of the apparatus installed on such an elevator. Ordinarily the hydraulic elevator is operated by a pilot valve, this being moved from a shaft to which is attached a pulley, the operating ropes from the car being fixed to this pulley and moved by a lever in the car. In applying the Ruddick Safety Device to hydraulic elevators, a magnetic clutch (Fig. 2.) is used in conjunction with the above switch. This clutch consists of an iron-clad magnet, part of which also forms the pulley to which the ropes are attached for operating the pilot valve. The accompanying sketch showing a a half section view, will give a fair idea as to the application of this device.

A and J are the iron covering for coil and operating pulley respectively; this being free to revolve on the shaft when the electrical circuit is broken. B is an armature which is keyed on to the shaft F in such a manner that it is free to move longitudinally on the shaft. C. is a soft iron core; D is a coil of magnet wire. In operation, the electrical circuit is closed making a powerful magnet of A,C,D, etc., which draws the armature B up to the face of the magnet. It will be noticed that a cone shaped pin, E, is fixed on the armature which fits into a recess on the soft iron core, C. The purpose of this is to prevent any tendency of the pulley to skid round the armature, and at the same time makes it absolutely essential that the operating lever should be brought back to zero position before the car can be operated, thus avoiding complications in operating the car. The weight H_1 on the end of the lever is meant to bring the pilot valve to the stop position in case a door should be opened, or if for any reason the electrical circuit should be broken when the spring, K, will force the armature back and thus allow the shaft to be free to turn.

Another advantage which this device has, is that it makes possible dead man control on hydraulic elevators. Such control, we believe, has not hitherto been installed on this type of elevator. This is made possible by having a switch attached to the car operated simultaneously with the ordinary operating lever. This answers the double purpose of breaking the current, thus avoiding burning of contacts on the doors, and places within easy reach a means of instantly stopping the car under all conditions. When the armature is disengaged by the spring, K, it forces it back over a pin, N, a hole, M, being drilled in the armature to fit over this pin, thus providing a positive interlock, so long as the armature is not drawn up to the magnet.

In some cases, owing to the weight necessary to bring the pilot valve to the stop position it has been found



Elevator Protective Device, Fig. II.

necessary to supply a means of doing this by power, preferably water power, as this has been found to be most convenient. When this means is employed, a small cylinder is used, the piston of which is always forced into a central position by the admission of water. An additional lever is attached to the shaft, and the piston rod coup-

led to this lever. Water is supplied through an automatic valve which takes the place of the spring plunger, N. The operation of this valve is as follows:

Supposing the car was travelling either up or down, and the clutch was disengaged for any reason whatever, the spring, K, would force the armature back against the plunger, N, which would, in the case in view, be the stem of a piston valve, this valve being held closed by a light spring. This would in its turn, open the water valve and let water into the cylinder before mentioned, which would turn the shaft round until the hole, M, was opposite the plunger, N, which is in the stop position. The plunger would then immediately fall into the hole, M, and automatically cut off the water. This valve, we may say, is a two-way valve, which when not admitting water allows the water to go back through the same pipes down to a return, the syphon effect draining the cylinder, thus allowing the car to be operated in the usual manner.

Two ock nuts, H, are fitted on to the end of the shaft, so as to allow of the armature being adjusted. The collar, L, is to prevent the pulley from moving forward. The power necessary to operate this is very small, being from one to one and one-half amperes at 12 volts, say about 20 watts, so that where a direct current supply is not available, it is quite practicable to put in a small battery of accumulators.

* * *

CANADIAN VAULT CONTRACT JUST COMPLETED IN SHANGHAI, CHINA

IN OUR OCTOBER NUMBER of 1908 we referred to the success of a prominent Canadian safe manufacturer in having secured the contract, in competition with the world's largest manufacturers, for a large treasury vault, with modern fireproof and burglar-proof doors provided with time locks, for the China Inland Mutual Insurance Company at Shanghai, China. This was surely a victory for Canadian industrial enterprise and it serves as a death blow to the antiquated, unpatriotic contention that our banks and trust companies must go to the United States or England for the safest, best and most economical vault and vault doors for the many banking and business buildings now being erected all over Canada. If this firm can secure a contract for such an important piece of vault work in China, in open competition with the world, we would ask, why should our own Canadian institutions find it necessary or expedient to purchase the products of foreign manufacturers? This is the first piece of work of this kind, as far as is known here, that has ever gone into China—that is vault work constructed on modern western lines. That J. & J. Taylor, of Toronto (the firm here referred to) had to compete against others is naturally to be expected, but the order was secured on their own methods of construction, without attempting to follow the English specifications that were furnished. This last mentioned condition should render the honor bestowed upon this firm in being declared the successful tenderers, especially gratifying.

It will be of interest to add that it took about two and a half months for the work to go from Toronto to Shanghai and that J. & J. Taylor had to send one of their best workmen to superintend the installation. It took him just about a month's straight travelling, so that the work went about as far away from Toronto as it was possible. The senior member of this firm also went to Shanghai, partly on account of this work and partly on pleasure, and will continue his proposed trip around the globe.

A brief description of this noteworthy piece of vault work will undoubtedly prove of exceptional interest to our readers.

The vault and vault doors represent a class of vault work such as is in use by head offices of the chartered banks and trust and deposit companies, etc.

It is equipped with all modern features, such as having two best quality bank combination locks, giving over fifty million changes of numbers in each and is secured with the latest pattern of time lock as well as combinations. The door jamb is fitted with two rubber packings, the object of which is to prevent the introduction of explosives and the door is forced up against these rubber packings by two eccentric pressure bars, which are operated with a hand wheel, turning worms and gears. The spindles which operate the locks and the bolt work are built into the doors with enlarged centres, and, as well, are ground in as a further preventative against the introduction of explosives. The lock work is of the heavy revolving type, locking on all four edges of the door. The door swings on ball bearings at the bottom and rollers at the top. The door and frames have a polished machine finish. Underneath the lock work is jiggered brass and over the lock work is a plate glass frame to exclude dust and dirt. In addition to the work above described, which is illustrated in the advertisement of the above mentioned company on page 33 of this issue of CONSTRUCTION several lighter fire and burglar vault doors and fireproof doors were installed in the same building.

J. & J. Taylor is one of the oldest, most widely known and progressive manufacturing institutions in Canada, and they have not only been successful in establishing in Canada a most enviable reputation for their products but have invaded markets on every portion of the globe. It will be surprising to most of us to learn that Taylor safes, a Canadian product, are in use in India, South Africa, Australia, New Zealand, South America, Mexico, Cuba, the West Indies and China.

* * *

TWO INTERIOR WOODWORK CONTRACTS.

THE CANADIAN OFFICE and School Furniture Company, Preston, have recently been awarded the contract, by Mr. W. F. Brock, manager of the Royal Bank, King street, Toronto, for the equipment of their new branch office, at the corner of Dovercourt and Bloor street, which will be opened as soon as the fittings are completed, probably about the first of August. These offices will be finished in quarter-cut oak, fumed finish.

This firm has also been awarded the contract for the equipment of the offices of Robert Ward & Company, in the new Winch Building, now under construction in Vancouver. We understand this will constitute one of the handsomest suite of offices in Canada. The material employed is Mexican mahogany, and the design gives a large panel effect, much on the line of the Board room of the new Royal Bank, Montreal, which is considered by far the finest piece of interior woodwork of its kind in the Dominion.

* * *

PATENT GRANTED FOR MAGNESITE FLOORING

A DOMINION OF CANADA PATENT has just been granted to the Terrano Flooring Company of Canada, Limited, which will have a very important bearing on the Magnesite flooring business. This patent, No. 118,744, gives the Terrano Flooring Company of Canada, Limited, the exclusive right to lay a Magnesite flooring in combination with any class of expanded metal or wire netting on a wood foundation. The Terrano Company were the first to introduce this method of laying, which method is now being generally used by the companies engaged in the Magnesite flooring business.

View of Packing and Shipping-Room for galvanized sheets of the plant of John Lysaght, Limited, at Bristol, Eng.

ENORMOUS NEW SHEET METAL PLANT OF JOHN LYSAGHT, LTD.

THE ILLUSTRATIONS shown herewith give some conception of the enormous extent of the works of John Lysaght, Limited, recently built at Bristol and Newport, England, and will give some idea of the modern facilities employed.

The first illustration shows the interior of the new packing and shipping room for galvanized sheets at Bristol. On the right is seen a shipping berth for two barges, which can be loaded under cover of the roof an electric crane being used for this purpose. A very large travelling crane will be seen traversing the entire length of the building. On the left are a few of the corrugating machines used at these works and between these and the rest of the building is a depressed track on which a little electric car, with the platform, flush with the floor, runs back and forward conveying sheets to the point required. There are several tracks across the track in the centre and the electric car track referred to. This building was only opened last year, and as will be noted is large, spacious and lighted.

The second illustration shows a part of the interior of the mill at Newport where the black sheets are rolled. In this building there are thirty-two mills, each composed of two sets of rolls, for roughing and finishing respectively, with the engines, shears, cold rolls and other apparatus necessary for turning out in merchantable shape the enormous tonnage represented by large numbers of these mills, which is, probably not equalled, certainly not excelled, at any plant in the world. The whole plant at Newport has been installed within the last few years, having been removed from Wolverhampton to a more suitable position on the sea coast. The firm very wisely took advantage of the opportunity offered by the removal to adopt all modern improvements.

View of the portion of the interior of the mills of John Lysaght, Limited, at Newport, Eng., where the black sheets are rolled.

Fireproof Residences

THERE is no type of dwelling construction that has proven as superior in every particular—economy, fireproof qualities, stability, architectural possibilities and resistance against the elements—as has *reinforced concrete* and *cement stucco construction.*

The *cement stucco* house has proven its adaptability for all seasons, in every climate. It is warm in winter and cool in summer. It is cheap as wood, and has all the richness of effect possessed by the brick or stone house.

The *ideal cement stucco* house should be plastered both outside and inside, on

Cement Stucco Residence, Plastered Outside and Inside on "EXPANDED METAL LATH."

"STEELCRETE" EXPANDED METAL LATH
and CANADA FASTENER FURRING

A Southern Cement Stucco Residence, Plastered outside and inside on "EXPANDED METAL LATH."

"STEELCRETE EXPANDED METAL" is the universally acknowledged concrete reinforcement and lathing for cement stucco work. It has been used with the greatest success in the largest and finest structures on the American continent, during the past fifteen years, and is to-day the recognized standard.

With *"STEELCRETE EXPANDED METAL"* the strength is uniformly distributed; the steel is dependable in quality; the sectional area is exact, and it gives maximum strength for section with a perfect mechanical bond.

When specifying *"EXPANDED METAL,"* be sure that you get *"STEELCRETE DIAMOND MESH,"* the original and most practicable Expanded Metal on the market to-day.

Write for Catalogue, showing views of buildings, from residences to office buildings, factories and elevators, in which "STEELCRETE EXPANDED METAL REINFORCEMENT AND EXPANDED METAL LATHING" has been used.

EXPANDED METAL AND FIREPROOFING COMPANY, LTD.

Fraser Avenue, TORONTO

PEDLAR Expanded Metal Lathing

MADE BY IMPROVED PROCESS IN
EVERY STANDARD SIZE OF MESH

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IN THREE GAUGES:

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at

10, 13 & 15c. per sq. yard

The only lath that becomes thoroughly embedded in the plaster with the minimum consumption of material

GALVANIZED

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IN TWO GAUGES:

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16 & 17 1-2c. per sq. yard

Where Shall We Send Your Sample?

Our Galvanized Lath selected over all others, and used in the McGill Medical Building, Montreal, Que.

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For Samples; Catalogues, Details or Discounts, write to the Nearest Office of

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Montreal, Toronto, Ottawa, London, Chatham, Quebec, St. John, N.B., Halifax, N.S., Port Arthur, Ont., Winnipeg, Regina, Calgary, Edmonton, Vancouver, B.C., Victoria, B.C.

Head Office & Factory at Oshawa, Ontario

CANADIAN LABOR UNIONS HELD WITHIN GRASP OF AMERICAN LABOR OCTOPUS—GLACE BAY STRIKE DEMONSTRATES THE AWFUL POSSIBILITIES OF THIS CONDITION. - - - - - - - - - - - - -

NEVER BEFORE in the history of strife between employer and employee in Canada, have we been brought to so fully realize that our labor is almost absolutely controlled from *headquarters* in the United States, and never before has anything so fully demonstrated the awful possibilities of such a condition as the present coal strike at Glace Bay. One after another, the Canadian Unions have gradually become affiliated with the great *headquarters* in the United States until, at present, there is possibly not one independent Canadian Union left in the west or middle east. Their dues go to the United States. If a strike is in progress there, they pay their share for its support. They cannot strike without permission from *headquarters,* and they must submit to the rules and regulations as laid down by *headquarters* or they are thrown out. If the conditions under which they work do not suit *headquarters,* or if, to facilitate the winning of a strike elsewhere, it matters not how well they may be satisfied themselves, when ordered they must strike.

In other words our whole industrial fabric has been honeycombed by American labor organizations. The backbone and sinew of our every industry is greatly in the control of foreigners. Our mechanics and laborers are under the dictation of foreign labor officials, and have not even control over their own actions.

There was a peaceful little corner up in the far north eastern portion of Canada, that had its own independent organization through which the members transacted business with their employers. The conditions under which they lived were satisfactory. They were contented with their hours and their wages. There was none of the underpaid and overworked cry that we heard of in Colorado or none of the poverty, want and destitution that we are told existed in the Scranton mines. It was a peaceful, happy, prosperous community that had been far enough away to escape the Yankee walking delegate. But the big coal strikes in the United States had developed a lot of well trained organizers and when things became all peace and quietness in the big coal centres there, there was no more work for them, unless they should hie to a virgin field and, as Cape Breton was the last great unbridled coal area, they chose it as their field of operation.

To those who understand the operations of these organizers, it is easy to realize how even in a peaceful community of satisfied workers, they can bring about strife, unrest and dissatisfaction. They are perfectly trained for their work, and the sowing of distrust and contempt for the employer, is just as much a profession with them, as is preparing plans with an architect.

They did not have wages or hours as a basis upon which to work. The P.W.A. had a satisfactory contract with the Coal Company, and the best of feeling existed between the miners and their employers. But these professional agitators are resourceful, they know every trait and weakness of the miner, they know how best to sow seeds of discontent in his untrained mind, and it is easy to conceive of how they proceeded to impress upon him the weakness of the P.W.A. and the greatness of the U.M.W. of A. They pointed out that while things might be satisfactory at present, if the company saw fit to throw them down, how helpless they would be in an attempt to fight for their rights with their provincial union and how strong they would be with the financial and commercial strength of the U.M.W. of A. with 130,000 members at their back.

Quietly and stealthfully did they work their subtle influence until they had succeeded in getting well organized with a goodly number of members in each locality until, eventually, the membership, with continued work, grew automatically through the influence of the newly enrolled converts.

Again the Dominion Steel and Coal decision, unquestionably gave these organizers much more capital with which to work. Can these walking delegates be imagined, going about endeavoring to make plain to these unsuspecting workmen, that when the contract with the P.W.A. expired in December next, in the dead of winter, the Coal Company would want to take a portion of their loss out of its employees, and that the P.W.A. would never be strong enough to put up a fight and that if they did not accept the company's terms, they would be thrown out of the company's houses in the snow, without work and with no possible chance to get work elsewhere? On the other hand they argued "if you come with us we will be strong enough to make the company make a contract with the U.M.W. of A. this summer, if they don't we will strike in warm weather; we have unlimited strike funds to fight with and will get you all back to work before the cold weather is here."

The result is well known. The U.M.W. of A. made a demand upon the Coal Company for recognition, with the result that the matter was brought before the Department of Labor; a Board of Arbitration was appointed and they gave their decision, which ruled that the P.W.A. had a contract with the Coal Company; that the men should stick by this contract and that there was no reason why the Company should break its contract with the P.W.A. in favor of an organization controlled at Indianapolis, Ind., the headquarters of U.M.W.A.

This decision, of course, the U.M.W.A. would not accept, and the strike that followed, showed how perfectly successful these foreign promoters of industrial strife had been, in sowing discontent and sedition in this once peaceful, contented little Canadian community of miners.

We relate these details only to show how easily our

industrial equilibrium may be disturbed by Yankee organizers, *out of a job,* and to demonstrate how stealthfully this American labor octopus has gathered into its tentacles every labor organization in Canada, where it controls them at will.

Here is a once thriving, happy community of laborers thrown into a condition of wild disorder with 500 soldiers, to save life and property, camped on the ground, four thousand men out of work, and a great industry crippled by a band of professional Yankee trouble makers who want to take the seat of control from Sydney, C.B., to Indianapolis, Ind.

We do not question the right of labor to organize, for trade unions in many cases have had a tendency to improve the conditions under which men work. Men have a right, when they have a just grievance, to strike, and further are justified in using all peaceful and lawful means to gain their point. Every fair-minded man will concede that point.

But here are two countries, Canada and the United States, under two entirely different forms of government, each one striving to work out its own destiny. As nations, we have nothing more in common than has France and Germany, except that we speak the same tongue and there is no more reason why the United States should control our labor any more than there is a reason why they should control our customs tariff. But we have awakened, at last, to find that through our passive indifference or the unpatriotic spirit of our people, the control of our labor has passed into the hands of our industrial competitors; yes, to find that American labor officials have greater power over our workers than has our own government.

Could a condition be imagined whereby English labor officials would have control over the working bodies of the United States? No, the American is too independent and patriotic to permit of such a state of affairs.

It is argued that the Canadian Unions affiliate with those of the United States because it gives them greater strength. In the first place, that is a most un-Canadian contention. In other words, does the Canadian laborer wish to say to his employer, "You give me what I want or I'll bring force from the United States to make you give it to me." In the second place, Canadian labor is as strong, as compared with his employer, as the American is, as compared with his employer. The relative strength between the employer and the employee is the same.

We wish to reiterate that we are not opposed to properly conducted trade unions, they have become a very part of our industrial life, but this outside control of the very vertebra of our growth and prosperity, will not long hence become next to intolerable. Our legislators will be forced to find some solution of the problem, but in the meantime, *every American professional trouble maker who comes to Canada, for the sole purpose of sowing seeds of discontent and distrust among our workers, thereby crippling our industries and causing riot, disorder and ruin for the purpose of strengthening the American labor octopus, should be deported from the country as an undesirable.*

EDISON BELIEVES HE HAS OVERCOME THE OBJECTIONS OF THE CRITICS OF HIS FIRST ATTEMPT TO PRODUCE A $1,200 POURED CONCRETE HOUSE. - - - - - -

WIDE SPREAD INTEREST was created about a year ago by Mr. Thomas A. Edison's announcement that he had completed a model of a cement house which he proposed to erect by pouring thin concrete into a great set of iron molds. This house he maintained could be built in a day, and would cost but $1,200.

Had a man with a reputation less known made such a startling statement, the scientific world would have laughed. But when Edison, "the Wizard," the man who had made men sing and talk after they were dead, made this extraordinary announcement, engineers and architects looked at one another in bewildered amazement and wondered if the great Edison's mind was starting to fail, or had it really produced another phenomena.

The model, with description, was published broadcast, and it was plain to be seen that it was not the product of the brain of an old man grown childish; but, while not perfect, it was a marvellous creation of a genius.

After the engineering and architectural professions had time to give some thought to Mr. Edison's problem, criticism came from all sides. The architects maintained the design was anything but artistic, and that the idea was impracticable because several houses would have to be erected in one locality, and that the uniformity of design would be most objectionable.

The engineers first maintained it would be impossible to pour the concrete down through the molds, so that the mixture would be uniform at the time of setting, and that it would be impossible to fill the complete set of molds when fastened together, and thus insure a perfect structure. Another objection was that the cost of transportation of the molds and the cost of equipment, would be so great that the house could not be erected for much less than twice the amount claimed by Mr. Edison. The objections were many and varied. In CONSTRUCTION (May, 1908), we published an illustrated description of this first attempt, with criticisms by Mr. E. S. Larned, of Boston, an eminent cement engineer.

However, Mr. Edison was not daunted. He was determined to make possible a $1,200 solid concrete workman's house, moulded as it were in one solid monolithic form. One that would be everlasting, fireproof and vermin-proof.

To this end he has completed another model, guided, to a great extent, by the suggestions thrown out in the criticisms of his first attempt. This model, with descriptions, we publish elsewhere in this issue, and it looks almost as though Mr. Edison has broken the back of his problem.

The design, for a small cement house, is a good one, and if, as Mr. Edison says, he can produce six different designs of houses from the one set of molds by a simple manipulation of the several parts, he has overcome the principal objection of the architects. It may still be argued, however, that even with six different designs, there will be a lack of individuality such as would be required to make a picturesque community, but it must be remembered that these are simply to be workingmen's houses, and all will agree that there are few workingmen's communities that would, in any point of comparison, come up to a section built up with houses of the character Mr. Edison proposes.

Mr. Edison has found further, that it will take fourteen days instead of one, in which to complete a house. This, we believe, sounds more plausible.

Whatever defective points his present scheme may have, it is a fact beyond dispute that Mr. Edison seems to be working along the proper lines to produce a livable, sanitary, and fireproof house for the workingman, and, if he solves this problem, he will have given modern day civilization an invention that for actual utility and breadth of usefulness will equal, if not exceed, any of all his wonderful accomplishments.

Y.M.C.A. GIVE PREFERENCE TO UNITED STATES ARCHITECTS, MATERIALS AND APPARATUS IN THE ERECTION OF THEIR BUILDINGS — MONEY CONTRIBUTED BY CANADIANS SENT ABROAD. - - - - - -

THOUSANDS OF DOLLARS have recently been subscribed by Canadians, in various parts of the Dominion, for the erection of Y. M. C. A. buildings. These vast sums of money have been donated, principally by large manufacturers and merchants in our larger cities, with a liberality best shown by the fact that more than $300,000 was raised in Montreal within an exceptionally short period of time. In Hamilton a few days ago, $55,000 was raised, and we understand that similar campaigns are contemplated in several other Canadian centres where new Y. M. C. A. structures are to be built.

The Y. M. C. A. cause is a good one and worthy the patronage and support of every Canadian citizen, who is in sympathy with the work they are doing. No one will gainsay the fact that the clean, wholesome conditions, under which thousands of young men are permitted to congregate in well-appointed quarters where every care is being exercised to uplift and develop them, both physically and mentally, should be encouraged and supported.

But would it not seem reasonable, if these structures are made possible through the liberality of Canadians, that in their erection, as much money as possible should be spent with Canadians? Or is it right, is it fair, or is it honorable to cart this money, these contributions of Canadians and Canadian institutions, over to the United States to be spent in channels recommended by the great headquarters there—the same channels in which they have been accustomed to spend the money used in the erection of their buildings across the border?

All the recently erected and proposed Y. M. C. A. structures in Canada have been planned by an American architectural firm, and the appparatus, appliances and fixtures have, in most cases, come from the United States.

One instance recently came to our notice where a manufacturer who had been a liberal contributor to the Y. M. C. A. for many years, was unsuccessful in getting even consideration for his product, a product that has been installed in some of the largest buildings in Canada, and has given excellent service. But the United States architect had been accustomed to specifying an American made product and, as a simple matter of course, would consider nothing else. This, we maintain, is absolutely wrong, and should not be tolerated by so worthy an institution as the Y. M. C. A.

It may be true that there are architects in the United States who have had more experience in erecting Y. M. C. A. structures, than our Canadian architects have, but it would be foolish to say that we have not architects who are equal to the task of planning buildings that involve intricate problems of infinitely greater magnitude than do Y. M. C. A. structures. More than this, suppose it were true that a trifle better plan could be obtained from an outside architect, suppose that a trifle superior equipment could be obtained in the United States, should not some consideration be given to the manner in which the money was obtained and the source from which it came? Does the Y. M. C. A., supported by Canadian contributions for the benefit of the Canadian young man, require a better building than we can build?

He who seeks charity should be charitable. He who profits by the generosity of others, should himself be generous. He who would appeal to the sentiment of others should himself permit his actions to be tempered by sentiment. He who preaches that "it is more blessed to give than to receive," should show himself worthy of some of these showers of blessing.

Let it be understood that we wish in no way to detract from the great work being done by this organization, nor do we believe that it is unworthy of the greatest suppport it can be given, but we do maintain that an institution that has been treated so liberally by our newspapers, our manufacturers, our business and professional men, should be more considerate of their benefactors.

RELATIVE COST OF BUILDING TO-DAY AND TEN YEARS AGO—APPLICATION OF SCIENTIFIC METHODS OFFSETS INCREASED COST OF LABOR AND MATERIALS. - - - - - - - - - - - - - - -

WHETHER architect, builder or owner, the natural answer to the question as to the relative cost of buildings to-day, as compared with ten years ago, would be that they were very materially higher; but a careful consideration of the subject leads inevitably to a modification of this view. If by reason of more stringent laws the accommodations of a certain class of buildings are made more expensive, it does not necessarily follow that the cost of the building has been increased through an increase in the price of materials or the cost of labor; if the man earning from $3,000 to $5,000 a year demands in his dwelling two good bathrooms and steam heat, where he was formerly content with a hot air furnace, one toilet and a tin bathtub, that increase is not chargeable to the increased cost of labor or materials; if by reason of insufficient renting space in a given locality the rentals per square foot for offices increase 25 per cent. and owners lavish marble, cooled distilled drinking water, and other things to attract tenants to new buildings, requiring an additional outlay, that is not chargeable to the increased cost of labor and materials.

On the other hand, in both the architecture and engineering of buildings, the last ten years has seen a vast improvement—designs are very much simpler and better, architecture is more truly the science of ornamented construction, the economical use of the materials of construction has greatly advanced, and engineering knowledge of limiting economic conditions has been greatly extended. Building problems are receiving ten times the study that they received ten years ago at the very lowest estimate, and these influences have combined to decrease the amount of material and labor required to secure given accommodations.

After having made a comparison of costs of a number of buildings erected ten years or more ago with similar buildings erected recently, a prominent engineer states that he found that by the application of intelligent, enlightened design the building of to-day to accommodate a given number of guests, if it be an hotel, or to give a certain number of square feet of rental floor space, if it be an office or loft building, costs practically but little more than the corresponding building of ten years ago. While it is true that the wages paid to labor have materially increased in amount, it is also true that labor, when unhampered by union restrictions as to the amount to be accomplished, will do enough work to make the unit cost for labor no greater than it ever was.

It was further stated by this engineer that in making the comparison above spoken of he found greater differences in cost between practically exactly similar buildings (by which is meant buildings renting the same utilities for the same gross amount) than existed between similar buildings erected ten years apart, but both intelligently designed, thus showing that it is incumbent on the owner, more to-day than ever before, to choose his designer, whether it be engineer or architect, wisely.

The West Front, New Catholic Cathedral at Westminster, London. A striking facade essentially Byzantine in character. Note the enormous arch, wider than that of St. Marks, Venice, and the somewhat excessive detail and decoration. Restrictions of "Ancient Lights" limited the architect to a low elevation, increasing the difficulties of treatment. Mr. John Francis Bentley, Architect.

LONDON'S NEW ECCLESIASTICAL EDIFICE.—Catholic Cathedral Erected at Westminster a Striking Example of the Early Byzantine Style.—Interior Rich in Beautiful Marbles and Mosiacs.—Absence of Colored Glass in Windows.

By HERBERT M. CLARK

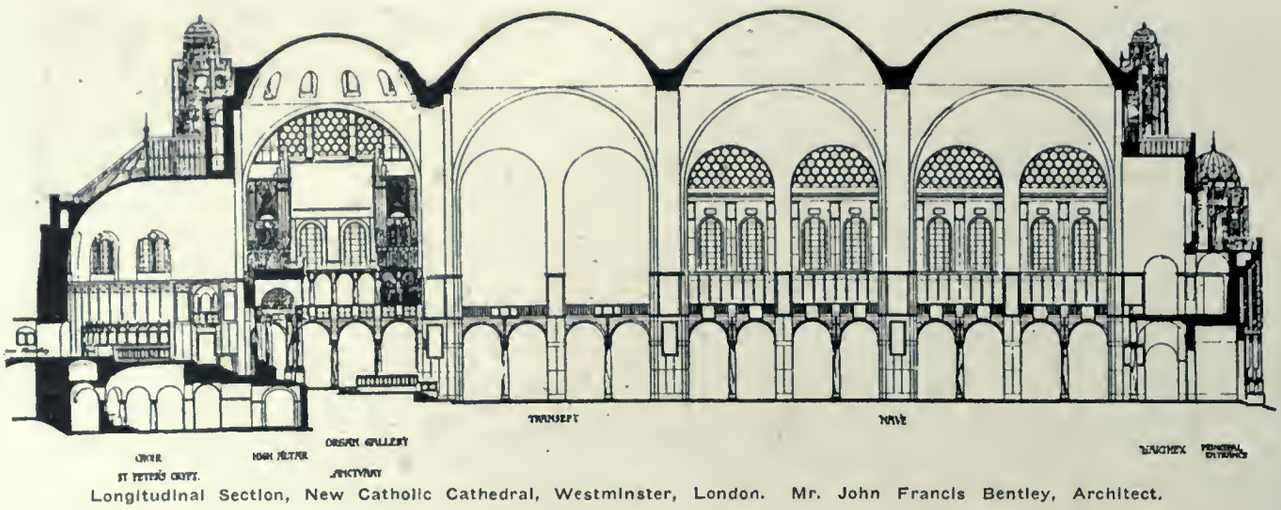
THE CREATION of a building worthy to represent fully the cosmopolitan faith of the Catholic Church in "the immense capital of a world-wide empire of power and influence." Such was the dream of Cardinal Wiseman, who, shortly before his death in 1865, expressed the hope that a Cathedral might be erected for the Metropolitan See of Westminster. The same year, the Catholic body, presided over by his successor, Cardinal Manning, pledged itself to build a Metropolitan Cathedral as a memorial to Cardinal Wiseman, a project which obtained the approbation and special blessing of His Holiness Pope Pius IX. Cardinal Manning labored to further the work; first, however, providing Catholic schools and institutions for the poor children in the diocese and raising funds for the acquisition of the site. Before his death the site now occupied by the Cathedral, which lies a little back from Victoria street, and is the site of the old Tothill Prison, was purchased after various preliminaries, at a cost of £55,000. The late Cardinal Vaughan, who succeeded him, brought the project another step towards materialization when, on June 29, 1895, he laid the foundation stone of the Westminster Cathedral. The contrast between the humble chapel of the beginning of the nineteenth century and the magnificent cathedral to-day structurally complete, affords a remarkable illustration of the expansion of the Catholic Church in Great Britain.

As to the style of the architecture, there had been much divergent opinion, Cardinal Vaughan favoring early Byzantine, and few will doubt the peculiar fitness of the selection of this style, for Byzantine Art was the first distinctly Christian Art; moreover, the possibilities of Byzantine had never been demonstrated in Great Britain on so vast a scale. The architect, the late John Francis Bentley, who came of Scottish family, and who, it may be mentioned, had originally favored a Gothic Cathedral, was hitherto untried in the Byzantine style, and, before preliminary plans, he went abroad to study its subtleties and steep himself in its beauties. And he has been very successful. His task was difficult. A great cathedral was to be built, the site was within a stone's throw of Westminster Abbey, and something to show, something striking, was expected of him. He might have made certain changes had time permitted reflection, or had some modifying influence been brought to bear on his designs, but his patron, Cardinal Vaughan, gave him sole charge. The speed with which this enormous structure was completed, in less than eight years, is one of its features. That there is no sign of rush or haste, no useless expenditure on the rectification of errors, but in every part an exquisite finish to even the minutest detail, is a tribute to the thoroughness of the architect. A study of the ground plan and sectional elevation and a consideration of the "shut in" nature of the site, reveal the difficulties besetting the designer and the boldness of his conception.

The length of the building is 360 feet and the greatest breadth 156 feet. With such vast surfaces of brick, one is tempted to think that a simpler design might have been more impressive, especially as one is compelled to view the building from nearby (the exigencies of space render this a necessity, as apartment houses, etc., surround the site closely). A distant view, were it possible, would perhap give the lines more beauty than is apparent at close quarters. When examined from the south-east corner, which point affords the most open view, the lines appear broken up and dispersed. The cupolas of the nave, the gables of the transept, the roofs of the chapels, and a multiplicity of detail everywhere, produce a restless, almost a gay effect, which does not convey a feeling of solemnity, whilst the all-pervading layers of stone which stripe the brick, add to the freshness of the general coloring. This showy effect will doubtless be toned down somewhat when the brick is "weathered" by the tempering London atmosphere. Nevertheless, the view of the whole structure from any point is striking.

The main front is very ornate, perhaps too ornate, the lavishness of detail being accentuated by the "stripes"

The Cathedral as seen from the south-east. This view well illustrates the vast dimensions of the building, which is 360 feet in length and 156 feet in breadth. The cupolas, gables and windows produce a busy effect. Note the windowed dome over the Sanctuary. The south wall of the Sacristy projects beyond the Cathedral walls.

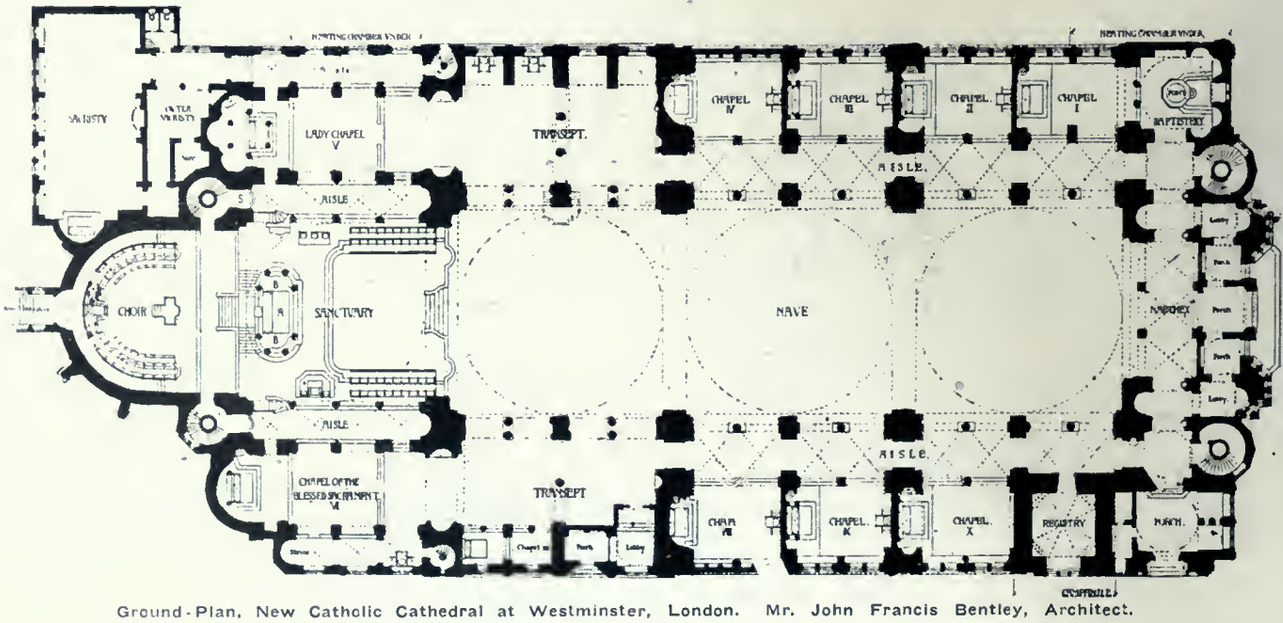


Longitudinal Section, New Catholic Cathedral, Westminster, London. Mr. John Francis Bentley, Architect.

which are in great evidence. Indeed the excess of detail has a distinctly marring effect here. The medallions on the pillars of the arch might well have been omitted, as the effect of "crowding" which they produce on the pillars of the lower tier detracts from the balance of the whole arch. Observe in the illustration, this arch, which encloses the three entrances. Its enormous size leads one to picture it supporting some towering mass, instead of which it carrie but a course or two of stone and brick, for which such vast dimensions are not structurally essential. Further, the series of mouldings which form the arch project from the wall, thus demonstrating the arch to be purely ornamental. It must, however, be remembered that here perhaps more than anywhere, the architect was hampered by such restrictions as "Ancient Lights." A glance at the longitudinal sectional elevation shows the nave to be considerably higher than the west front, the reduced height of the latter being necessary in order to conform with the requirements of the law. Above the arch is the inscription "Domine Jesu Rex et Redemptor per Sanguinem Tuum Salves nos."

At the north-west corner stands the much criticized Campanile, or St. Edward's Tower. The usual purpose of the Italian campanile is to hold a bell. This tower, however, when viewed from a distance, seems far too delicate for such a purpose. Again, when seen from nearby, the courses of stone and brick crossing horizontally, break the vertical lines and detract considerably from the effect of lightness and height. At such a height, too, the treatment of the head should surely have been bold and free; as it is, the detail is lost and at a distance one sees an attenuated tower, the top of which is apparently merely rounded. Possibly it was designed solely to draw attention to the Cathedral at its base. In this it is successful. Rising high above the surrounding buildings, it dominates the city about it, symbolic perhaps of the militant spirit of the Catholic Church, and assuredly an achievement for that church in a Protestant country. In passing it may be remarked that the Campanile, 280 feet high, though 40 feet shorter than the nearby Westminster clock tower, appears higher owing to its "thinness."

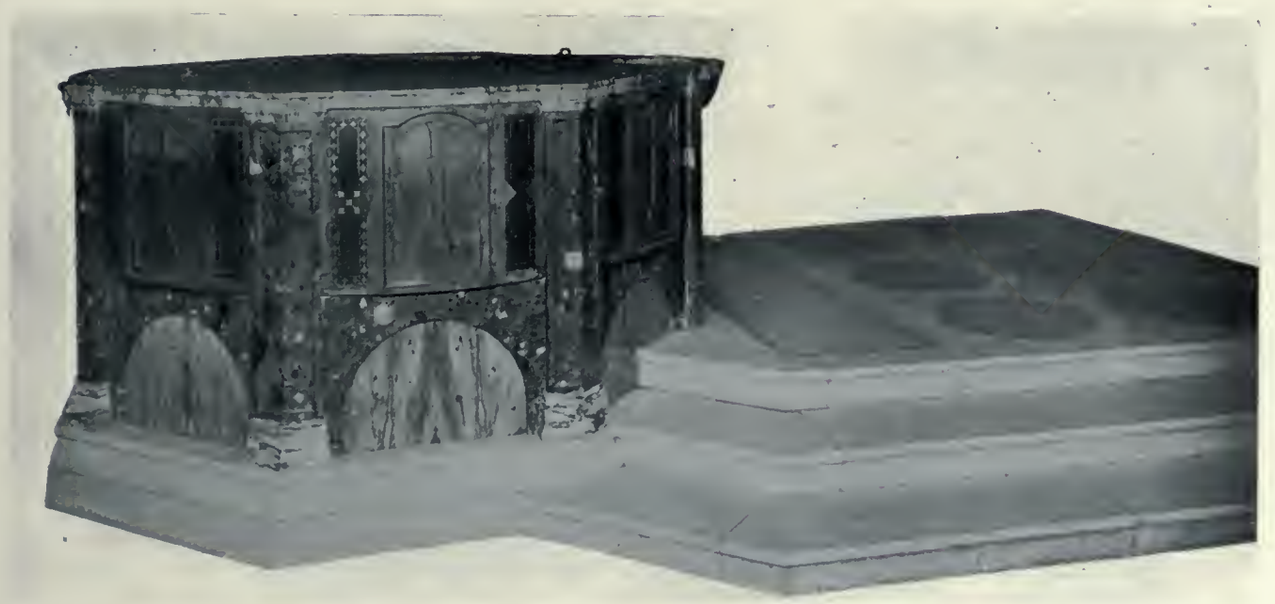
The voice of criticism may be heard without, but it is silent within. The interior is magnificent, the predominant impression being the overwhelming effect of space. This is due to simplicity of treatment and a masterly disposition of the lighting. The nave consists of a series of gigantic piers, which rise until they curve into stately arches, subdivided by smaller ones. The depth of these arches is immense and the lines are everywhere simple and dignified. The gallery is supported on open arches and columns; from these spring the long arched windows, and above them are the lunette windows, the whole being contained within one of the deep arches above mentinond. The lighting is a triumph. There is no "colored" glass; instead the artist-architect has given delicate green cathedral glass, and through it filters a silvery light, which, combined with skillful window-grouping, gives light and shade in exquisite proportion. Standing at the west end of the nave, one sees the wall of concrete and brick towering up into the dim shadows of the roof, 117 feet above;



Ground-Plan, New Catholic Cathedral at Westminster, London. Mr. John Francis Bentley, Architect.

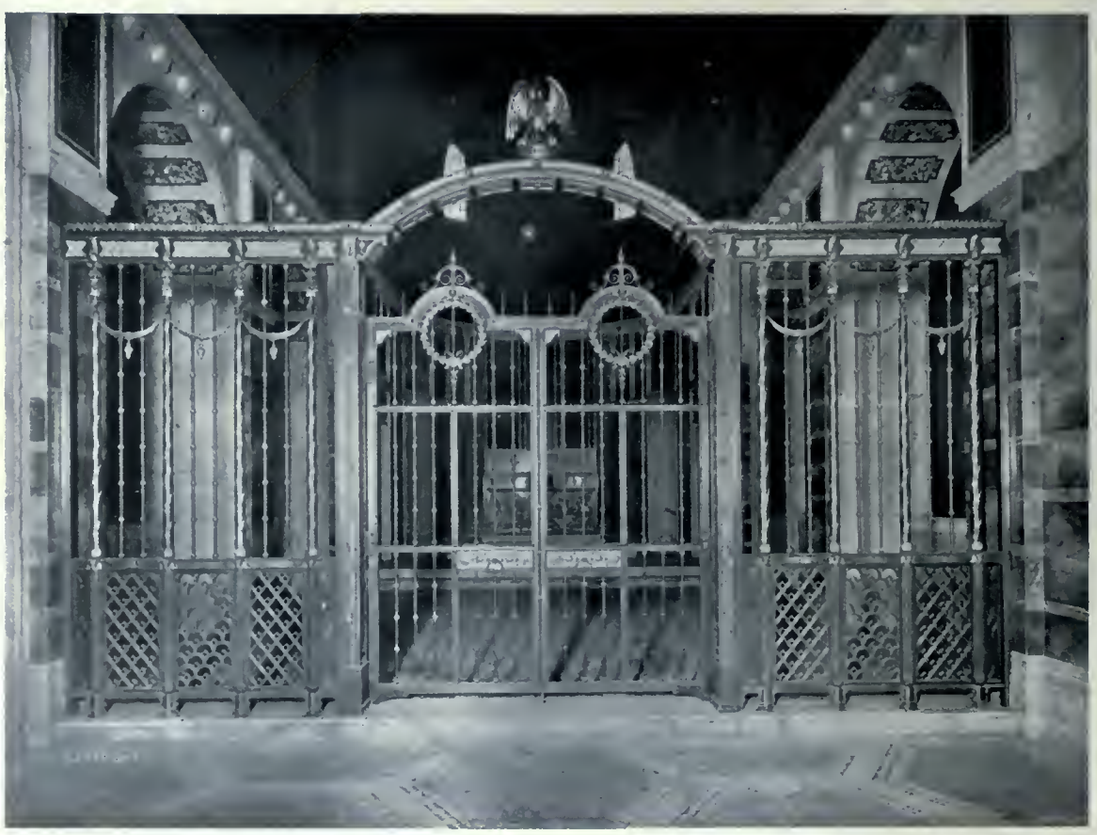
St. George's Chapel, East End View, New Catholic Cathedral at Westminster, London. This interior is remarkable for beautiful mosaic work and different colored marbles. Note the simplicity of the altar, the lines of panelling, and dado of marble. Mr. John Francis Bentley, Architect.

and then the gaze is carried to the east end, where, the dome over the sanctuary being "windowed," the baldachino is flooded with light. The whole effect is solemn and impressive to a degree. There is one harsh note. An enormous cross, thirty feet in length by twenty-two feet in breadth, is suspended in the nave. One associates one's ideas of the dimensions of the cross, with the dimensions of the human body, and with these dimensions in mind, a



The Font, New Catholic Cathedral at Westminster, London. Composed of various marbles, panelled and inlaid. Note that the panels bearing the Cross are of similar design to the lower lights of Baptistry window. This harmony of detail is continued throughout the whole building. Mr. John Francis Bentley, Architect.

St. George's Chapel (West End) and Baptistry, New Catholic Cathedral at Westminster, London. A most successful treatment, the beautifully proportioned arch of white marble giving a highly satisfactory view of the Baptistry. Note the excellent windows and disposition of lead and glass lights, which are well designed and proportioned. Mr. John Francis Bentley, Architect.



Chapel of Blessed Sacrament, New Catholic Cathedral at Westminster, London, showing the Screen and Gates. A fine example of modern metal work, the design being beautiful and the execution perfect. Mr. John Francis Bentley, Architect.

comparison of the size of this cross and of its immediate surroundings, is inevitably made, which naturally diminishes the proportions of the whole interior. The idea of the cross in this most prominent position is excellent, but how much more effective would have been a cross of normal size.

A magnificent double colonnade or ambulatory runs all round. West of the transept on the south side are the baptistry and four chapels, and on the north an entrance porch and three chapels, the space of the fourth being occupied by the base of the tower. East of the transept there are also two chapels, north and south, and still further east, flanking the apse, the outer sacristy and sacristy. The south wall of the latter projects beyond that of the cathedral.

A study of the plan, or better, of the building itself, shows the excellent proportions obtained in all parts, ground space being economized without any resultant crowding. Note that the heating chambers are placed on the south, which is the more exposed side.

The decoration of three of the chapels is practically complete. The designs reveal a fine appreciation of the values of line and color. Notice in the illustration the really exquisite mosaic work in St. Gregory's chapel, the simplicity of the altar, and the beautiful effects obtained with the different colored marbles. The treatment of the west end of the same chapel (illustrated) is most successful; the lines of the white marble screen are simple and the whole scheme is perfectly proportioned to permit a sufficient view of the baptistry. The baptistry window is a good example of the beautiful window work throughout the cathedral. It may be studied with advantage. Not only are the lights well designed and proporioned, but the disposition of lead and glass in each light is most satisfactory. The decoration of the font includes crosses on marble panels of the same design as these lower lights.

In the chapel of the Holy Souls, above the altar, the lines of which are again simple and very effective, is a splendid example of marble panel work, and above this again are symbollic illustrations in mosaic of the "Triumph of Life Over Death." The treatment of the dado and flooring is worth careful attention, indeed, the whole chapel demonstartes the decorative possibilities of marbles. The chapel of the Blessed Sacrament, which lies on the north side of the choir, is fronted by a screen and gates of great beauty. Artist and metal-worker have rarely produced finer work than this.

Chapel of Holy Souls, New Catholic Cathedral at Westminster, London. An example of the decorative possibilities of marble. Note the effective designs of floor and dado, and the unique treatment of Altar, a splendid piece of marble panel work surmounted by mosaic work illustrating the "Triumph of Life Over Death." Mr. John Francis Bentley, Architect.

The altar is a solid block of polished gray Cornish granite, weighing fourteen tons; the baldachino surmounting it is an exquisite piece of work, with his designs for which the architect was especially satisfied. It is of white marble, carved, panelled and richly inlaid with lapis-lazuli and supported by eight monolith marble columns of dark color and wonderful polish. With the light from the southern windows streaming upon it, the effect is extraordinary. Probably in no other building in Europe have so many exquisite marbles been assembled, or such care bestowed upon their selection. The grain and

texture indicate the many different sources of their origin. In the Byzantine Church of Sancta Sofia at Constantinople, Mr. Bentley had seen some marble columns which fulfilled his exacting requirements, but all trace of the quarry whence they came had been lost for centuries. Chance revealed a description of this quarry, which was located and reopened, and produced many of the beautiful monoliths in the building, that compel admiration by their high polish and delicate bloom-like coloring. During building operations all marble columns were coated with wax to preserve the polish.

A stone flooring was provided in the plans and was laid according to design in the northex. It was not, however, completed in the nave, where a floor of hardwood, more suitable to the cold northern climate, was laid, which harmonizes well with the brick walls in their present state. Eventually the wall surface of the whole interior is to be faced with marble, painting and mosaic First a dado of paneled marbles forty feet in height, and above this, mosaic. Mr. Bentley's scheme for this latter decoration provides for a history of the church. A century will doubtless elapse before all this is completed. The cost of such work is heavy and the execution slow, since competent workers in mosaic are few. Indeed, Mr. Bridge, who had charge of the mosaic work, actually organized a school of women art students for mosaic. Much of this wall decoration has been completed in the sanctuary and it affords some measure of the ultimate appearance of the interior.

The Nave, New Catholic Cathedral at Westminster, London, with its extraordinary effect of space and vastness. Simplicity of treatment and excellent lighting are two of its principal features. The piers and arches are gigantic, but perfectly balanced. Note the effect of the light on the Baldachino from the dome of the Sanctuary. The Cross mars somewhat by excessive size. Mr. John Francis Bentley, Architect.

A critical analysis of this building would specify, as its gravest fault, the style of the architecture; for Christian though it be, the Byzantine style, evolved in a land of sunshine and strong lights and shadows, is least effective in a dull, northern climate. Picture the exterior of this cathedral, distant, in the shimmering heat of a southern sky, and you have the natural atmosphere. This knowledge increased the difficulties of the architect, who has, nevertheless, created a beautiful monument. The thoroughness of his work is apparent throughout, from the cross at the top of the campanile to the well lighted crypt chapel beneath the choir.

The Westminster Cathedral is the most important

The Baldachino, New Catholic Cathedral at Westminster, London. An exquisite canopy of white marble, carved, panelled and inlaid with lapis-lazuli, and supported by eight monolith marble columns. The Altar beneath is a solid block of granite weighing fourteen tons. Every marble column in the building is a monolith. Mr. John Francis Bentley, Architect.

work of the Catholic Church in England since the Reformation and, architecturally, the greatest ecclesiastical production for centuries.

THE VALUE OF PICTURE POSTALS to an engineer (and this may also apply to the architect) may not appear very marked at first thought, but in a paper before the Municipal Engineers of the City of New York on improvements of the appearance of municipalities, Mr. Charles W. Leavitt, Jr., stated that many valuable hints as to the design of structures from the aesthetic point of view might be gained at a very small expense from a study of the French, Italian and Austrian postals. He advised all engineers engaged in the design of public works to form a collection of these cards, on account of their information regarding harmonious and pleasing design. While in Paris he obtained several thousand cards showing views of the French streets, parks, lamp-posts, bridges, buildings, drinking-fountains and other structures which help to make or mar a city's appearance, and these cards have been of considerable assistance to him in his practice in this country by furnishing suggestions for the treatment of public works.—ENGINEERING RECORD.

REINFORCED CONCRETE IN BUILDING CONSTRUCTION.* —Early and Modern Cements.—European and American Systems.—A General Treatise on the Principles and Methods of Construction as Applied to Various Work.

By EMILE G. PERROT, Assoc. A.I.A., Mêm. A S.C.E.

THE OLD TIME-WORN ADAGE "There is nothing new under the sun," has never found a better application than in the revival of concrete construction. It is now an old story with us as to the use the Romans made of concrete in their aqueducts, bridges and buildings. Of course, the modern use of concrete differs from that of the Roman just as modern engineering science has outstepped the ancient. Hence, we must expect to see numerous innovations in the application of concrete, especially in its latest development as reinforced concrete.

Violet-le-'Duc, in his dictionary of Architecture, gives illustrations of the early application of concrete, not only by the Romans, but also by latter civilizations, notably in France, where he shows the use of concrete for window lintels in a chateau at Carcassonne, built at the end of the eleventh century.

Plain concrete is nothing more than a kind of masonry. Ordinarly rubble masonry composed of small stones and concrete composed of large stones may come under the class of either masonry or concrete. The concrete employed by the Romans in many cases, especially for buildings, was veneered, sometimes with brick, sometimes with stone. Our modern Roman shaped brick owes its origin to the Roman protolype, which was a long, thin brick like our modern one, but with one side pointed so as to better bond with the concrete backing.

EARLY AND MODERN CEMENTS.

The important constituent, however, of both the rubble and concrete, is the binding agent or cement. The Romans used a natural cement, while in modern practice, we use Portland Cement, and it was not until the manufacture of cement in Belgium, France and Germany, in about the year 1860, that reinforced concrete was attempted.

The use of lime as a binding agent for stone, brick and other materials was known in very early times. How long this preceded the use of natural cement, or when the latter was introduced is unknown. It is known, however, that over 4,000 years ago the Egyptians made natural cement having decided hydraulic properties, and over 2,000 years ago the Romans made a similar cement of excellent quality, which they used for foundations, piers, sewers, water pipes, etc. Prior to this an aqueduct was built at Carthage over 70 miles long, and which at one point crossed a valley where natural cement arches over 100 feet high were used. Some of these are still standing, a testimony to the high quality of cement manufactured at that date.

In Peru and Mexico, walls have been found so old that the rock has been worn away, leaving the cement mortar projecting from the joints. The time of their construction is only a matter of conjecture.

The beginning of the modern practice of cement making is ascribed to John Smeaton, the engineer who constructed the Eddystone Lighthouse in the English Channel. While looking for a mortar for that purpose, he discovered, in 1756, that impure limestones containing a certain amount of argillaceous matter possessed decided hydraulic properties when calcined.

The discovery grew out of the necessity of securing a strong mortar that would withstand the influence of sea water and also the mechanical action of the violent storms to which the lighthouse was exposed. The problem was successfully solved by Smeaton, who, after testing the various limestones of England, established the principle that a limestone that, when dissolved in hydrochloric acid, yields a residue of from 15 to 25 per cent. of solids, will, when mixed with sand, harden under water. This residue, which is mostly silica and alumina, practically represents the chemical constituents of the Roman pozzuolana.

As a result of Smeaton's discovery, search was made all over England for hydraulic limestones, and among others found were liver-colored lumps or nodules of natural cement rock, discovered by Parker in 1796. From these the first natural cement known to commerce was produced, and the name of Roman cement was given to it, because its chemical composition was about the same as that which had become famous among the Romans. This cement very much resembles the Rosendale and other natural common cements found in the United States. This discoverer of natural cement involved a very simple process of manufacture, and is still adopted in the production of many thousands of barrels of light-burned hydraulic cement made in the United States to-day.

The first Portland cement made in America was by the Coplay Cement Company, at Coplay, Pennsylvania. David O. Saylor, the president, conceived the idea of making Portland cement from the argillaceous limestone from which they were making natural cement. Early in the seventies, he produced a cement that showed a tensile strength equal to the imported, but which, after a time disintegrated. Saylor's work was of the experimental and practical order, and realizing the necessity for a study of the chemical composition of his materials, he employed John W. Eckert, a graduate of Lehigh University, and to him is due the credit of demonstrating the adaptibility of this new kind of material to Portland cement manufacture. This marked the beginning of the Portland cement industry, and from the hundred of acres of this material in the Lehigh Valley and New Jersey district, thousand of barrels of cement are being made daily. Portland cement is also made in other parts of the United States, but of different materials.

INVENTION OF REINFORCED CONCRETE.

With the growing favor of plain concrete in construction, and the knowledge of its constitutional infirmities, it is but natural that the recent rapid development of concrete reinforced with bars of metal distributed throughout the material should have been employed to overcome these weaknesses. So successfully has this been attained, that the introduction of reinforced concrete marks a new epoch in the history of building, the possibilities of which seem unlimited.

The invention of reinforced concrete is generally attributed to J. Monier, a French gardener, who, in 1868, constructed flower pots with concrete strengthened with a metal network in order to reduce their thickness. This modest beginning was the starting point of numerous other applications.

At the Paris Exposition of 1855, however, there was exhibited a boat constructed on this system by Mr. Lambot. In America the first example of this construction was in the year of 1875, when W. E. Ward constructed

*Paper read at Toronto before first annual convention of Canadian Cement and Concrete Association.

a house of concrete in which the floors were reinforced with bars; but it is to E. L. Ransome that we owe the use of reinforced concrete on this continent.

PRINCIPLE OF CONSTRUCTION.

The principle of this construction as used for supporting members in buildings, is based on the following facts:

Every simple beam, loaded either uniformly over its length or concentrated at any point thereof, is in compression at the top and in tension at the bottom.

By using steel rods of the proper area and at the proper location to resist the tensile stresses, and arranging the concrete so as to resist the compression, the beam will be in equilibrium, as the resistance of concrete in compression is so much greater than it is in tension, the latter being of a low value, no dependence is placed upon the concrete to resist the tensile forces, sufficient area of steel being introduced to resist these strains. The force of adhesion between the concrete and the steel is, however, sufficient to transmit the internal stresses across the section of the beam, so that the fundamental principle of the theory of the beam is applicable to this system of construction the same as to a beam composed of a homogeneous material.

EUROPEAN SYSTEMS.

Of the European Systems, the Monier System was the first to be used on a large scale. The slabs are reinforced in both directions and supported upon iron beams. The Cottancin System was patented in 1889 in France; and consists of wover wire.

The Hennebique System dates from 1879 and is used for beams, slabs and columns. This system was not brought out until 1892. Mr. Hennebique was one of the first to introduce the reinforced concrete beam, although Coignet and Cottancin in France, Moller in Germany and Ransome in America introduced this method at about the same time.

The Moller System, brought out by Professor Moller of the Polytechnic School of Brunswick in 1894, is used for floors and bridges. In this system use is made of a fish-bellied beam supporting a slab reinforced with rolled beams.

The Bonne System, introduced by M. Bonne of Paris in 1893, is used in the manufacture of pipes, special iron sections are used made in form of a Latin Cross. Bridges are also constructed on this system.

The Bordenave System, used in 1887, is confined to the construction of pipes, sewers, reservoirs. The Boussiron and Garric System is used for slabs and beams in buildings, etc. The rods are located in the bottom of the beam with V-shaped stirrup projecting upwards.

The Matrai System was invented by a Hungarian engineer. This system uses steel beams with cables running at right angles to the beams and in a diagonal direction. In the Locher System, the reinforced consists of layers of flat bars some of which run the entire length of the beam, while others stop off at various points along the beam, being turned up at the ends forming stirrups. In the De Valliere System the stirrups are twisted and have an eye for the bars to pass through.

Francois Coignet was the first to point out the advantages that would result from the combination of metal and concrete, in 1861. His son communicated his theories to the French Society of Civil Engineers in 1894.

AMERICAN SYSTEMS.

In 1876 Mr. Thaddeus Hyatt made many experimental beams with iron introduced in a great variety of ways, as straight ties with and without anchors and washers, truss rods in various forms, flat pieces of iron set vertically and laid flat and anchored at intervals along the entire length. These experimental beams were tested and broken by David Kirkaldy of London. In the year 1877, Mr. Hyatt published a work entitled, "An account of some experiments with Portland cement combined with Iron as a Building Material," which contains a description of these tests and dicussion of the results obtained. This is the oldest American System, and was used principally for slabs. Flat bars on edge punched, with round rods threaded through them, was the system employed for reinforcement. Mr. Jackson afterwards applied this principle to beams in 1877.

The Ransome System was invented by Mr. Earnest L. Ransome, who operated in San Francisco. His improvement was patented in 1884, and consisted of square twisted bars used in beams. He was the first in America to use reinforced concrete on a large scale. At the present time numerous systems and bars are on the market but it is not in the provence of this paper to go into details of each one.

We see from the above that the early use of reinforced concrete was for tanks, reservoirs, pipes, bridges and like structures, and the application to buildings was gradual, first being used in connection with rolled beams as a filling or slab. This was the manner in which the Monier System was first employed in France. As the use of the material became more general, reinforced concrete beams, as well as slabs, were used. Then reinforced concrete columns were introduced, and finally whole buildings were constructed of this material.

As the possibility of making an economical and thoroughly fireproof structure in reinforced concrete became evident, progressive manufacturers seized the opportunity to erect buildings of this material. In Europe manufactories were erected in which the entire structural members were of reinforced concrete, the walls being brick paned or filled in between columns with brick spandrels and windows. This construction is used to this day, and makes a very economical method of building.

The next step to brick paning was to make the entire exterior of concrete, omitting the brickwork entirely. This is done by constructing the walls with columns under the girders and filling in between with a lighter construction of concrete, or making the entire wall one thickness, in the same manner as is usual to build a brick wall. Of course, numerous variations of these several main methods of construction have been employed, and as the art progresses we find some interesting combinations of construction which were not dreamed of in the early days. We even have Edison, the wizard of Menlo Park, startling the world with his twenty-four hours concrete house made in cast iron moulds.

METHODS OF CONSTRUCTION.

One of the common methods of using concrete is to build the exterior and bearing walls of brick, and to make the interior columns, girders, beams and slabs of reinforced concrete. Of late buildings constructed entirely of reinforced concrete have become very common, but as the manner of finishing the exterior concrete is in a rather unsettled condition, some persons prefer to use brick walls, simply using the concrete in lieu of what would ordinarily be built in wood, or possibly steel and terra cotta. One of the most satisfactory ways of using reinforced concrete is to make a concrete cage similar to a steel cage and surround the cage with brick or terra cotta.

Where brick walls are not desired, reinforced concrete wall columns, as mentioned above, make an ideal method of construction, as there is in this system the least amount of concrete poured as part of the monolith, thus reducing the danger from errors showing in the finished work. The paning or filling between columns can be done after the forms are removed from the wall columns, and with a different material if so desired; solid plaster partitions or wire lath and channel iron studs can be used if desired. This cheapens the construction of the walls a considerable

amount, as the costly item of concrete walls is usually the forms. In order to present a respectable appearance, the forms must be accurately and neatly made, and this feature usually adds to the cost.

Continuous walls of concrete are usually used where an abundance of light is not desired and the openings are few; in this case the thickness of the wall can be materially reduced from that usual in brick. The Philadelphia Building Regulations permit reinforced concrete walls to be made two-thirds the thickness of brick. Concrete blocks used for piers make an excellent construction provided the voids in the blocks are filled solid with cement grout and steel rods and ties introduced.

BEAMS, GIRDERS AND REINFORCING BARS.

As reinforced concrete beams became more and more popular, various attempts were made to introduce systems of floor construction that would be different from those in previous use. As most of the systems were patented, it was necessary to deviate from what had been done heretofore. This has led to a number of modifications in building floors, which, while appearing on the surface to be radically different from each other, can be classed under three main divisions, varying from each other in some fundamental.

The first group consists of loose bar systems in which the reinforcing elements are separate bars or rods, whether plain or deformed.

The second group consists of built-up frames making a number of bars into a unit and placing them in the mould as such.

The third group consists of moulding the beams and girders in advance on the ground, permitting them to harden and then to erect them in much the same manner as steel or wooden beams are erected. This last system has not been very widely employed. The Edison Portland Cement Co. has used this system in a building, built for themselves. They call the system "Separately Moulded Members."

It is seen that the shape of the bar in the above classification does not influence the grouping of the system. It is the writer's belief that the use of the word "system" has been abused by being applied to a form of bars instead of to a method of applying bars for the purpose of reinforced concrete.

Each of the above classes or groups can be sub-divided into variations from the general type; also, there are combinations of structural steel shapes with concrete which could be classed in a separate group, but it was thought best not to confuse strictly reinforced concrete system with any combination of the two.

The use of plain bars for reinforcing concrete seems to have found favor in Europe to the exclusion of almost any other type, principally on acocunt of the universal rolling of round and square rods, which make them more readily obtainable and in general answer the purpose. Their use, in the writer's opinion, should be restricted to such work where the loads are quiescent, as there is danger of the bond between the concrete and steel being broken if the construction is subjected to shocks. In important members, hook ends should be used on the bars to assist in preventing slipping of the bars; also, when plain bars are used, they should lap much further than if deformed bars are used.

In the United States, practice seems to favor the use of deformed bars. There are a number of patented bars on the market calculated to increase the bond between the steel and the concrete. In figuring the area of these bars, net sections should only be considered, as it is very seldom that the projections add to the area of the bars. Cold twisted square bars are much used and constitute one of the best forms of bars. High carbon steel bars are being made from original billets used for reinforced concrete, and if deformed make excellent reinforcing bars, but on account of their brittleness should only be used in sizes of one inch and under and where sharp bends occur, they should be made hot.

The trussed or Kahn bars has the double feature of being a deformed bar, as well as providing some stirrup for the web reinforcement of the beam.

The use of expanded metal and a webbing or fabric consisting of main wires and secondary wires at right angles to the principal ones are, in effect, deformed bars, the difference being that there are a number of them assembled together.

In girder frames with the stirrups shrunk on or otherwise rigidly attached to the main bars, the adhesion is so much increased as to bring this type under the head of deformed bars.

The use of cables for reinforcing beams and girders is not considered practical, although there is one system on the market which advocated its use. The writer cannot see any advantage gained in the use of cables for beams and girders, and a decided disadvantage is apparent, as the cable to be effective should be drawn up tight, which is not practicable in beam and girder construction. For slabs in connection with a webbing, cables may be successfully used, but they will be of little value unless drawn up tight.

STAIR CONSTRUCTION.

We have seen how reinforced concrete is applied to walls and floors. We will review briefly its use in connection with the various adjuncts of a building, such as stairs, chimneys, footings, partitions, reservoirs, etc., also the various methods adopted for waterproofing concrete.

The practice of making stairs of incombustible materials, even in non-fireproof buildings, is not new; the use of cast iron strings, horses and risers with slate or marble treads is very common. Hence, it is only natural that in a fireproof concrete building the same precaution should be taken, and as a matter of fact, we find a ready application of reinforced concrete to stairs.

In buildings of the factory type, the stairs are usually enclosed by a wall or fireproof partition and sometimes the stairs are of the return type, having two runs between stories with a half-pace or landing. If this is the case, each run forms an element for treatment by itself, having the header beams carried on the enclosing walls, which are usually constructed at the same time the stairs are built if the walls are of concrete. If the enclosing walls are of brick (supported on the concrete floor and columns), the stairs may be built first and the brick walls around the stairs afterwards.

However, the building of the brick wall first, leaving pockets for the ends of the beams and slabs where half-paces and landings occur, is to be preferred, as then the concrete can be made to flow into the pockets and grooves left in the brickwork, thus solidly filling the entire space; while if the walls are built after the stairs are constructed, underpinning the ends of beams and slab is necessary to secure a firm job. The usual method of building the stairs of the type mentioned is to consider one run or flight as an inclined slab having the step cast thereon, resting at the top and bottom of the runs on beams or headers. This involves only a simple calculation to determine the thickness of the concrete under the step and the size of the reinforcing steel.

Sometimes, by reason of there being a large well in the stairs and consequently no means of supporting the interior corner of the quarter-pace or landing, it is necessary to run a string around the well of the stairs. This string acts as a beam and is heavily reinforced. Sometimes in double threaded stairs in which there are two flights or runs over each other to the story, in order to save head room no header beam is used, but the stairs are carried on the side walls having the main reinforcing steel running parallel to each riser in the bottom of the soffit.

If no special finish is desired, the treads and risers are finished with a 1 to 2 cement and sand top coat, the same as for sidewalks. The edge of the step and soffit of the stairs are finished smooth with a cement coat brushed on, unles the stairway is plastered, then the soffits and edges are plastered with the rest of the work. If a rich finish is used, the rough concrete stairs can be covered with marble treads and risers with an ornamental balustrade to match, as shown in the illustration.

CHIMNEYS.

Much discussion has been given in the technical press to the construction of the reinforced concrete chimneys. This has been brought about largely owing to the fact that some of them have collapsed. My own experience in this matter is that while reinforced concrete chimneys can be, and are, constructed on perfectly safe lines, there does not seem to be the same necessity to use concrete for this part of a building, since there are other materials possibly better adapted for this purpose than reinforced concrete. I refer to the hollow tile chimney. However, if it is desired to use a reinforced concrete chimney so that the exterior effect of the building as a whole will not be destroyed by using two dissimilar materials on one operation, a strictly safe and durable chimney can be constructed of reinforced concrete.

In designing such a chimney, it should be borne in mind that an inner shell or lining, built separate and distinct from the outside or supporting shell, is necessary. This need not extend the entire height of the chimney; furthermore, it should be constructed so that any needed repairs can be made to this inner shell without in any way affecting the main outer shell.

We have had three chimneys constructed of reinforced concrete for buildings designed by our firm, two of which have such a lining, while the third is without any lining, although the owners intend to have one put in.

My reason for recommending an inner lining is not that the concrete is injured by the heat such as is found in an ordinary chimney, but to prevent any disintegration taking place inside the chimney due to injurious gases discharged by the boilers. Should a chimney not be lined and disintegration take place, it might not be noticed in time to repair the damage before a collapse would occur. A very simple way of lining a concrete chimney is by a 1 1-2 inch or 2 inch coat of asbestos cement plaster, applied over wire lath, which is secured to the inside of the outer shell by expansion bolts, this wire lath being set about 1 inch from the shell to make an air space. If such a lining is used and in course of time becomes damaged, the wire lath can be replastered without removing any reinforcing metal; whereas, if a reinforced concrete inner shell 4 or 6 inches thick is employed, then when repairs are necessary, this inner shell must be, in whole or part, removed, and either new concrete placed to take its place or plastering must be resorted to. The former method is by far the cheaper and is just as effective. Furthermore, if the wire lath and plaster method is adopted, the outer shell can be erected perfectly plumb and in a straight line from top to bottom, thus doing away with the dangerous offset which has been common in the type of chimney where the inner core is of thick reinforced concrete and does not run the full height.

With the monolithic method, the concrete used in the chimney must be made very dry so that the forms can be shifted in a day and thus permit of their re-use in the section above. This concrete is not as dense as a concrete made wet, and consequently is more porous and not as suitable for reinforced concrete.

PIER AND COLUMN FOOTINGS.

The most common use of reinforced concrete is for large spread footing under piers and columns, as well as under continuous walls. The use of steel beams for this purpose is much older than reinforced concrete, but the cost of the beams made the use of this type of footing expensive, since the concrete that enveloped the steel beam grillage was not counted upon to take up any stress, only being used as a protection to the steel beams. However, in a reinforced concrete footing, the rods are introduced to reinforce the concrete; that is, to take up the tensile stresses, while the concrete resists the compressive stresses. In the case of piers the rods may be run at right angles parallel to the sides of the footing or diagonally. In the case of continuous footing having a uniform load per running foot, the main rods run across the footing, secondary rods being run parallel to the wall to bond the concrete together. If the load is not continuous on the footing, then a second layer of main reinforcing bars must be used in the top of the footing. Stirrups are not usually necessary in footing.

CONCRETE PILES.

There are three methods of constructing concrete piles, namely, separately moulded piles; piles moulded in a shell or pipe, which shell or pipe is withdrawn; and piles moulded in a light metal shell or mould sunk in the ground and permitted to remain therein. For foundations where water is encountered considerable money and time is saved over pier construction and the permanency of a concrete pile makes it more desirable than a wooden pile.

Reinforced concrete partitions, if made monolithic, can best be constructed by building the forms of matched boards run horizontally and securely fastened to suitable uprights; these forms are kept the proper distance apart by separately moulded separator cement blocks about 4 inches square, of a length equal to the thickness of the partition, having a 5-8 inch hole cast the length of the block through the centre. These blocks act as spreaders between the two sides of the forms, and should be spaced about one block to every 9 square feet of wall, according to the height of the partition, with 1-2 inch bolts passed through the forms and blocks to hold the forms in position. After the concrete has hardened and the forms are removed, these bolt holes are filled up with cement mortar flush with the face of the partition.

TANKS AND RESERVOIRS.

There seems to be no better use for concrete than for tanks and reservoirs. There are three general methods of watreproofing concrete: First, by adding some ingredient to make it waterproof, either in the form of a dry powder or a liquid, or the use of powdered hydrate of lime.

Second, the concrete after being placed can be waterproofed on the surface with either asphalt, pitch and paper, hydrex or some similar material; this is usually held in place by a second layer of concrete or a brick wall.

Third, concrete can be made waterproof by so grading the aggregates, sand and stone, so that the mixture becomes very dense thus preventing the percolation through the material, this latter method is the least reliable, but has been used with very good results in special cases.

RETAINING WALLS.

The use of reinforced concrete for retaining walls has become more general with the development of the material, and can be used in place of heavy masonry wall at a somewhat less cost. By providing a wide spread base and making use of the back material to add to the weight of the wall, a very economical wall can be built of reinforced concrete, and a number of such walls have been built. For a vault or cellar, walls to resist earth pressure, a reinforced makes an admirable construction.

Concluded on page 55.

BONDS, MORTAR JOINTS, COLORS AND PATTERNS.—Elements Which are Factors of Composition in Artistic Brick Wall Surfaces.—The Opportunities Which They Afford the Designer for Character and Individuality of Treatment.—Some Interesting Examples.

A DIVERSITY OF OPINION seems to exist among certain members of the architectural profession, as to what should constitute the proper thickness for mortar joints in brick work, in order to obtain the most satisfactory and artistic results in exterior walls of brick surfaces. Some are inclined to adhere rigidly to 3-16 to 3-8 inch gauge, allowing but a fraction over this, as the extreme thickness; while others are, in theory if not so much in practice, leaning towards the adoption of a joint of a greater and more pronounced thickness, as being structurally correct and more effective from an architectural viewpoint.

In discussing the subject recently, a well known practitioner said: "As to what is the proper thickness for mortar joints in brick exterior surfaces, must be determined by the architect. His success depends, to a large extent, on his appreciation of the individual piece of work in hand, the character of bond which is employed, and the extent of the wall area to be treated. A joint which would be highly satisfactory architecturally, in one instance, would be found utterly lacking in another. Individuality in surface work, as in the design and plan of a building, rests solely with the architect's power of conception and ability to create. Mortar joints, bonds, contrasts, and the graduations of colors are the elements of composition, and these are found to be extremely elastic in the hands of the clever designer."

Fig. 1.—Facade of Club Building, showing an interesting treatment in diaper work. The bricks, 12 x 2½ x 4 inches in size, and of a rough texture, are laid up with a gray raked mortar joint, three-quarters of an inch in thickness, the bond being of a special character. The color tones are a soft warm gray tinged with brown, and white headers and special moulded bricks, on a smooth brown ground.

Kidder's treatise on Masons' Work, specifies the thickness for mortar joints, for common brick at 3-16 inch and not more than 3-18 of an inch, stipulating that every joint and space in a wall, not occupied by other materials, should be filled with mortar. Pressed brick, being usually quite true and smooth, can be laid with 1-8 inch joints, and they are often so specified. A 3-16 inch thickness, however, is probably stronger, as it permits a more thorough filling of the joint. It is impossible to completely fill 1-8 or 3-16 inch joints with mortar, and numerous small holes admit driving rain in streams and efflorescence and disintegration can in many cases be traced to holes in the facing.

According to the same authority, very little first-class work is now being done with fine joints. The general tendency is more towards wall surfaces with character and texture. The joints should be thick enough to bring the facings to an even bed with the backings and to allow them to be bonded with the headers. They may be from 1-4 of an inch to an inch in thickness. Frequently the joints are recessed from 1-8 to 3-8 of an inch, and sometimes the horizontal joints are recessed with the vertical joints flush, or vice versa.

A new style of brick work, introducing a somewhat radical departure from the conventional method of laying pressed brick, was conceived and evolved by a firm of Detroit, Mich., Architects, a little over a year ago. Since its inauguration, this style has steadily grown in favor, being adopted by a number of other architectural firms of that city in the erection of buildings during the past season. Its principal feature is in the joints which are usually of black mortar. These are made three-eighths of an inch deep and raked out to a considerable extent, thus leaving the wall with rather a unique appearance. The general custom had been to make the mortar for pressed brick, at the best, not more than one-quarter of an inch thick; and, while there was some doubt expressed by the mason who first undertook this method, as to the safety of the work, it was soon demonstrated that this treatment resulted in walls possessing both beauty and stability. This style is adapted to office buildings only and not for residences and small structures. One drawback is that it necessitates a procedure of carrying out the work, that is somewhat slower than the regular

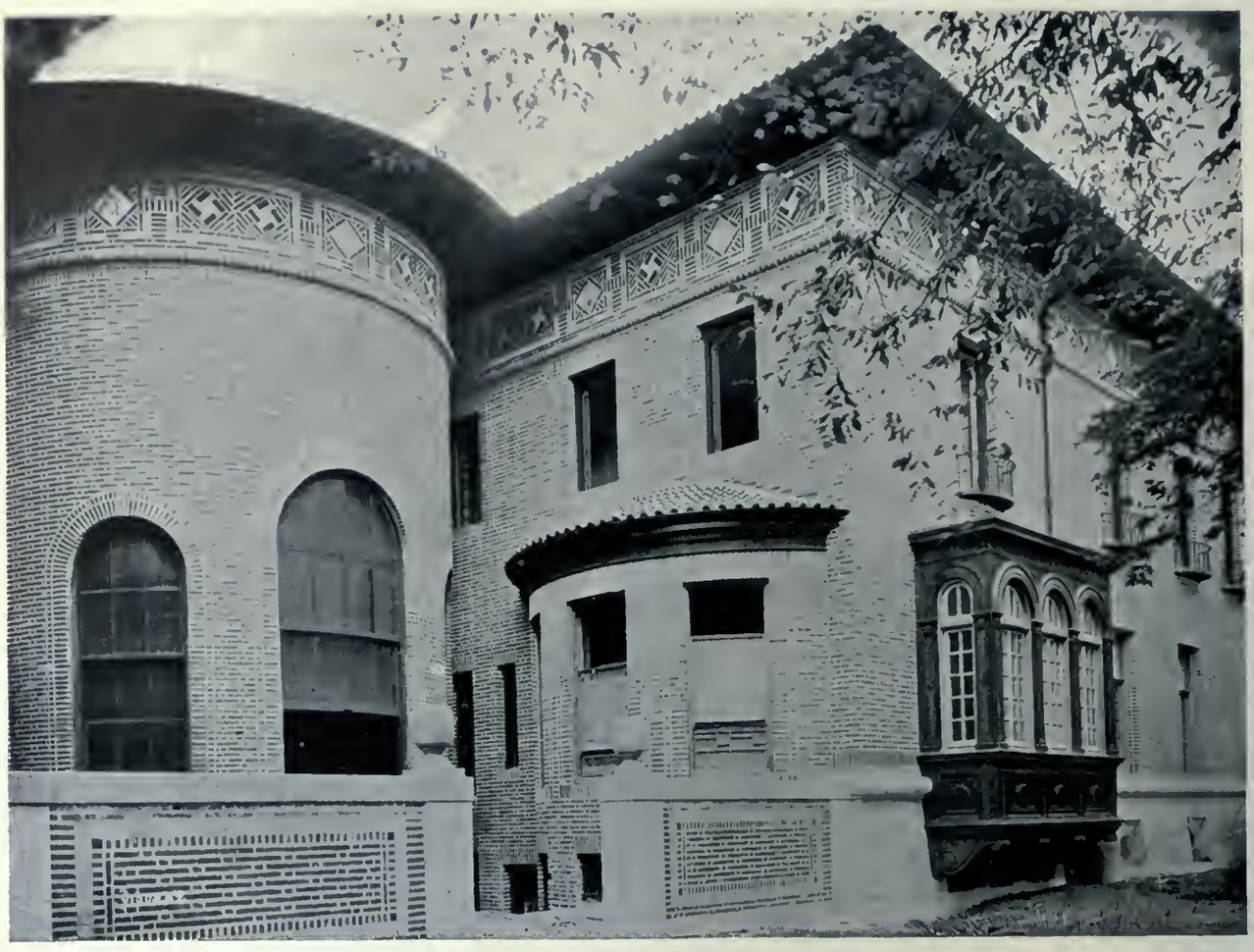


Fig. 2.—Brick residence in which the effect of the double stretcher Flemish bond and large horizontal mortar joints can be seen. The size of the bricks, which are of medium and dark shades, are 8¾ x 1⅞ x 3½ inches, and the vertical joints are narrower than those which run horizontally, the latter being 1/8 inch in thickness. The pattern of belt course beneath the eaves is particularly noteworthy.

method. Not more than four or five courses of brick can be laid at one time and the work must be done entirely around the building before the next series of courses can be begun.

With diaper work or surface patterns there seems to be unlimited possibilities for giving variety to plain wall space. It affords an excellent opportunity for the designer to display his originality in the treatment of brick surfaces. Great care and thought, however, are essential at all times. The exterior walls should not be so marked as to make the pattern insistent and thus interfere with other features of the building. Taste and discrimination are important factors, and especially so where different colors, tones, or shades are employed. One of the best opportunities for the use of colors lies in the direction of pattern work for freize-courses and band courses. Surface decorations, it must be understood, are by no means confined only to varying shades or colors of the brick. Sometimes an exquisite design results solely from the adoption of some particular bond, and the use of colored mortar. Again, a pattern owes the charm of its expression to the combination of colored brick and the nature of the bond. Proportions and sizes of designs can be materially changed by the use of headers, and very often in the latter case, the bond, in order to show the pattern work to advantage, is of a mixed character, and can, therefore, be termed as being *sui generis*.

It is the latitude given the architect in this respect that enables him to give a variety of expression to surfaces which would otherwise be decidedly plain. Much excellent work of this character is common in the brick buildings in European countries, and with a growing appreciation of the results to be obtained, the average architect on this continent is coming to regard the consider-

Fig. 3.—Detail of window of house illustrated in Fig. 2, showing the uniform manner in which the brick work flanks the window on either side.

ation of diaper work, bonds and mortar joints, as being

quite as much with the function of architecture, as is the design and plan of a building itself.

An interesting example of diaper work is to be seen in the club building illustrated herewith and designated as Fig. 1. The surface treatment shows a variety of patterns which results in a very commendable exterior. The

Fig. 4.—Hotel building of attractive design, the facade of which is built of red pressed brick with blue toned bricks for trimmings. These are laid up in the ordinary Flemish bond with white raked-out mortar joints of an appropriate thickness.

bond is of a special character, and the bricks used are of a rough texture, 12 by 2 1-2 by 4 inches in dimensions, and laid up with a gray raked, mortar joint, three-quarters of an inch in thickness. The color tones are a soft, warm gray tinged with brown, and white headers and special moulded bricks, on a smooth brown ground. Both the treatment beneath the upper cornice and the band course below the balcony are unique and effective, while the entire facade suggests unlimited possibilities in work of this kind.

In Fig. 2, an illustration of a residence of a somewhat unusual design, in that a portion of the house is

Fig. 5.—Detail of doorway of boiler house, illustrating the running or plumb bond, a bond common in a large number of buildings throughout the country. The bricks used in the structure are of varying shades, and the joints are half an inch thick, of gray color, cut rough and flush.

circular in plan, simple brick work is shown, with a decorated pattern or belt course extending around the building beneath the eaves. Here the effect of large horizontal mortar joints can readily be seen. The brick which is of the Indian tapestry variety, rough in texture, and of mixed medium and dark shades, is laid up in a double stretcher Flemish bond. The size of the brick is 8 3-4 by 1 7-8 by 3 1-2 inches, and the vertical joints are nar-

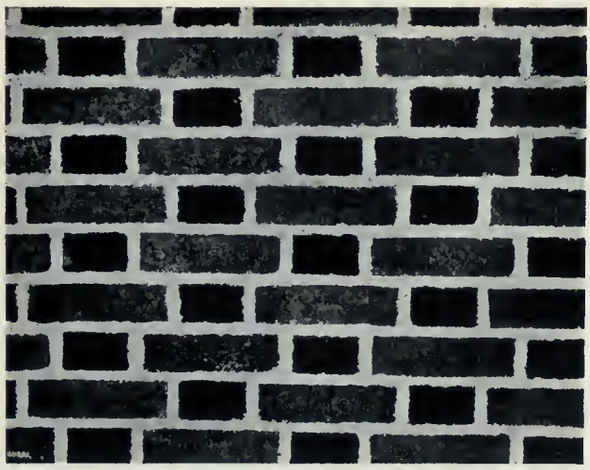


Fig. 6.—A wall of "tapestry" brick, 8 x 2½ x 3¾ inches in size, in Flemish bond and five-eighths of an inch struck mortar joints of white. All stretchers are of dark blue, while the headers are of medium red, to overcome the non-actinic properties of red and blue. This effect is a reversal of what is apparently the darker brick into the lighter, and vice versa.

rower than those which run horizontally, the latter being 1 1-8 inch in thickness, or a trifle over half the thickness of the brick itself. The mortar used is of a grey color, rough in texture and cut flush at surface. A very pleasing design is to be noted in the band course, in which the panel borders and nearly all center figures consist of mortar, the centres of some of the smaller panels

being of scagliola. Fig. 3 is a detail of window of the same house, showing how the brick is laid in order to uniformly flank the window on either side.

In the hotel building shown in Fig. 4, a very commendably designed structure, the facade is built of red pressed bricks with blue toned bricks for trimmings. These are laid up in the ordinary Flemish bond, with

Fig. 7.—Another example of the double stretcher Flemish bond, only here the mortar joints are much thinner, being but one-eighth of an inch in thickness and slightly raked-out. The bricks used are 8 x 2½ x 3¾ inches in size, and of a rough texture; the stretchers being of dark clear red, and the headers of a brown blue color.

white raked-out mortar joints of an appropriate thickness.

The running or plumb bond, is illustrated in Fig. 5, showing detail of doorway of boiler house recently erected for a large educational institution. This bond is quite common and can be found in a large number of buildings throughout the country. In this particular job, however, the walls have been greatly improved in appearance, by the adoption of brick of slight varying shades. The mortar joints are one-half an inch thick, of grey color, cut rough and flush.

A rather unusual piece of brick work, particularly so as regards the colors employed and the rough texture and quality of the brick itself, is shown in Fig. 6. This character of brick is known as the "tapestry" kind. The style of bond is Flemish; the bricks, which are 8 by 2 1-2

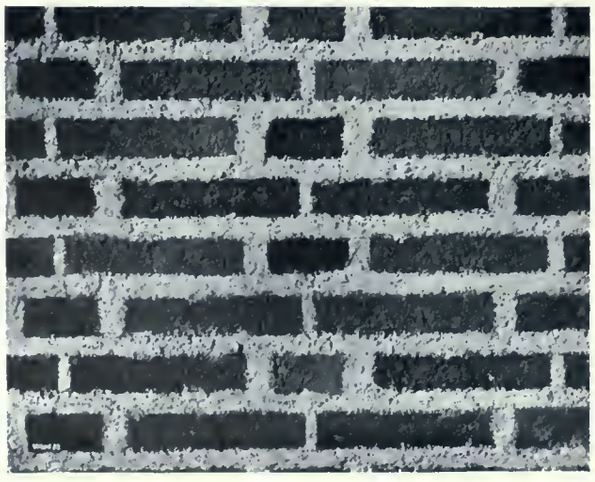


Fig. 8.—Although the bond is identical with that shown in the preceding illustration, in this case the joints, which are white and cut rough and flush, are 1¼ inches in thickness; while the brick itself is 9 x 2 x 3¾ inches in dimensions. Here the stretchers are gray and light brown, while the headers vary from gray and light to dark brown.

by 3 3-4 inches in size, being laid up in white struck mortar joints, 5-8 of an inch in thickness. All strechers are of dark blue, while the headers are of a medium red, so as to overcome the non-actinic properties of red and blue. This effect is a reversal of what is apparently the darker brick into the lighter and vice-versa.

Possibly of equal interest, is the brick work seen in Fig. 7. As with Fig. 3, the double stretcher Flemish bond is employed, only the mortar joints are much thinner, being but 1-8 inch in thickness and slightly raked out. The bricks used are 8 by 2 1-2 by 3 3-4 inches in size, and of rough texture; the stretchers being of dark clear red, and the headers of a brown-blue color.

Another example of double-stretcher Flemish bond work is illustrated in Fig. 8, but in this case the mortar joints which are white and cut rough and flush, are one and one-quarter inches in thickness; while the brick itself, is 9 by 2 by 3 3-4 inches in dimensions. Here the stretchers are gray and light brown, while the headers vary from gray and light to dark brown.

Fig. 9 shows a wall of bricks of an ordinary size, laid up in a running bond, with the conventional 3-8 inch, raked, white joints. The texture and color scheme are, however, noteworthy, the effect being produced with bricks of clear red, and reds with flushed edges.

Of late years, we are coming to see considerable brick used for interior work, the trend in this direction being more particularly noticeable in some of the recent ecclesiastical edifices and public institutions. The average student of architecture is well acquainted with the efforts of the early Byzantines and how admirably they expressed their ideas of interior work in brick, marble and mosaics.

Fig. 9.—A wall of brick of ordinary size, laid up in a running bond with the conventional ⅜ inch, raked, white joints. The color scheme, however, is noteworthy, the effect being produced with bricks of clear red, and reds with finished edges.

How it was possible for the use of brick to decline in this respect, can perhaps only be ascribed to one of the periodic retrogressions which art has suffered. It is said that everything moves in cycles, and it is quite probable that we are about to witness a revival in the use of brick for interior work, that will make the architecture of this age notable for its achievement along this line. Fig. 10 shows the interior of a modern church in which brick forms the principal element of the decorative scheme. The side walls and sprandrels of the arches are of a smooth buff brick, laid up in a running bond with a 1-4 inch, white, struck, mortar joint. The ceilings of the arches and upper portion of the walls consist of much larger sized bricks, semi-glazed and varying in shades, arranged in sort of a herringbone fashion.

The limitation of the possibilities of brick work in plain surfaces is by no means encompassed by the views of bonds, mortar joints, and patterns shown in this article. They simply show a variety of effects which suggest to what extent work of this character can be developed, and equally as good results can be obtained from bricks of other textures, different bonds and mortar joints, much depending on the nature and extent of the surface to be treated. It is quite plain, however, that the study of these elements is quite within the designer's cur-

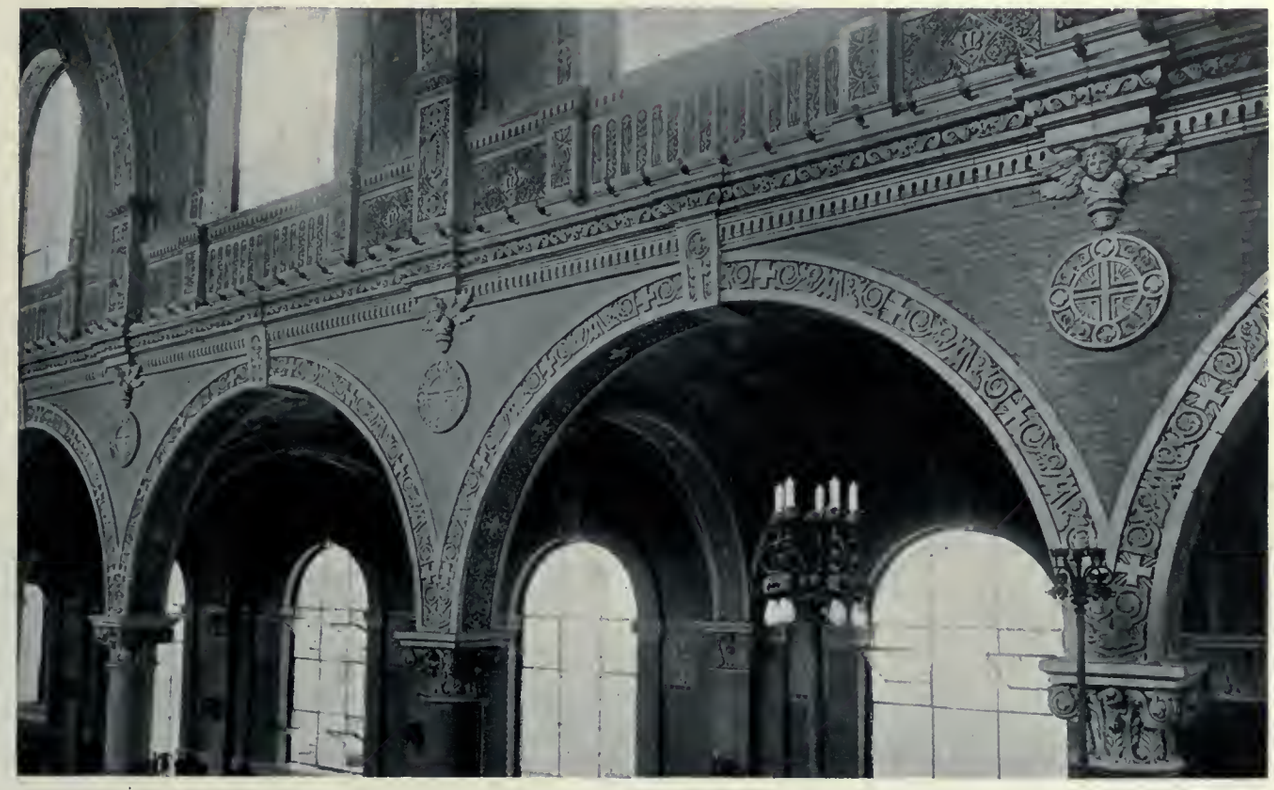


Fig.10. Interior of modern church in which brick is essentially an element of the decorative scheme. The side walls and spandrels of the arches are of a smooth buff brick with quarter-inch struck joints of white mortar. The ceilings of the arches and upper portion of walls consist of much larger sized bricks, semi-glazed and varying in shades, arranged in a sort of herringbone fashion.

riculum, and his success greatly depends on the degree to which he appreciates this fact.

The photographs used to illustrate this article were kindly loaned CONSTRUCTION by Mr. E. F. Dartnell, of Montreal.

REINFORCED CONCRETE IN BUILDING CONSTRUCTION.—Continued from Page 50.

We have seen how successfully reinforced concrete has been used as a structural material; how in the engineering world it has taken its place in the fore ranks of the materials used for construction purposes. It remains now for us to consider its adaptability as a material susceptible of decorative treatment, as well as artistic expression.

I will give you an idea of the fundamental basis governing the use of the material for decorative purposes when applied to building construction. The architect's means of expression is by the use of the materials of construction, which must be so moulded and shaped as to give the appearance of solidity; that is, that the building is a concrete reality, that it is solid and substantial in addition to being a thing of beauty. Hence the various shapes that enter into the design must be such as are suitable for the material out of which the part is to be moulded or shaped; it is here that the ability of the skilful designer is shown, since a shape or design that is suitable for one material is very frequently unsuitable for another. We all know that wrought iron can be bent and twisted into all manner of shapes and have a delicacy impossible in a less ductile material, as wood or stone; hence, a suitable design for a wrought iron grille is unsuitable for wood or stone. Now concrete is a plastic material, and its composition can be varied to obtain any desired result in the finished structure, hence, apart from the form it takes, the finish should be expression of the material.

This brings us to the pith of the subject, and at once suggests how we should treat our exposed surfaces to meet this principle of art. The customary plaster finish on concrete, even if the natural result of the process of moulding, is not a true finish, in so far as truth of expression in art is concerned, since the appearance of a smooth concrete wall is almost the same as a plastered brick wall and gives no suggestion as to the ingredients composing the body of the wall. Hence this character of finish cannto be said as rightly belonging to concrete.

The finishes in which the method of moulding the concrete is apparent, and also the one which exposes the aggregates entering into the composition of the concrete, should be the ones used when the true expressive character of the material is desired.

Apart from the expression of the inherent quality of a material, the effect which it is desired to obtain in any material is paramount to the material itself. So that if the feeling of lightness or heaviness is sought for in a design, the texture of the wall surface should harmonize with this idea. Concrete, being an artificial material, is, therefore, more susceptible to finer shadings of treatment if the aggregate is changed than many natural materials, and the cost is much less.

This phase of the artistic development of concrete is, I might say, still in its infancy, and much remains to be done to develop a real style in concrete. A very satisfactory method of exposing the aggregates of the concrete is to tool the surface, after the concrete has hardened, thus removing the thin film of neat cement and make a coarse picked surface with the stone or aggregate showing. If the stone is selected for size and color, any effect desired can be obtained.

AN ELECTRICAL PLANT to cost $5,000,000 is to be constructed at Grand Falls on the St. John River in New Brunswick, where there is a natural water fall of 135 feet. The plant, the contract for which was recently awarded, will develop an energy of 120,000 horse power, and power will be furnished to numerous towns in New Brunswick and Maine. It is expected that this enterprise will result in the establishing of many new manufactories, including a large pulp and paper mill.

BUILT-IN FURNITURE.—Designs, Descriptions and Methods of Construction.—Suggestions of Artistic and Useful Appointments in Interior Decorative Work.

BUILT-IN FURNITURE forms an integral part of the consistently appointed small or medium sized house, furniture designed to become a very part of the interior decorative scheme. We herewith reproduce from the CRAFTSMAN some creditable designs, with descriptions, and, in some cases, plans and details, showing method of construction, that will be found interesting to designers of economically and artistically built and decorated moderate priced dwellings.

Furniture of this type has a peculiarly interesting and homelike charm in the smaller residential structures, such as the craftsman houses which appeared in the last (June) number of CONSTRUCTION under the heading of "Selected Designs for Bungalows and Cottages," and it is becoming more and more a requirement of the architect to consider essentials of this character when designing and planning domestic work.

KITCHEN CUPBOARD.

Figure I. is a design for a large kitchen cupboard, and is meant to be a part of the construction of the house, as is evidenced by the casement window and wall section that appear between the two high cabinets. It is an easy matter, however, to modify the construction so that it can be made as a separate piece, and in that case the window would be better replaced by two or three shelves, which might be curtained if desired. Also, the section of the wall which shows in the centre, and which is made of wide boards V.-

Figure 1.—Built-in kitchen cupboard.

jointed, might better be replaced by a panel like those of the doors, or the whole space might be shelved. The construction of the piece speaks for itself. It is, of course, designed on severely plain lines and is supposed to be made of the same kind of wood that is used for the other woodwork of the room. If meant for a kitchen cupboard, it would afford ample room for dishes, cooking utensils and supplies. In a dining room it would serve for china closet, linen press and cabinet for silver and glassware, and in the living room it could be used to store away almost anything that it might be desirable to put out of sight.

Copper door and drawer pulls and escutcheons are suggested for this design, as they harmonize with the dark-colored wood intended to be used; but for other woods wrought iron might be more effective.

SIDEBOARD AND CHINA CLOSET.

The piece shown in Fig. 2 is meant for the dining-room, and is a combined sideboard and china closet. The construction is much simpler that that of the big kitchen cupboard and the piece is meant to occupy

Figure 2.—Sideboard and china closet.

about one-third of the space demanded for the other. The chief difference in the making is found in the doors of the cupboard, which have small square panes of leaded glass with broad muntins of wood. This sideboard also is easily convertible to other uses, as it would be quite as convenient in the kitchen as in the dining-room, and in a small kitchen would be better than the larger piece. Also it might serve as a cabinet for a living-room; but in that case, the whole open space should be shelved for books. In a house with little closet room the drawers might prove very convenient in a piece of living-room furniture.

DESIGN FOR CABINET.

Fig. 3 is a design for a cabinet, and is simple. It is primarily designed for the living-room. This cupboard, of course, can be fitted for a variety of uses, from the storing of such things as books, magazines and writing material, down to overshoes; and in camp life such a convenience would often be greatly appreciated. Yet like the former two this piece would be equally at home in the din-

Figure 3.—Design for combination bookcase and cupboard.

ing-room or kitchen, or wherever a combination of shelf and closet room happens to be required. Like the others also, this was primarily intended to be built into the wall, but can be made as a separate piece, if necessary. A slight touch of decoration is seen in the dovetails and tenons at the ends, but the natural beauty or crudity of the whole piece depends entirely upon the workmanship. Any one of these cabinets can just as well be made with an accuracy of workmanship, fineness of finish, and beauty of color that would harmonize with the most carefully planned surroundings; or it may be finished so as to express the camping character of bungalow furnishings—although, of course, there would be no difference so far as the construction goes. The whole difference would lie in the choice of wood and the finish of minor details.

BOX COUCH.

Another bit of furniture that is equally useful is the box couch shown in Fig 4. This is very strongly made with mortise and tenon construction, carefully pinned through with wooden pins so that racking apart is impossible. The decorative effect is entirely dependent upon those features which give strength to the piece, and is very interesting, the rails along the sides and ends being so adjusted as to give the impression of a long panel between. The ends are raised considerably higher than sides to allow a support for the pillows. The whole lower part of the couch, that is, the box proper, is carefully lined with wood so that it is proof against dust, moths, or dampness. It would be an excellent plan to make this lining of cedar,

as that fragrant wood is in itself a preservative, but, of course, this extravagance would be advisable only in case of a very finely finished

Figure 4.—Box couch.

couch, the lower part of which might be used for storing furs, winter garments and other things from which it is necessary to keep the moths. For a bungalow—and for storing in daytime of the bedding used upon the couch at night—a lining of plain pine would be quite good enough. The top of the couch is supported upon stout webbing stretched firmly across the frame. Couch springs are placed upon this webbing and then comes the thickly padded upholstered top, which does away with the necessity for a mattress and makes the couch entirely comfortable for use as a bed. The presence of one or two such couches in a bungalow or small cottage adds greatly to the sleeping accommodations, as well as offering a storage place for bedding or extra clothing. Like the other pieces, this couch can be made as plain or as sumptuous

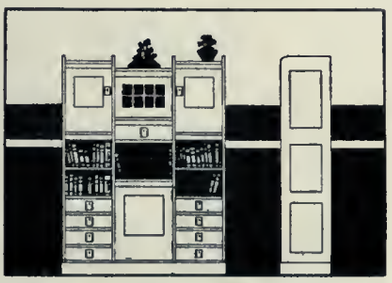


Figure 5.—Bookcase.

looking as seems desirable. It all depends upon the wood selected, the finish given and the material used for the upholstering.

BOOKCASE.

In the bookcase shown in Fig. 5, the arrangement of the open bookshelves with relation to the cupboards above the drawers below gives to the piece a marked individuality which would make it an interesting piece of furniture in any room. The door and drawer pulls and escutcheons are also definitely decorative in character, and the placing of the square panels in the cupboard doors, as well as the use of the small leaded panes of glass in the door of the upper central compartment, all combine to carry out consistently the quaint effect that is desired. This piece, and those that follow, are close enough to the craftsman idea to combine with them very well in a general scheme of furnishing, and in many instances, would add much to the decorative effect of the room.

BOOKCASE AND SECRETARY.

The combination bookcase and secretary shown in Fig. 7 carries out the same idea; the open compartments which serve as bookshelves being placed with an eye to the decorative effect of the whole. The square central cupboard is divided into a set of rather intricate pigeon-

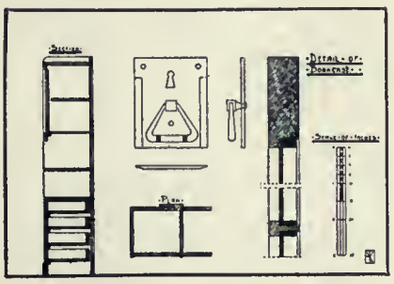


Figure 6.—Detail of bookcase shown in Figure 5.

holes for use as a secretary, and the long cupboards at the sides, as well as those at the top, give additional room for filing away manuscripts. In this piece there is a touch of applied ornament in the small geometrical design, which is inlaid in black wood in the upper part of each long panel.

BOOKCASE AND DESK.

The model shown in Fig 9 is a combination bookcase and desk. More open shelf-room for books, is provided in this piece, though there is also ample provision for the filing away of papers and manuscripts in the cupboards and drawers. In this case the inlay takes the form of one tiny square in the centre of each of the small panels in the upper

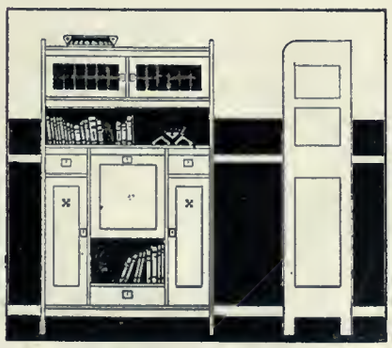


Figure 7.—Combination bookcase and secretary.

cupboard doors, and of four squares in each of the lower panels.

BOOKCASE.

The piece shown in Fig 11 carries more intentional ornamentation than the others of the group. In addition to the leaded panes at the top and the inlaid design on the panels of the

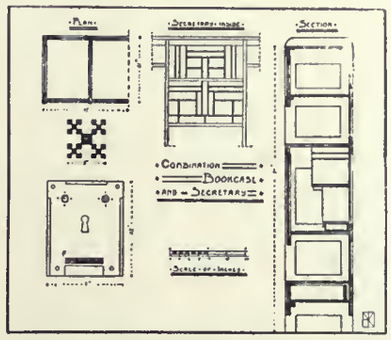


Figure 8.—Detail of combination bookcase and secretary shown in Figure 7.

three lower doors, the escutcheons and hinges are definitely decorative in character, and the corner posts depart from the usual severity of line in being chamfered at the top and bottom, and in showing a beading, which also appears below the doors. If the plainer effect is preferred, all these touches of decoration may, of course, be omitted, as the use of them is entirely a matter of personal preference.

SIDEBOARD.

The sideboard shown in Fig. 13 is of ample size, being eight feet in length, and provided with good-sized cupboards and seven drawers, large and small, for silver and table linen.

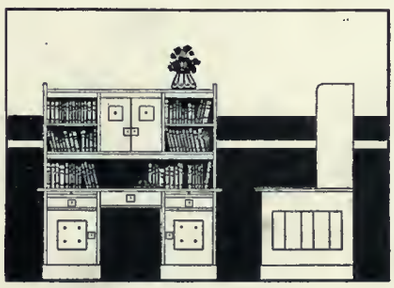


Figure 9.—Combination bookcase and desk.

The back extends nine inches above the top, and a rail is fastened across it in such a way as to afford support for plates and platters which may be stood on edge at the back. The doors, which are strengthened inside with chamfered cleats, are ornamented on the outside with long strap hinges of wrought iron. These, with the door and drawer pulls also of wrought iron, form the only touch of decoration. Nevertheless, the piece may be made exceedingly beautiful by using carefully selected oak or chestnut—or any other wood that is rich in color and hard enough for cabinet making purposes—and finishing the wood so that its full quality of color and grain are left revealed. While it may be given

a surface tone to harmonize with the color scheme of the room, this tone should be carefully chosen with reference to the innate color quality of the wood. The best way to treat almost any wood is to use a chemical process to deepen and mellow the natural tone and then, if any further modification of color is needed, give it a very light surface tone of gray, green or brown which will be hardly perceptible, and yet will bring the natural color of the wood into harmony with the color scheme demanding one of these tones. With some

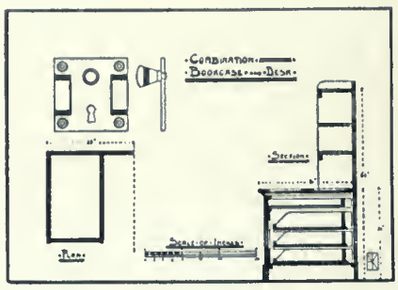


Figure 10.—Detail of combination bookcase and desk shown in Figure 9.

woods, wrought iron is by far the most effective for hinges, pulls and escutcheons; but for others, copper is more in keeping, and still others demand dull natural brass.

CUPBOARD.

The cupboard, Fig. 14, is a kitchen piece, and is made large enough to serve practically all the purposes of a pantry. This is made throughout of V-jointed boards, but in the lower doors the boards are used in the form of panels. The upper cupboard is shelved for the accommodation of kitchen dishes and supplies and would better be made with glass doors as shown in the model. There are two large cupboards below, each supplied with one shelf for the stor-

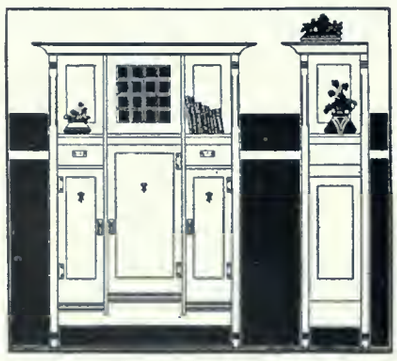


Figure 11.—Bookcase.

ing of the larger kitchen utensils and more bulky provisions. Each of these cupboards has two doors opening from the centre to allow the most convenient access to the shelves. Above these cupboards are four good-sized drawers and then a top shelf that affords a working space twenty inches wide. The upper cupboard is sufficiently raised above this shelf to allow it to extend to the full width, and in this recess a small shelf five inches wide is placed across the back to hold spice cans and such small matters.

COUNTER-SHELF.

The counter-shelf, Fig. 15, is placed directly below the kitchen window and conveniently near the sink. It is raised six inches from the floor so that the space beneath may be cleaned without difficulty, and has an ample supply of drawers and cupboards below the broad work-shelf at the top. The work-shelf overhangs the lower part sufficiently to allow plenty of room for anyone working there, and is supported on brackets so that it is quite strong. The shelf is used in the place of a work-table, and would be better if covered with zinc, both because the zinc is easier

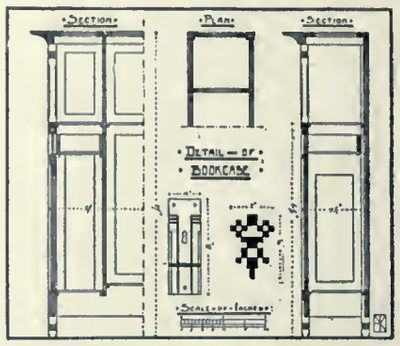


Figure 12.—Detail of bookcase shown in Figure 11.

Figure 13.—Sideboard.

to keep clean than wood, and because such a covering would make the shelf much easier to build at home, as there would not be the necessity for the wide boards and careful joining that would be demanded if the wood were left exposed.

FINISH OF WOODWORK.

As so much of the beauty of any scheme of furnishing or interior decoration depends upon the finish of the woodwork, we herewith give for the benefit of those who are interested or engaged in carrying out work of this kind, an excellent process used for mellowing and deepening the color of such woods as pine, British Columbia fir and cypress, but not oak or chestnut.

This process is simple, as it is merely the application of diluted sulphuric acid directly to the surface of the wood. The commercial sulphuric acid should be used rather than the chemically pure, as the first is much cheaper and is quite as good for this purpose. Generally speaking, the acid should be reduced with water in the proportions of one part of acid to two parts of water, but the amount of dilution depends largely upon the temperature of the weather. Conditions are best for the work when the thermometer registers 70 degrees or

Figure 14.—Kitchen cupboard.

more; if it is much above 70 degrees, the sulphuric acid will stand considerably more dilution than it will take if the air is cooler. Of course, the state of the weather must be taken into consideration only when the work is to be done on the exterior of the house, as with interior work it is possible to bring the temperature to the required height by means of artificial heat. Sunshine is not necessary to produce the desired result, as

Figure 15.—Built-in counter shelf.

the process of darkening is not oxidation, but corrosion. The final finish for interior woodwork, should be one or two coats of wax.

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Current Topics

A GRAVITY INCLINE at a German quarry generates power for reinforcing the quarry engine. A dynamo geared to the drum shaft is connected electrically to a motor on the engine shaft. The cars are started by running the dynamo as a motor, the change back being automatic when the dynamo voltage rises.

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ALTHOUGH THE USE OF SCAGLIOLA has been general on this continent only a few years, it is by no means a new invention. On the contrary, it is an old Italian process, revived in the early part of the sixteenth century by Guido Sassi. It was largely used by the Florentines in some of their most elaborate works, and was introduced into Great Britain by Wyatt about 1750. Properly used it is an excellent material. But it should never be employed to replace marble in monumental buildings, where strength, durability and richness are called for. Above all, it should never be used in juxtaposition with and in imitation of genuine marble.

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THE WINNIPEG BUILDERS' EXCHANGE is now comfortably settled in its new home in the recently completed Ideal Block at the corner of Portage avenue and Hargrave street, where two modernly equipped flats have been leased. The new quarters are far more commodious and conveniently arranged that the old place on McDermot street, and the accommodations are sufficiently ample to meet the growing requirements of the exchange for some time to come. In addition to a large Exchange room, 53 x 20 feet, with three adjoining estimating rooms, there is a board room, secretary's room with private office, and twenty-one large and small offices appropriately furnished. As all the space is well occupied, and as the membership is steadily increasing, the Exchange nowadays is a veritable hub of activity.

POSSIBLY THE OLDEST ROOFING TILE in existence has recently been brought to prominence in Alsace. The roofing tile has been used on the chapel in connection with the Castle Lichtenberg. The tile bears the inscription of the year 1682, and is remarkable for its size. Its length is 16 inches and the width is 6½ inches, and the tile weighs 4 pounds. The tile is burnt well and still of good color. The maker of the tiles has scratched in the tile clay a picture of the old castle with the towers.

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IT IS A WELL-KNOWN FACT that blue prints are apt to fade when exposed to sunlight or even to an ordinary strong light, and the result, during a long contract when plans are constantly in use, is unsatisfactory. According to the AMERICAN MACHINIST, a remedy is to be found by exposing the prints until badly burned, and then washing in clear water until all the emulsion is removed. While they are still wet, the prints should be laid, with the blue side up, on a smooth surface, and covered evenly with peroxide of hydrogen by means of a paint brush. The background will thus be brought out very blue, and the lines perfectly white, and the prints will remain practically permanent even in bright sunshine.

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A NEW BRICK with an outline of glass and centre of concrete has been invented by Mr. C. B. Lawton, of Pittsburg (Penn.). Any color of which glass is capable can be utilized. The surface is imperishable except by violence. A wall built in this manner, it is said, becomes like one solid sheet of glass and concrete, and will prevent the opening of a joint because of settling as is the case in ordinary brick or stone construction. It is further contended that a glass brick wall is proof against the passing of water. At the works of the company (in which the inventor is interested), is a large experimental tank which holds 1,000 barrels of water. When completed the tank was found to be proof against the passing of water, and it is now used for water supply and for fire purposes. These bricks can also be readily laid up with a butted joint without concrete filling, thus leaving a dead air chamber. This, it is claimed, fills a large demand where dampness is to be figured with or sweating walls are to be avoided. An additional claim is that partitions built of this brick need no centre support as the combination of glass brick with concrete filling makes a truss capable of holding its own weight and tenfold more, if necessary.

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ARCHITECTURE IN PARTICULAR found support and patronage at Constantinople even in those ages when the plastic arts had sunken into a state of barbarism and almost entirely disappeared. We read in the histories of the Byzantine emperors of the seventh, eighth and ninth centuries accounts of buildings of astonishing magnitude, splendor and beauty, says an English writer. These qualities especially distinguished the palace of Justinian II. among the numerous edifices erected by him; the walls of it were overlaid with gilded bronze and with marble slabs, and the entire floor was of marble. He, however, was surpassed by one of his successors, Theophilus. This emperor built the celebrated Bucoleon, in which stood a bronze lion seizing a cow; the summer palace Bnos, the palace named the Pearl, and Pentapurgion, the Karian palace and the Triconchus. To the last building adjoined the colonade of the Sigma, and an acoustic structure was contiguous to the latter. At the Triconchus and Sigma Theophilus constructed a fountain, the basin of which was set in silver. Below it was an eminence on which seats could be placed for his courtiers, and to which there led up a flight of steps of white marble from Proconnesus. The fountain was supported by two slender columns, on which stood two bronze lions from whose mouths water flowed, for the purpose of diffusing coolness over the open ground in front of the Sigma.

THE MAMMOTH NEW BRIDGE of the C.P.R. at Lethbridge, previously described in these columns, will, in all probability, be opened to traffic the early part of August. The last of the steel towers of the structure has just been completed and all that now remains to be done is the putting on of the deck. This bridge will rank among the world's great structures of its kind, and it is a glowing tribute to Canadian engineering skill and enterprise. Its construction involved the labor of a small army of men for a period of two and a half years, and the cost of its erection was $1,500,000.

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FIREPROOF CONSTRUCTION is coming to be more widely adopted in the United States with each succeeding year. There is a growing conviction among builders that it is not only the safest and sanest, but the cheapest in the long run. Building records of the country show that the total of new construction done in the 51 leading cities during 1908 amounted to $546,467,390. The building record in the same cities for the past month of March was nearly $64,000,000, just about twice what it was for March, 1908. A goodly proportion of this later work was built or is being built fireproof. Considerable reinforced concrete work is being done, although the largest percentage of fireproofing executed is of standard steel and hollow fireproofing tile blocks.

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AN EARTHQUAKE-PROOF BUILDING, says BRICK AND POTTERY, of London, (Eng.), has been worked out in design by Professor Boermel, a well-known engineer and scientist. The essential feature of the building is a massive foundation, consisting of a massive bowl upon which is placed a rocking foundation, the radius of whose curved bottom surface is somewhat less than that of the bowl. At its centre is a half-spherical pivot, fitting into a cup bearing at the centre of the foundation. Upon the rocking foundation is built the house or other desired construction. To prevent the movable portion from canting too freely, and to bring it back to the vertical position after the earthquake shock has passed, it is supported at eight points, near its periphery, by a series of spring buffer, which are bedded in the lower bowl-shaped foundation. The shock of an earthquake is transmitted to the building through the yielding springs, and its interior steel-frame structure is relied upon to take care of any remaining stresses that pass through the springs to the building itself.

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THE MASSIVE CONCRETE BRIDGE at Peoria, Illinois, has failed and many theories are advanced as the cause. Investigation, however, has shown happily that the failure was not due to the concrete structure itself but to a bad foundation. The two piers beyond the draw span toppled suddenly and noiselessly from their foundations and, carrying three arches of steel and concrete with them, slid into the waters of the Illinois River and sank almost entirely from sight. The pier beyond the draw was the first to give way, sinking towards the draw span. The sinking of this pier dragged the next one with its connecting arch with it, and this in turn dragged the second and third arches down to the water twenty feet below. The plans and specifications set forth that the piers which sank were to have been built on piling sunk six feet below the bed of the river, there being 110 piling under each one of the piers which gave way. These piers had been built on the piling without any regard as to whether rock bottom had been touched or not. Consequently, the weight of hundreds of tons had slowly but surely crushed down its frail support. Investigations have proven that the concrete structure itself was perfect and merely the fact that no care was taken to place the bridge on a rock foundation caused the destruction of this structure, valued at $100,000.

THE NEW TYPE OF CONCRETE RAILWAY TIE, of which the Italian Government recently ordered 300,000, is proving so satisfactory that a contract for a similar lot has just been awarded. The cost of the ties is $1.48 each, and it is understood that before long they will be universally employed on all lines throughout that country.

* * *

IT IS GENERALLY AGREED that the oldest house in the United States stands in St. Augustine, Fla., on a tiny, narrow thoroughfare near the center of the old city. This house was built in 1564 by the monks of the Order of St. Francis. It is a solid structure, built of coquina, a combination of seashells and mortar that is quite indestructible. In the early days of the Spanish settlements this substance was quite plentiful in the vicinity of St. Augustine, the walls of the old city gate as well as that of Fort Marion being built of it.

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CONSIDERABLE NEW WORK in railway construction will in all probability be shortly undertaken in the Canadian West. At the present time, in and about Winnipeg great interest is manifest regarding the proposed new line of the "Soo" railroad, which is to run from Thief River Falls to Duluth, thereby opening a direct line from Winnipeg to Duluth and Chicago. This is evidently a line projected to meet the plans of the Great Northern Railway Company, which is about to build a line from the international boundary into Winnipeg. Two survey parties have begun work, and the actual construction will follow. It is predicted the direct line between Winnipeg and Chicago will be in operation over the tracks of the Canadian Pacific Railroad by the fall of 1910. There is also considerable speculation over the probability of the "Soo" building a line to Fort William, connecting at that point with the Canadian Pacific, while it is the well-known intention of the Canadian Northern Railroad to build into Duluth from Fort William. These new lines indicate the activity in railroad circles of Western Canada, and their operation will mean much in the development of Winnipeg and the Prairie Provinces.

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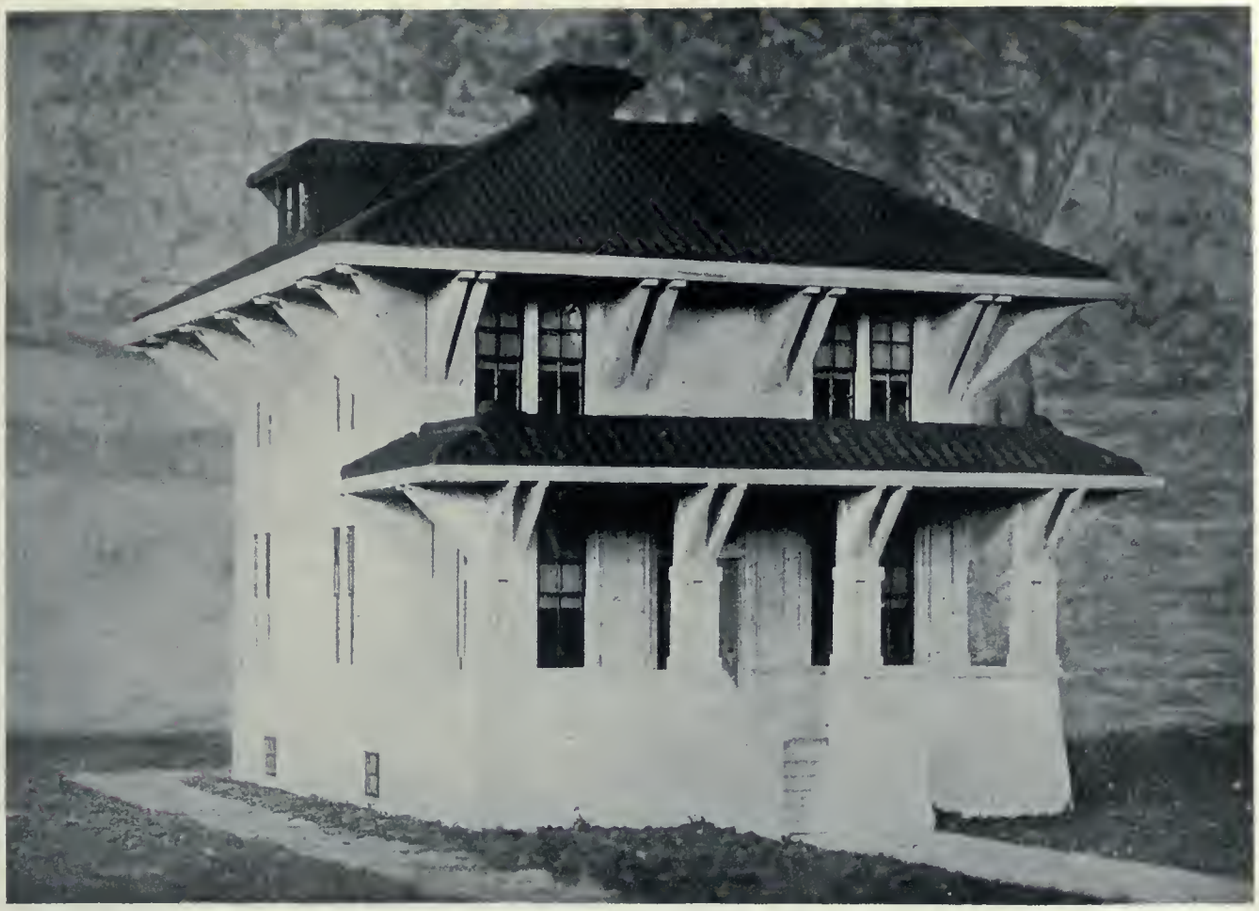
TORONTO'S LACK OF APPRECIATION of the aims and objects of the Canadian Cement and Concrete Association in treating their first annual show, held in the Queen City last March, as a purely commercial undertaking, has been the object of some very severe criticism, especially by our contemporaries in the United States, who fail to understand such unpatroitic as well as parsimonious treatment of an infant industrial organization.

CONCRETE of Detroit, in its July number, says: "Two things have been done recently by the official board of the Canadian Cement and Concrete Association that will mean a betterment of conditions across the border. The first and less important move was the decision to bring before the city officials of Toronto the benefits to be derived from an annual cement show. The city charged the association $1,150 last March for a week's rental on a cold, damp, over-ventilated market building in which the exhibition of concrete machinery and supplies was held. A committee from the Association will wait upon the Toronto Board of Control with a petition asking for a rebate of this charge.

"The Association lost money on its convention and show, as was anticipated. The city officials and the newspapers of Toronto seemed to look upon the exhibition as a purely commercial proposition. They refused to believe that it had any educational features and no helping hand was offered to the promoters of the project. It is to be hoped that the Association's committee will succeed in its mission and convince the board that the organization is working only for the improvement of the building trade in Canada and the education of the builders and the general public in the uses of Portland cement."



Front view of new model for Mr. Edison's $1,200 concrete, fire-proof workingman's house, the practicability of which the inventor claims he is about to demonstrate.

THE EDISON $1200 MONOLITHIC HOUSE.—New Model of One-piece Poured Concrete Dwelling Designed for the Economic and Sanitary Housing of the Working Class.—Adjustable Moulds Provide for Variety in Design.—Practicability of Invention Shortly to be Tested.

Under the heading "The Edison Concrete House," we published in "Construction," (May, 1908), an illustrated description of the method proposed by Mr. Edison for the erection of a $1,200 cement house for the working man. With this, we gave a criticism by Mr. E. S. Larned, C.E., of Boston, Mass., of Mr. Edison's model with his proposed methods of construction. Both architects and engineers did not believe that "the Wizard's" scheme was practicable; first, because it would tend to eliminate individuality in design, and, secondly, because it was not believed possible to pour concrete into a great set of molds, such as would be required to cast a complete structure in one solid monolithic mass. Mr. Edison determined to overcome these objections, and has just completed another model, in which Mr. Edison believes he has overcome the criticisms of his first attempt. The following is an abstract from an article which appeared in a recent issue of the "Cement World," and will prove of exceptional interest not only to architects and engineers, but to all who are concerned with the problem of providing sanitary, fireproof and vermin proof dwellings for our laboring classes, at a low cost.—Editor's note.

ARCHITECTS AND ENGINEERS and in fact all technical men who have a knowledge of the properties of concrete greeted the first announcement of the Edison poured house two years ago with incredulity and smiles. The most frequent objection, or criticism, offered was the apparent impracticability of pouring concrete into an intricate set of molds and securing a surface throughout that would be free from imperfections. "It will clog," "It will not flow," were expressions heard on all sides. Then objections were offered on artistic grounds. "Imagine a city of houses, every one of which was like all the others. It is preposterous," was said. Mr. Edison has answered all these objections to the full satisfaction of the most critical. Here are the important facts about the poured house which will be spoken of more in detail further on. He has produced a mixture of a consistency almost like water which holds the stone or aggregates in suspension, allows the mixture to flow freely to all parts of the molds and secures a uniform distribution of the aggregates throughout the mass. The molds are adapted to variations of arrangement, thus making it possible to change the style of houses with the same set of molds. With five or six sets of molds, therefore, a wide variety of style is possible.

Yet Mr. Edison makes no boast of his accomplishment. The first house itself, which will be cast in a few weeks, will be sufficient answer to all critics. And while hitches may occur and unforseen difficulties may arise it must be the conviction of any man who views the specimens of poured work in the laboratory—specimens in which the aggregate was held in suspension while being poured—that the poured house is a fact and not a dream.

For be it known that with this problem solved and with the further fact that the design for every one of the parts of the intricate mold has been completed and now awaits only the pattern maker and the foundry there seems no doubt of its success.

The model for Mr. Edison's $1.200 house, as is illustrated herewith, is about 4 ft. high and everything, even to the interior partitions were included, is on the cast. The window glass was not overlooked, and the little house is lighted by miniature electric lamps.

It has been mentioned casually that Mr. Edison has had this matter on his mind for eight years. His first idea was a two-family house, the designs for which were furnished by a New York architect. Considerable work was done on this design, which is the one familiar to all newspaper and magazine readers.

The work progressed so far that some of the patterns for the molds were made. But Mr. Edison came to the conclusion nearly a year ago that the design was not practicable and offered many serious obstacles. But more important than this consideration was the fact brought forcibly to his mind that the one-family house is the structure demanded. He brought into his organization George E. Small, a young engineer from Philadelphia, a man expert in detail work, and Henry J. Harms, an engineer who has seen service all over the world, particularly with the Dutch government in India. These men designed the house shown on these pages and were instructed after its acceptance by Mr. Edison to proceed with the designs for the patterns and make all necessary experiments.

A house like this built of stone, both Mr. Edison and his engineers say, would cost several thousand dollars. But if the operator of the molds for the Edison house buys his materials in large quantities it can be built for $1,200. Now this house is designed for one family with a floor plan 25 by 30 feet. It is intended to be built on lots 40 by 60 feet, giving lawn and small garden room.

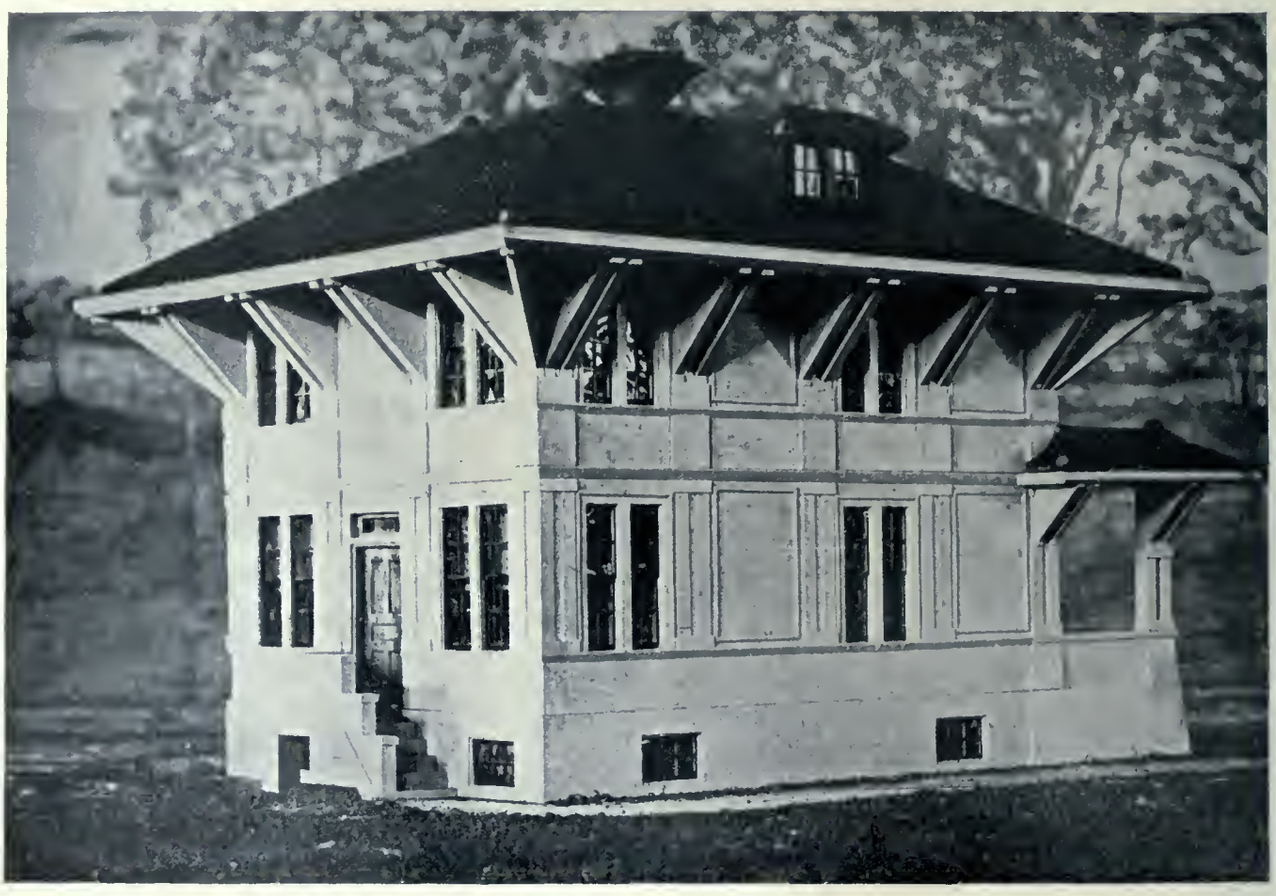
The front porch extends 8 feet and the back porch 3 feet.

On the first floor is a large front room 14 by 23 by 9½ feet high, intended as a living room, and a kitchen in the back 14 by 20 by 9½ feet high. In the corner of the front room is a wide staircase leading to the second floor. This contains two large bedrooms, a wide hall and a roomy bathroom (7 feet 6 inches by 7 feet 6 inches by 8 feet 2 inches high). The third floor has two large rooms.

Each room has large windows, so that there is an abundance of light and fresh air. The cellar, 7 feet 6 inches high, extends under the whole house and will contain the boiler, wash tubs and coal bunker. The main room, as well as the outside of the house, will be richly decorated.

The decorations will be cast with the house and will, therefore, be a part of the structure and not stuck on, as is done at the present time.

It is an important fact about this house that it will be entirely of reinforced concrete, including the roof, floors, bath and laundry tubs. The doors and window frames will be the only parts of wood or metal, so it will be practically fireproof. The mixture composing it is both water-proof and verminproof. The inside walls, stairs and partitions will be concrete also, and no plaster will be used. The surface left by the molds will be perfectly smooth and can be painted or tinted if desired.



View of model, showing how Mr. Edison's house will appear from the side and rear. The design, it must be admitted, is eminently superior in every respect to Mr. Edison's original model.

All the decorations and ornaments will be cast with the house and in every case will be a part of the wall which it adorns; in fact, the entire house will be in one piece, as if hewn or carved out of a solid piece of stone. The cost of the house, $1,200, Mr. Edison says, includes heating and plumbing and a structure ready for occupancy. He lays special emphasis on the fact that this price is based on the building of houses in large numbers where materials can be purchased in large quantities and where the gravel excavated on the site can be used in the mixture.

As has been indicated, cast iron molds will be used, set up on a concrete foundation or footing. Some time before the molds are set up this footing and the basement floor will be placed in order that they may be thoroughly set before the molds are erected. The molds will be placed on this footing, and the cast house will include the basement walls. Regulation reinforcing rods can be used in the molds. The stack for the bathroom and all

gas pipes will be placed at the time the molds are set up. Mr. Edison allows four days for the erection of the molds. For this house several hundred pieces will be required. Each will be fitted to be assembled with the others and locked readily. The time necessary for the pouring of the liquid he says will be only six hours. Four days after the pouring the dismantling can be done. Six more days are allowed for the hardening of the concrete. The inventor thus makes fourteen days as the time necessary for the completion of a house. This time may be reduced under favorable conditions.

It is estimated that with six sets of molds 144 houses can be built in a year. As the same forms are used indefinitely the cost is reduced to a minimum. Concrete residences at the present time and under the conditions that require the use of wood for forms are prohibitive on account of the expense for lumber.

As to the method of pouring there has been much speculation outside of all consideration of the mixture itself. Extra large size mixers will be used. The concrete after being mixed, will be dumped into large tanks from which it will be conveyed to a distributing tank on the roof or top of the forms. A large number of open troughs or pipes will lead the mixture to various openings in the roofs, whence it will flow down and fill all parts of the molds to the footings in the basement till it overflows at the tip of the roof. The actual pouring will require about six hours, and while the pouring is going on the mixture will be agitated to prevent the congestion of the materials. This will be further accomplished by the addition of a certain colloid, or clay, to the mixture.

The fact has been absolutely demonstrated by experiment, as proved by specimens in the laboratory and by actual and exhaustive tests, that a mixture is produced that has all the characteristics of a liquid, flows readily and fills all interstices and openings, and that during this flow the heavier aggregates can be held in suspension so that they are distributed evenly throughout the mass. This hardly seems credible, but the details of the ornamental work shown from the laboratory appears to substantiate this fact. Each piece was poured from this liquid that was almost as fluid as water, yet it is a true concrete and stands all the compressive and tensile strength tests. Any good Portland cement can be used in the mixture.

The most convincing fact in support of Mr. Edison's claim that the mixture he has evolved will be satisfactory in the pouring process is the result of a test at the laboratory.

In this test the face of the form was removed so that the surface of the material was exposed. The upright section to which the funnel was attached was 7 feet high. The lower section was 24 feet long, jointed to another section 16 feet long by a perpendicular part 3 feet high. The tail end of the form was another perpendicular section 3 feet high. The forms were made of ordinary dressed lumber, 1-inch stuff, and securely nailed. The inside dimensions were 4 by 4 inches. The liquid used in this test contained crushed granite of the size that would pass a half-inch mesh sieve. It was poured in a funnel, the pouring continuing till the mixture ran over at the other end, which is nearly on a level with the funnel. In its progress the liquid containing the stone made a turn at the bottom, passed along 24 feet to the upward turn, flowed up, stone and all, 3 feet to the section parallel with the bottom one, back 16 feet and up 3 feet. The stone remained uniform in the mixture throughout, and was as evenly distributed at the far end of the form as at the funnel. The surface is even and smooth, but is much improved by the use of cast iron forms, for by the use of these the grain of the wood forms is avoided.

Ornament for large panel. Ornament for columns. Detail of panel decoration.

Details of decorative scheme for the Edison Concrete House.

Messrs. Small and Harms have all the remaining parts of the molds ready for the pattern maker, and as soon as the patterns are completed the work of casting the molds will be done. After that the first experimental house will be poured in sections to learn certain points and discover possible defects if any may exist. It is expected now that the first pouring will be made this summer, possibly the end of August. If this is successful, as it now appears sure of being, a larger pouring will be made of the cellar and the first floor and a third pouring will include the complete house.

It is not to be presumed that Mr. Edison and his engineers have had no difficulties. Difficulty is a factor that lurks all about the Edison laboratory, just as it does about any other institution where original things are being accomplished. But so many seemingly impossible things have been done that the inventor and his lieutenants feel reasonably certain that they have reached the goal of success with this house. The mixture has been secured. The forms are a certainty. Now for the house. One of the last difficulties encountered, Mr. Harms said, was the problem of removing the interior molds after the pouring, particularly those of the basement. This problem has been solved satisfactorily and the system of taking away the inner molds no longer presents any trouble.

One of the principal objections made to the Edison house was on artistic grounds. When announcement was made of the poured house the architects instantly offered the objection that every house would be alike, that a whole town might be built with one set of molds and would present an appearance of monotony. We are able to assure all who object to the cast house that a number of variations of style are possible and provided for in any set of molds. There may be variations in the porch, or a 1-story bungalow may be cast with the molds. Then if six sets of molds are made use of the field of variety will be greatly widened.

A complete set of molds will cost approximately $25,000, while the necessary plant will cost $15,000 more. Successful operation will require six sets of molds to keep men and machinery constantly employed. So it will be seen that a large capital will be required, and on that account building operations with the Edison molds will be

Detail of the two exterior ornamental bands, Edison concrete house.

carried on only by responsible men. The inventor himself will not be commercially interested in the molds. With the problems involving the industrial world that surround the adoption of the forms and the building of any very great number of houses after his method neither Mr. Edison nor the men engaged in the cement industry have any concern. He aims to accomplish the building of good homes for the workingman at a price within his reach, and the change in economic conditions that may come must be met when the time arrives.

The architect will always have clients and the skilled mechanic will always be in demand, for individual taste must continue to find expression. But the tenement house dweller for whom this house is intended cannot build under present conditions, much less consult an architect.

The Edison house will reduce living expenses enabling any man to own a home without paying twice its cost. Fire insurance and repair expenses will be eliminated altogether.

Such is the Edison house as it was explained by the inventor himself and his engineers for your instruction and profit.

There's a cry from millions of mothers and children who group about in the human bee-hive tenements of the great cities, craving a breath of air,a glimpse of blue sky, a few blades of grass. Swallowed up and submerged as they are in the dark back rooms, this house Genius of Invention is to be their salvation.

An Omnicient Architect.

Of the various vocations that absorb the humand mind,
The architect's profession is the most peculiar kind.
An office and a shingle are essential things, no doubt,
But, several other factors help to round the practice out.

Mechanical ability a set of plans to make,
Artistic sense to work them up so they are sure to take.
Preliminary estimates at maximum prepared,
That will foot up so little that the clients won't get scared.

Some knowledge of surveying, that he may lay out the land.
The lines and grades electing where the edifice shall stand.
In "ancient lights" and "real estate" he must be quite at ease,
Not to mention landscape gardening, sidewalks, sewers, shrubs and trees.

Then he must cope with coping and everything discussed,
And know much more of fencing than how any arch will thrust.
Clarivoyant he must be, to know before the work's begun,
Exactly how the thing complete will look when it is done.

Aufait in all materials, in every kind of stone.
Which best will hang together, and which will stand alone.
Not stuck on stucco, but in clays familiar as a potter,
And be on terra firma when he talks of terra cotta.

Then, he must pile-up harmony, both presto and andante,
And take care of his capital when he puts up his antae.
He must be fully posted on his heating and his frieze,
And the lining of his architrave must not bag at the knees.

His members, frames, groins, ribs and feet would puzzle any doctor,
His attics and his lofty forms electrify the Proctor.
No laundress or musician knows as much as he of fluting.
His moulding way up to O. G. as well as his mail-chuteing.

Slate, tiles, conductors, shingles, tin, eaves, cornices and fines;
Paints, oils, stains, putty, glass, the finishes they use;
Accoustics, optics, papers, paint interior decoration;
Distempers, dog-teeth, dados, plumbs, jambs, beads of every nation.

There's tensile strength, and crushing strain and fireproof construction,
Plumbing and gas, electric work and ventilating suction;
Lime, mortar, plaster, cement, brick, locks, bolts, door closers, hinges.
And with each peculiar client know just where the shoe impinges.

Boilers and fuel, pipes, exhaust, the fastest elevator,
Cold storage as embodied in the ——— Refrigerator;
Ranges and grates and furnaces, the principal of Ruskin;
The better points of every school, Assyrian, Greek Etruscian.

Stair builder, mason, carpenter, designer, what a head!
'Tis marvellous that "Fools rush in where angels fear to tread."
He gives his best for perfect work, and when he's done it all,
He finds his labor is in vain, "that closet is too small."

—EXCHANGE.

AN ENGLISH COMPANY capitalized at $5,000,000 has been formed to purchase the British patent rights of Dr. Heinrich Colleseus, of Berlin, covering a method of manufacturing Portland cement from the waste product of iron blast furnaces. The company expects to erect cement plants at different points, and to make a bid for export trade.

Ornament for the panels of porch.

Ornament of water table.

Detail of decorative work, Edison concrete house.

CELTIC ARCHITECTURE.*—Examples of the Various Periods of Building Design in Ireland.—Cromlech and Dolmen Builders and Methods of Construction.—The Influence of Christianity.—Irish Ecclesiastical Work. ∴ ∴ ∴

By W A. SCOTT, A R.I.B.A.

MANY SAVANTS in other arts besides Architecture, I believe, agree in placing the Celtic conception of current architecture as at least as interesting, if not as prominent or far-reaching, as the other well-known developments of the elements of building.

This same art of building is, after all, the very foremost of all arts, because, without it, no other art or science could have been born, much less developed.

Concurrently with my poor endeavors on the archæological aspect of my subject, I am to remark upon the lessons which this practice of architecture by those long-dead Celts may teach to us modern exponents of architecture the art of building. These lessons are, I think, self-evident, and I do not propose to labor this point at all.

To more readily understand the origin and development of those Christian buildings in Ireland, which are the first structures that may be dignified by the term Architecture, it is advisable to pass in brief review the pre-Christian structures and buildings of which we have evidence or remains.

To use the words of the late Margaret Stokes: "Owing to the fact of Ireland being the farthest western point of Europe from those centres of culture in the East and South, whence the current flowed, it was long centuries after the first wave of culture broke upon the Irish shore. It is in that country, where they last existed, that we find the largest traces of those elements which are common to all races in the development of their primeval arts. In the older countries, where they first existed, they have been superseded in the vast tracts of time covered by their history. But in this little western isle, where their appearance was later, their periods of existence were shorter, their transition more rapid than in the East, since the older the human race becomes the more rapid does progress advance, and changes follow in quick succession; so that it is only in a country that is situated as Ireland was that we may expect to find such a series of monuments still existing as will give us tangible evidence of the arts and customs of each period, back to that which is remote."

CROMLECH AND DOLMEN BUILDERS.

Ireland may be said to possess more remains of early Christian art and architecture than most other countries. This is due to many causes, amongst which are its isolated position and being the most westerly point of Europe. So far as can be ascertained the first buildings in Ireland were the cromlechs or dolmens, erected probably by the Fir-Bolgs. They were generally placed on a hill or rising ground, and constructed of several upright stones, covered by a large slab. This slab in some cases extremely massive and said to weigh in some examples so much as 100 tons. Kernanstown, County Carlow, may be quoted as an instance of this Cyclopean construction. These structures were intended as tombs for a hero, a chieftain, or some person of remarkable distinction. The remains of monuments of this class are very numerous, there being no less than 800 of them spread all over this island.

That the cromlech builders came from the East is evidenced by the diminution in size of the covering slabs and blocks of stone used in their construction, as one traverses the island westward. While those along the eastern coast in Leinster have covering slabs of from 18 to 29 feet in length, those on the western coast are only 8 to 10 feet, thus tending to show that the fashion having been set on the east coast (always the richer and more cultured part of Ireland), the poorer builders, often no doubt by lack of suitable material, built as near to the admired originals as possible.

This gradual degeneration of the type in Ireland, as we travel westward across the island, would lead us to surmise that dolmen builders—who have left still finer monuments in Britain (as at Stonehenge) and on the Continent—reached the Irish shores from the East, the stream of emigration pressing westward till its final arrest on the Atlantic coast.

These dolmens are sometimes surrounded by circles of upright stones, measuring so much as 150 feet in diameter (as at Loughcrew, Newgrange, and elsewhere). More advanced monuments of this type—but covered with a mound of earth or stones—are the dome-roofed sepulchres, as at Dowth and Newgrange. A distinguishing feature of the later monuments is the carving found on the upright stones forming the walls, the roofs, and lintels, consisting of incised patterns, amongst which are to be found circles, groups of concentric rings, spirals, zig-zag, lozenges, dots, stars, and fern pattern. These carvings were executed with chisel and scraper and sometimes with the punch. A fine collection of plaster casts of the principal inscribed stones at Newgrange is now exhibited in the Irish section of the Science and Art Museum.

EARLY FORTS OR DUNS.

Stone forts or duns, such as those on the Arran Islands, are roughly oval or circular in form, with massive walls constructed without mortar. The outsides of the walls are of carefully fitted masonry, the centre part being filled in with rubble.

In Dun Aengus, on the Arran Islands, it seems as if the wall had been built in short lengths, each completed independently of the other, and such a method would resemble that which the French term building in pares. Then the stones, which are fixed as headers, are tilted downwards towards the fact of the wall, so as to draw off the water from the joints. These details, along with the existence of regular doorways, at once raise these forts to the rank of "buildings," and place them far above the ordinary camps and strongholds of the Britons. In these doorways, which are all formed with inclined jambs and horizontal lintels, we see—as at Fort Staigue and Dun Aengus—that the weight of the superstructure is thrown off the lintel by means of a still wider stone placed a layer or two above it. These doorways vary in depth from 18 to 27 feet, and are roofed by a series of stone slabs from 6 to 8 feet in length.

The Staigue Fort, in Kerry, is the most perfect example now existing in Ireland. It is nearly circular in plan and about 114 feet in external diameter. It is built of Shistose slate, the spaces between the larger stones being filled in with spawls. The wall varies in height from 10 to 18 feet, and is 13 feet 6 in. thick at the base and 7 feet at the top—both faces of the wall are built with a batter. The inside of the wall is formed into series of stages all round, with steps connecting them at intervals. The steps are surmounted by small platforms

*Paper read before the Architectural Association of Ireland.

near the top of the wall. The whole work exhibits considerable skill and much consideration.

Although the structures and buildings just described may seem to many of you entirely out of place in this paper, yet they will serve to indicate that the inhabitants of this island were skilled in the handling of stone as a building material, as distinguished from those primitive people who were only used to build their huts with mud-and-wattle construction.

INFLUENCE OF CHRISTIANITY.

Upon the introduction of Christianity, the conversion of the king or chieftain—the owners of these forts—usually followed the establishment of a Christain mission, and instances are recorded in which the owner dedicated his fortress to the service of the new God.

After a time, or perhaps at once, an oratory or church, with a cell, was built within the old military enclosure for the residence of the missionary and for worship; and as time went on those men who became missioners banded themselves together under certain rules of life and became what we know as "monks."

In the erection of these buildings local workmen and undoubtedly existing methods of construction were employed.

Such proceeding as the foregoing is clearly set forth in the History of the Monastery of Inismurray:

"With these facts before us, it is easy to see how the first Christian architecture in Ireland was developed from the pagan. It would appear that the monks had adopted the methods of building then practised by the natives before the introduction of Christianity, gradually making such modifications in form as their difference of purpose and some traditional usage required. Within this stone fort, now become Christian, or the cashel built in imitation of it, the first Christians found shelter for their little oratories, their round bee-hive huts, their wells, gardens, and burial grounds."

I fear I may be dealing at too great length with these structures, so will pass on to, and briefly examine, two other classes of buildings, approaching more nearly to the form of the early oratories and churches.

The next form of building which we meet is that commonly known as the Bee-Hive Cell. Some of these were placed under the ground level, or covered with a mound of earth, the entrance being concealed; but those we will not consider: others were formed over the ground, and were somewhat in the shape of the common straw bee-hive. They were usually circular in plan and dome-shaped inside and out. This shape was not obtained by the use of the arch (which seems to have been then unknown) but by projecting each succeeding course of stones beyond the other (in other words, corbelling), that is, forming smaller horizontal rings at each course, and so on till the small opening at the top was covered by one stone. The Esquimaux to this day build their ice-huts somewhat in this manner.

This form of building was adopted by the first Christian missionaries. After a time the inside was changed from circular to rectangular in plan, as at Skellig-Michael, off the coast of Kerry. Later still, the rectangular shape was continued to the outside, and this gives the form of the recognized Christian oratories.

The oratory of Gallerus, in Kerry, seems to be the direct outcome of the change in plan from circular to rectangular. The same principle of construction is used, the difference being, as before pointed out, in the shape of the floor of the building. The door is now made more important, and an eastern window is first introduced. This oratory of Gallerus is rectangular in plan, measuring about 15 feet long and 10 feet wide inside. The walls are 4 feet thick at the base and slope upwards in a curved form till they meet at the ridge. As in the bee-hive cell the roof is formed by setting back the stones from the outside, one above the other, till the apex is reached. The angles of the projecting stones, inside of which the roof is formed, were cut off and show tool-marks. There is a bass-stone, with socket for a cross on the ridge over the eastern gable. The doorway in the west gable is covered by a lintel. On the inside over the lintel are two projecting stones, with holes, from which the door was hung. A small window, with rounded head, cut out of a single stone, gave light from the east gable.

At Kilmakeder, not far from this place, is a similar oratory, but in a ruinous condition. The main features are the same as at Gallerus, but the quality of the masonry and the general finish of the work is not nearly so good. The east window is covered by a lintel, and the jambs have an external as well as an internal splay. The external splay is unusual; but, being unusual, only adds to its interest. It is impossible to think that these old builders were regulated by any canons of art, and they certainly were not so prone to follow other men's rules and regulations, as some architects are at the present day.

CELTIC ARCHITECTURE.

We now come to what I call Celtic Architecture. This may be said to commence in the churches built with cementing material and dressed masonry, as distinguished from the earlier buildings erected of dry rubble. These churches were rectangular in plan, with a doorway in the western and a window in the eastern gables. In later times windows were introduced in the side walls; but not usually at first. The doorways have inclined jambs, like those in the earlier forts, and are covered by a large lintel stone. In later churches the lintel is sometimes smaller, and had a relieving arch turned over it to take the weight off the centre. An example of this occurs at Glendalough.

Great blocks of stone were used in some places for the lintels, which must have required considerable ingenuity to lift into position.

The lintel stone over the doorway of St. Fechin's Church, at Fore, County Westmeath, is 6 feet long, 3 feet wide, and 2 feet 4 inches high, and weighs about 3 tons. A local tradition tells of the difficulties experienced by the workmen in raising this stone to its place, and that St. Fechin, taking compassion on the workmen, sent them away for the night, and that on their return next morning the stone was found perfectly adjusted over the doorway. This story was related to me about sixteen years ago by an old man in the village of Fore. Such stories are, however, common and not confined to Fore.

Windows are small, usually in the eastern end, at first covered with a lintel, and later with two stones inclined together in the form of an isoceles triangle, then a rounded head hollowed out of one or more stones, the sides invariably splayed to the inside, to permit the spread of light as it entered.

The massive masonry, composed of huge blocks of stone—especially in limestone districts—is very remarkable, some of the stones being so long as 8 to 10 feet. The quality of the masonry varies considerably, and depends almost entirely on the material to be had in the district. The stones were sometimes dove-tailed and halved into each other in quite accurate fashion, and in some instances were without spawls. This masonry was cemented together with a cement or mortar, in which sand and shells (near the sea-coast) and sand and clay (in inland places) were used.

In treating of architecture or building of any period it has been usual to lay down rules to define the characteristics and features of that period. From these features the date or style is supposed to have been known. I cannot follow this course, nor can I conceive that the early builders who designed and erected these churches worked by any code of rules other than that of fashion or from what some one of them had seen or possibly had heard of. In districts where material and surrounding

influences differed widely, the builders were not greatly concerned that their buildings should correspond, or be in a "pure style," as the term now goes. In fact, I am perfectly convinced that no such rules existed and that no great anxiety to conform to a style could have prevailed. The early builders were true designers, and, working from the primitive cell, with its lintelled doorway and sloping jambs, by development, and with the assistance of that most revolutionary discovery in all the world's building, "the arch," arrived at the beauty of the work which, for an Irish example, exists at this day in Cormac's Chapel at Cashel and numerous other places.

FEATURES OF EARLY CHURCH WORK.

One striking feature of these early churches was the projecting pilasters on the gables and sometimes on the angles, at first massive and about the same thickness as the walls themselves, later much reduced in size, moulded on the angles, and with carved caps and bases, as at St. Molaise's House on Devenish Island. These projections were carried up along the slope of the roof and a string course was carried along the side walls at the top where the slope of the roof commenced, to throw the rain water clear of the walls. These features lent an air of strength and dignity to the building, which went to enhance that dignity it already possessed in the broad, simple surfaces, and large massive masonry.

The first churches, as I said before, were simple, rectangular buildings: as time went on, and the number of Christians increased, it became necessary to enlarge the churches or build new ones. Many instances of enlarged churches exist. Sometimes a chancel was added to an eastern end, and the old east window enlarged till it reached the importance of a chancel arch. In other cases the original church, which was too small, was converted into a chancel and a new body or nave was built to the western end of it. In this latter the old western doorway was converted into a chancel arch.

We will now consider some of the main features. The form which the first chancel arches took was that of a semi-circle springing from straight jambs, with square angles, and all unmoulded: no impost was used. The stones were chisel-dressed, of varying or equal sizes, and well jointed. In later work an impost moulding was used; at first plain, but later moulded, and afterwards carved. Then new features were introduced in the shape of one or more sub-arches, sometimes called "orders of arches." These were at first plain, but afterwards moulded and carved with a wonderful variety of ornament, such as "chevron," rows of sculptured human and animal heads.

STONE ROOFS AND METHOD OF CONSTRUCTION.

The roofs of most of the churches are no longer in existence; those only which were built of stone have remained, and even some of these latter are in ruins. The first stone roofs were formed by projecting each succeeding course of stones, as in the case of the bee-hive cells; but when the use of the arch became known the roofs were supported on arched vaults, as at Cormac's Chapel.

It may be that the most important achievement of Irish architecture was the discovery of a method of stone roofing at once enduring, lofty, and picturesque, which seems a natural growth as a defence in a climate exposed to rain, snow and tempest. The latter examples of these buildings mark the transition from the period of the round to the pointed arch; but there are early stone roofs of simpler and ruder form, and there still remain a number of buildings in Ireland which can be so arranged as to show in a regular series the striving after and final achievement of the pointed arch.

These churches all form studies of the deepest interest owing to this fact; but it will be sufficient for our present purpose to name four—Gallerus, Friar's Island (near Killaloe), St. Columba's House at Kells, and Cormac's Chapel, Cashel.

The first evinces no knowledge of the principle of the arch, for the form of a pointed arch was obtained by one stone projecting beyond another till they met at the apex. This roof was liable to sink at the sides from the great weight of the stones.

The second church in our list shows that the method adopted for counteracting this was as follows:—The lower storey of the building was roofed by a barrel vault, built on the radiating principle. On this was raised the high-pitched stone roof, at first—as in Friar's Island—constructed of rectangular slabs of various thicknesses laid in courses, each overlapping the preceding one, and dressed inside and out to the rake of the roof. Under the ridge is a space left, the primary purpose of which was to lighten the weight on the vault, but which afterwards in larger buildings served as a chamber. In the oratory or house of St. Columba, at Kells, the construction of the upper arch is less rude, and the builders were evidently striving to rise from the false-pointed to the more perfect form of the radiating arches. The stones are laid in horizontal layers half way up and then radiate towards the top.

The open space above the barrel vault is divided by cross walls into three portions, the section being a triangle, having two sides formed to a rude curve, these sides not being arched but built of thin stones and thick beds of mortar, the courses projecting as they rise. The process followed seems to have been this—that the walls were brought up to the level of the springing of the arch, and then dry stone cross walls were built supported on which a rough centering was made, and upon this the arch was formed by building flat stones on their edges with a rough approach to radiation by the use of thick mortar beds, and finished at the top by selecting a thicker or a thinner stone, as the case might require for keying. Then, having brought the external walls to the level of the eaves, they proceeded to form the roof, carrying it up in masonry resting on the back of the arch as far as was judged safe to go, and building with a hollow space to reduce the weight, introducing cross walls for support.

In the roof of Cormac's Chapel a farther advance is seen. Here the coverings of both storeys are true, arches, constructed with radiating joints and the upper one in every respect a pointed arch. This is only one of several examples of the kind in which pointed arches were used, and the date of whose erection is probably prior to the existence of buildings in England in the pointed style. The boldness with which the heavy stone roof of Cormac's Chapel is placed 50 feet above the ground upon a structure little more than half the width, as well as the skilful manner of its execution, are very striking.

TYPICAL EXAMPLES.

To come now to particular examples of the early churches. In St. MacDara's Church, on an island off the coast of Connemara, we have a typical example of the early stone-roofed church. It is built of large stones some 4 or 5 feet in length; the gables have projecting pilasters, and this projection is carried up along the slope of the roof. The doorway is of the lintel type, with inclined jambs. A round-headed window lighted the interior from the east end, and there is another window in the south wall. The roof was of stone, with level beds, but is now in ruins. The old church at Killiney contains a portion which was erected in the early times of which we are speaking.

The doorway in the west gable is lintel-covered; on the soffit of the lintel is marked a cross. This is a peculiarity found in another place—the Lady Chapel at Glendalough. The east window has inclined jambs, with

splays to the inside, and is covered with a flat lintel. The chancel arch is of the early type, being square on the angles or jambs, and without imposts or sub-arch.

Glendalough contains one of the most interesting groups of ecclesiastical buildings in the country. It presents examples of almost every type of Christian architecture in Ireland. There is the Early Oratory, the Small Church, the Round Tower, the Stone-roofed Oratory or Church, the Cathedral, the Romanesque Church; and numerous Crosses.

The Church of Our Lady, one of the earliest of the buildings, consisting of a nave and chancel, the walls 3 feet thick, of local mica slate, with quoins of dressed granite. The chancel arch is in ruins, the doorway of the lintel type, with inclined jambs, is formed of dressed granite in large stones, and has a shallow projecting flat band as an architrave running round the jambs and head. The lintel has a cross inscribed on its soffit, like the one at Killiney Church.

Trinity Church contains an interesting example of the early chancel arch, without mouldings or impost. The stones forming the arch are well-dressed and accurately fitted. The east window is round-headed, cut out of a single stone. The insides of the jambs and arch are splayed, and the inside arch is formed of several stones; a triangular-headed window occupies a position in the south wall. The doorway in the west gable is square-headed. Petrie says: "There was formally a round tower belfry attached to the western end, which fell in 1818."

The Cathedral, said to have been erected in the seventh century, is of considerable extent, the nave being 48 ft. 6 in. long by 30 feet wide. This was evidently roofed with timber, being too wide and the walls too light for a stone roof, as constructed in that early period. The chancel seems to have been added subsequently, the masonry differing from that of the main church, and not being bonded into it. The east window was of remarkable and considerable richness, widely splayed on the inside and moulded on the angles. The arch had a zig-zag or chevron moulding running round its inside. The carving of this window is now in a dilapidated condition, but sufficient remains to show its design and general appearance. The chancel arch is incomplete, only the jambs and part of the springing-stone remaining. The doorway is square-headed, with a comparatively small lintel stone, having a relieving arch over.

St. Kevin's House (sometimes called "St. Kevin's Kitchen") may have originally been used as a domestic building; but it was afterwards converted into a church by the addition of a chancel, (now disappeared). A smaller added building at the north side of the position occupied by the chancel now remains. This addition was probably used as a vestry or sacristy. It is stone-roofed, but the outer covering is dilapidated. The entrance from the nave into the chancel was cut through the east wall, and was not constructed as an arch, but formed with a semi-circular head, cut through the courses of stone.

The upper part of the original east window, built up when the chancel opening was made, may be traced over this opening. The nave is covered with a circular vault, and over this is a low chamber between the top of the circular-vaulted ceiling and the splayed roof. The roof is formed of horizontal courses of stone, with the outer angles cut off to the slope of the roof. Over the west end is a belfry in the form of a small round tower. This was probably also an addition. The doorway in the west gable, now built up, is square-headed, with a relieving arch over the lintel.

LATTER ADDITIONS.

Speaking of the additions to the building, Petrie, who made a very careful examination of it says: "It is highly probable that these additions were made not long after the erection of the original building, that this building in its original state was at once the habitation and oratory of the eminent ecclesiastic. . . . I see no reason to doubt, and it is highly probable, that it received shortly after his death those additions which were necessary to make it a church fit for worship of those who would be led thither from reverence to his name."

The House of St. Columba, at Kells, County, Meath, is very similar to this building, and, except that it was not added to, and corresponding as it does in the manner of construction, one is led to suppose that it was built by the same masons.

Another building of this type is St. Flannan's House at Killaloe. Petrie is, however, in error when he speaks of St. Molaise's House, on Devenish Island, as having been exactly similar to these structures in everything but the superiority of its masonry. St. Molaise's House is smaller by half than any of the other buildings compared, and would correspond more with St. MacDara's Church (with its projecting pilasters) than to any other. The Rev. J. E. McKenna, C.C., M.R.I.A., of Enniskillen, in his book on "Devenish," says: "What makes this work unique of its kind and throws such a mystery around its age, is the beautiful sculpturing of its pilaster quoins." The Cyclopean masonry belongs to a very early period. Dr. Petrie, who examined it, saw no reason to doubt that Molaise performed his devotions in it; but Petrie must not have examined its sculptured quoins, or he would have pronounced this to be work of the 10th or 11th century.

From the position they occupy, and the great distance the stones, of which they are part, extend into the wall, it is quite clear that they were not, as has been suggested, inserted hundreds of years after the church was built. We can account for the architectural anachronism which the Devenish pilasters involve only by supposing that they were left perfectly plain at first, just like the projecting side-walls of MacDara's Church, and centuries after they were carved as we now find them.

This church, or oratory, as it might more properly be termed, is quite small, and could not have afforded accommodation for more than half-a-dozen persons. The walls remaining are only 3 or 4 feet high; the doorway in the west gable is square, with a flat projecting architrave, and the jambs do not incline. A peculiar feature of the doorway is that it is recessed or rebated on the inside as though for a door-frame or to form a surface for the door to close against. The roof was of well cut stone, not roughly dressed, as in the buildings before noticed, but finely chiselled and each stone lapping over the one underneath to protect the joints from the entry of water and also prevent the thin edge of the stone being flushed by the action of frost or weather, as it undoubtedly would be if cut to a sharp edge. Father McKenna, during his examination of this building, discovered some of the roofing and barge stones, and made a restoration of the roof, which is illustrated in his book on Devenish.

"IRISH OR HIBERNO ROMANESQUE" PERIOD.

We now find ourselves at a period in the history of the architecture of Ireland which is designated by the term "Irish-Romanesque" or "Hiberno-Romanesque." This kind of work did not commence all at once, but grew, as indeed all styles or kinds of work do, and it is impossible to draw a line dividing the buildings which came before this time, and say "this style commenced here, and the other ceased."

There are two methods of describing remains of this class. One by general description of the leading characteristics, picking out the features from the building generally; the other by describing the building separately. The latter will be, I think, the best for our purposes. However, a few notes of the general appearance will not be out of place. Afterwards we can examine the buildings separately.

The changes we first notice in the buildings now under consideration are: The substitution of the arch for

the lintel in doorways and other openings, the multiplification of arches or orders of arches, and the elaborate ornamentation and sculpturing of these features.

Walls are not constructed with such massive masonry, and are often higher, the roof being sometimes less steep in pitch.

Windows have mouldings and carvings on their external faces and are larger and sometimes moulded and carved on the inside.

The sculptured decoration bears strong resemblance to the unequalled metal work of this country.

As we examine the buildings separately, we shall notice further distinctive characteristics, which, though not universal, are observable in such charming variety and without any tiresome repetition, such as may be found in some modern buildings.

Hardly two buildings are alike, and all have their own peculiar diversity of detail.

The church on the island of Inniscaltra, on Lough Derg, is, perhaps, one of the earliest of this type, re-erected, it is said, in the end of the 10th or early in the 11th century. The nave measures 30 feet long and 21 feet wide, and the chancel about 15 feet long and the same in width. The chancel was probably added at the time of re-erection by King Brian Boruma, the masonry of which it is constructed differing from that of the main church. The doorway, now in ruins, consisted of three orders, that is, of three receding arches, with the jambs recessed to correspond. The angles of the jambs were rounded and finished with small sculptured human heads as capitals under the imposts. The arches were ornamented with chevron or zig-zag ornament. The inside of the doorway was finished with a single jamb only, having a rounded angle, with shallow sinkings on either side to form an attached column.

The chancel arch, springing from carved capitals, was composed of three receding arches or orders, and was unmoulded. The centre arch sprung from two attached semi-columns. The capitals were simple bowl-shaped, connecting the round columns with a square abacus. They were carved in low relief, with a broad simple leaf pattern.

The windows in the nave are different, one with a square head and inclined jambs has shallow flat bands continued round as an architrave, probably belonging to the original chancel; the other, round-headed, cut out of a single stone, with shallow moulded architrave continued all round the sill and head. A small triangular opening is placed in the west gable high up.

The doorway of the church at Kilmakeder, in Kerry, combines the arch and lintel. It is of three orders, with characteristic carving. The inner order is covered by a large lintel stone, filling the whole tympanum of the arch. On this lintel is carved a grotesque head, in relief. The angles of the jambs are rounded and grooved at the sides to form columns. The capitals are simple bowl-shaped, with a round neck-moulding to connect it with the column.

The chancel arch is in two orders without marked impost; the inner order of the arch is ornamented with zig-zag moulding, and the outer order has a round moulding on the angle and a band of incised beads bounded by shallow grooves.

The side walls are recessed and panelled, with engaged semi-columns, having simple caps and bases.

The church of Killeshin, near Carlow, contains remains of a remarkable doorway, whose arch is in four order, the outer order projecting beyond the face of wall and supporting a pediment surmounting the whole doorway. The angles of the jambs are slightly rounded and some are ornamented with shallow bead and scroll enrichments. The capitals are very fine, having carved heads on the angles, the remaining spaces being filled with interlaced work. The faces and soffits of the arches are ornamented with delicately carved ornament of the zig-zag pattern, with borders of beads. The whole work displays considerable refinement.

The church at Freshford, County Kilkenny, is noticeable for its beautiful porch doorway. The outer order projects beyond the face of the wall, and is surmounted by a pediment. The angles of the jambs are rounded to form attached columns, and have simple caps and bases. The caps bear traces of carving in low relief. The outer arch is covered with an ornamental hood-moulding, and is decorated with an incised pattern, unique in this style. The same pattern, somewhat varied, is continued on the soffit of the arch. The inner arches are ornamented with zig-zag, and have engaged columns, with caps and bases. The inside order of the doorway is quite plain, but contains an inscription in two rows encircling the arch and part of the jamb.

A singular feature, and one which flavors of the classic, is the short frieze over the impost moulding, returning round the ends of the porch with a band of sculpture.

The circular window in the gable may be said to be the only one (except another very similar at Rahan) of the period remaining in Ireland. If there be others, I am unaware of them. The arch at Freshford is in two orders, the inner with a rounded moulding on the angle, the outer enriched with chevron moulding, and, outside of this, is a hood-moulding continued all round the circle, with a string of balls carved on the inner angle.

The doorway of Clonfert, now used as a parish church, is of sandstone. Two outside pilasters support a pediment, inside of which are five orders. The sloping sides of the pediment are ornamented with a rope pattern, having carved human heads at the terminations. The orders of the arches are ornamented diversely, some with beak-heads, others with pierced discs, and others with rows of bosses. The impost moulding is well marked, and has carved on its outer angle a row of dogs' heads. The columns on the angles of the orders are round, except in two cases, where they are semi-octagonal. The whole of these shafts are ornamented with delicately incised patterns of wonderful variety and beauty. The pediment of the doorway contains a blank arcade of columns and arches, and the upper part over the arcade is filled with a triangular diaper, the alternate spaces being sunk, and having human heads carved in high relief.

The western doorway of St. Cronan's Church, Roscrea, is in three orders, with a steep pediment over; the inner orders of the arch are ornamented with chevrons and the outer one with a round moulding. On either side of the doorway an arcade is continued till stopped by the projecting pilasters at the ends of the gable. The two arches of the arcade on either side have pediments, but are quite subordinate to the central one.

Perhaps one of the most beautiful bits of carved work in the country is the chevron ornament on the inside of the east window in the church at Annaghdown. Beads, scroll, and leaf ornament is delicately used, and almost suggest goldsmith's work as a pattern.

The Rock of Cashel presents a group of buildings the most interesting in Ireland. The rock itself rises to a height of 300 feet over the great fertile plain in which it is situated. The principal building is the Cathedral, which was built according to the then new principles of the pointed arch, but the one with which we have to deal is that universally known as Cormac's Chapel. Historical records show that this church was erected by King Cormac McCarthy in the early part of the 12th century. The date of consecration is given as 1134 or 1135. At the moment we are not greatly concerned with the exact date: this matter has been discussed at length, and all the historical evidence quoted by Petrie in his work on the Round Towers.

The building consists of a nave and chancel, with two flanking square towers on the north and south sides at the end of the nave next the chancel. The building is not placed due east and west, but lies north-east by east. The chancel differs from the plan of the early Irish churches in having no east window, but in its place a rectangular recess, covered by a semi-circular moulded arch and with an arcade running round it under the springing of the main arch. Another point of difference and one that is peculiar, is the fact of the chancel not being placed on the axis of the nave, but inclining somewhat to the south side of it.

The ceiling of the chancel is formed by intersecting barrel vaults and diagonal ribs or arches. At the intersection of these ribs are four sculptured human heads. The whole of this groined ceiling and the walls of the chancel appear to have been decorated with frescoes, of which some traces remain. The chancel arch is composed of four orders, with well-marked impost mouldings. Two of the shafts are fluted and ornamented spirally. The capitals of the shafts in the jambs are variously carved, some with human heads at the angles, and others with strap ornaments. The carving of one side in one of these capitals remains unfinished. The orders of the chancel arch are richly carved with chevron ornament and a row of human heads.

The internal walls of the nave are ornamented with recessed arcades in the lower part, having flat pilasters, finished on top with a broad impost moulding, the under angle being carved. The angles of the pilasters are carved with zig-zag or chevron ornament in varying patterns. The round arches over these pilasters are without mouldings or projections, but are ornamented on the face and soffit with shallow, zig-zag pattern similar to that on the jambs. The upper part of the walls, which are recessed, have engaged half-columns, with moulded bases and carved capitals running up to support the ribs of the vaulting. The ceiling of the nave is a barrel vault, with square, unmoulded ribs or arches, standing clear below the surface.

The external features of the building are: A deeply recessed northern porch, in six orders. In each angle is a column, with base and capital. The arches are richly ornamented with zig-zag and bands of discs. The lintel which covers the inner arch is remarkable, and has a sculptured lion being shot by the arrow of a centaur. The whole doorway is crowned by a steep pediment, with broad barges ornamented with a zig-zag pattern. The upper part of the pediment is divided by a horizontal band and three vertical ones, all ornamented with zig-zag similar to that running up the slopes of the pediment.

A plaster cast of this fine porch has been made by Mr. George Coffey, and is now on view in the Science and Art Museum.

The doorway on the south side is smaller and much plainer, recessed in two orders, the arches ornamented with zig-zag, the outer order of the jambs with rounded shafts, the inner with a broad splay, having a faint interlaced pattern carved upon it. The tympanum contains a grotesque figure of an animal. The towers at the east end of the nave are square and of unequal height; that to the northern side is ornamented with horizontal projecting bands or courses of stone. This tower is covered with a pyramidal roof. The southern tower is ornamented with similar bands, but it is higher and finished by a paraquet. It contains the spiral staircase for access to the chamber over the vaulting. A blank arcade of small columns and arches is continued round the face of tower at about the level of the eaves. The south wall of the nave is divided up by rows of blank arcades and the upper part under the eaves is recessed with engaged semi-columns.

The apartments in the roof over the vaulting are on different levels, that over the chancel being much lower. This latter is lighted by two small windows, with flat lintels on the inside. The large apartment is lighted by similar openings in the east end and on the front side. Cutting into the roof are two square apertures for light, but they do not seem to be the original windows. At the west end is a fire-place, with flue and horizontal flues carried round the side walls, perhaps to heat the apartment. The walls of this compartment curve upward till they meet in a point over the centre and form a true pointed arch.

Stone corbels project from the converging sides or arches, probably to support the wooden floor of another apartment over. The roofing of this remarkable building I have already described when speaking of stone roofs.

Now, this practically ends, for purposes of my discourse, the work done in this beautiful style, and, although developed to such an extent, as exhibited in Cormac's Chapel, we may feel assured that it did not reach perfection.

One can see in thought what magnificent works would now exist had this style not been interrupted, but had run on and expanded, in the numerous and extensive abbeys and monasteries erected under non-native influences.

I am fully aware that I have but feebly and imperfectly glanced at some of the examples of this style of architecture, and that I have omitted points which may seem all-important to numbers of my audience.

I now purpose, however imperfectly, to say a few words on the adaptability of the examples of Celtic Architecture and ornament to the requirements of the present day. The early builders were well content to use the materials they found to hand. They did not, at least in early days, import stone easy to work, nor did they travel far for labour. In their massive building, their simple roofs, and their quiet but effective grouping of blocks of building, there is much to be admired and followed as a lead at the present time.

Their ornament was simple, but not the less effective, and was all of a type easily done years after the completion of the building. Some of the doorways and windows present examples of how beautiful a feature can be built up from simple forms of simple material. Any of these old doorways or windows will serve as types for architecture of the present day. Let us take care that, with all the advantages of Science now common to all, our work falls not behind that of these old masters, who made so much out of so little.

The man who starts out to follow the lead which has been set to him must be careful to imbue himself with a like spirit to theirs.

I am unable to lay down a more definite course, nor do I think it desirable to do so.

MR. J. H. LAUER, secretary of the Montreal Builders' Exchange, has given out an interesting review on the progress of building construction throughout Canada. The total value of buildings erected in 1908 in 73 localities throughout the Dominion was $51,223,398, compared to $56,305,792 in 1907. There were only 51 localities from which returns were received in 1907. Toronto leads in the total of the year's operations, with $11,795,436. Vancouver is second, Winnipeg third and Montreal fourth, with $5,062,326. Coming to the present year, 1909, the improvement throughout the principal building centres is strongly apparent, and marks a distinctive return to the prosperous state of affairs existing up to 1907. Under normal conditions, with a steadily increasing acreage and population, people are beginning to recover their confidence in the present and future prosperity of the Dominion.

Clinker brick residence, located at the corner of Crescent Roadand Cluny Avenue, Toronto, and originally the home of F. Sanderson, Esq. Mr. Eden Smith, Architect.

TORONTO'S FIRST CLINKER BRICK RESIDENCE.—An Attractively Designed Structure Which Demonstrates the Use of this Material in Domestic Architecture.—Interior Excellently Planned.—Living and Service Portions Distinct.—Fireplaces in All Main Rooms.

ONE CANNOT fail to observe in passing through our residential district the increasing number of clinker brick houses that have been erected during the past few years. The time is not so far removed when the use of clinker bricks in building construction was practically an unknown quantity. It is, in fact, only within the past ten or fifteen years—except in a few isolated cases where they were employed as a secondary material—that we have come to see any work of this character. Prior to then, clinker bricks were regarded as being an inferior product, a sort of a residue of the kiln that nobody seemed to want, and for which the manufacturers of burned clay products, try as they would, could not create a demand. Whether by chance or preconception, their value as a surface material for exterior walls was first recognized, is, judging from various opinions advanced, still a matter of conjecture. It may have been that originally some designer discerned in their semi-vitrified and mottled character a subtile quality yet unexploited; or again, possibly, owing to the low cost at which these brick could at one time be obtained, economy on the part of some builder first led to their adoption and thus revealed the excellence of their texture and richness of effect.

But, whether the one or the other, it has nevertheless followed that the former prejudice against clinker bricks, has been entirely overcome; and to-day, instead of these bricks being a rejected material, they are regarded as not only being desirable, but in many cases as being most preferable.

Structurally there is possibly no better brick available. Its hard burned surface renders it of a most serviceable character, enduring in quality, and but little susceptible to moisture. The only danger in its use, is in too great a striving for effect, which sometimes results in a surface with an over-studied, over-colored rigid appearance.

A noteworthy example of the use of clinker bricks in residential work, is to be seen in the accompanying illustrations. This home, it may be of interest to add, was the first clinker brick house erected in Toronto. It is situated at the corner of Crescent Road and Cluny avenue (Rosedale), and was designed by Architects Eden Smith & Sons, originally for F. Sanderson, Esq., from whose hands it subsequently passed to the present occupant.

The exterior of the house is most satisfactory in its treatment, the lines being direct and happily arranged, while the plain surfaces of the walls derive a pleasing expression from the variegated tones of the brick, the latter contrasting effectively with the gray stone of the foundation, the white painted woodwork and green of the stained shingled roof.

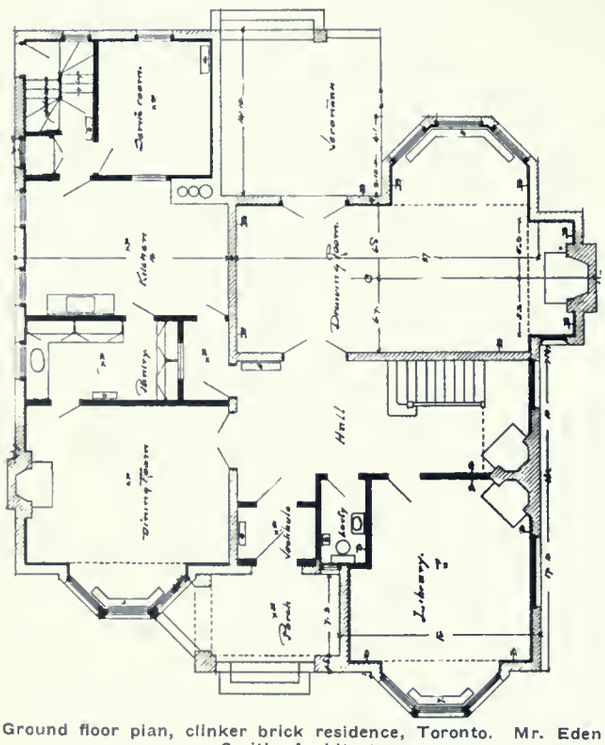
Directly at the front is a spacious porch with gabled roof and brick walls having a large arched opening and stone steps. Immediately above the porch, the main roof, slightly hipped at the left extreme and having a dormer with four windows, comes forward with a well graduated pitch, while to the right it forms a front gable with three small end windows. Beneath these windows is a bay projection at the ground and first floor, this feature having also been introduced on the ground floor at the left of

porch. All windows with the exception of the dormer and gables, are of small leaded glass panes, excellently arranged, and the chimneys, which are direct, rectangular

Entrance porch, clinker brick residence, Toronto, showing detail of arch and brick work. Mr. Eden Smith, Architect.

and uniform in outline, are so placed as to give balance and dignity to the general scheme.

Within, the disposition of the different rooms has resulted in an arrangement with every facility for comfort and convenience. The porch leads into the vestibule,



Ground floor plan, clinker brick residence, Toronto. Mr. Eden Smith, Architect.

which in turn gives access to the hallway, having a fireplace and an open staircase at one end. This arrangement makes the living and service departments quite distinct, and yet affords ready access from any one room to the other.

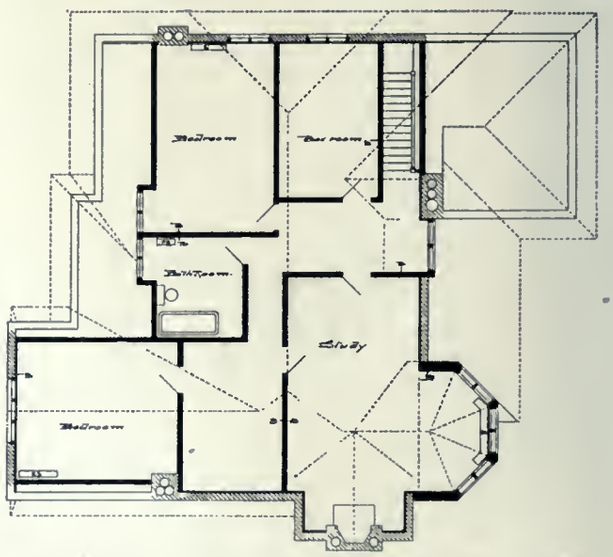
The library is situated at the right of the entrance so as to give it the greatest degree of quietude and privacy, while the drawing room occupies the entire space

First floor plan, clinker brick residence, Toronto. Mr. Eden Smith, Architect.

back of the hallway, and opens on to a large verandah overlooking a sloping garden at the rear.

The left portion of the floor is entirely taken up with the service department, the dining room being placed at the front. A large pantry with built-in cupboards and shelves, gives a direct passage between this room and the kitchen, the latter having a servant room and steps to the upstairs and basement at the rear. All the rooms are trimmed with oak, and the drawing room, dining room, and library all have open fireplaces and bay windows.

On the first floor are four bedrooms with built-in wardrobes, a sitting room, two bath rooms, and a large linen



Second floor plan, clinker brick residence, Toronto. Mr. Eden Smith, Architect.

closet, all advantageously located. Two of the bedrooms and the sitting room, have open fireplaces, while the latter opens on a balcony which is placed over the rear verandah.

The second or attic floor provides for an additional bath room, two bedrooms, a box room, and a study having also a bay window and an open hearth.

BRICK MAKING IN BIBLE TIMES.—Material First Employed in Mesopotomia Nearly Ten Thousand Years Ago.—Practice of Stamping Brick with Makers Name in Vogue Sixty Centuries Back.—Interesting Discovery Made by Chicago University Expedition.

THE RECENT BABYLONIAN expedition of the University of Chicago, while excavating at Bismya, discovered that the brick was first employed in Mesopotamia nearly ten thousand years ago. In that level alluvial plain, absolutely without stones for building material, but with an abundance of clay, primitive man, when he wished for a house more substantial than one of reeds, constructed its walls of the common clay soil of the ground. Experience taught him that if clay were molded and dried in the sun, it would be more durable. When he laid a chunk of moist clay in the sun to dry, he made the first brick.

In the lowest strata of the ruins of the exceedingly ancient cities of Bismya walls of these shapeless bricks were discovered; it was at a very early period that the Babylonians began to form the clay in a rectangular mold, as the modern Arabs of the desert still continue to do. During all of the period of Babylonian history sun-dried bricks, resembling the Mexican adobe, were employed not only in the houses of the common people, but as filling in the interior of the walls of the temples and royal palaces.

The man who discovered that bricks could be burned was that half-naked Babylonian of about 4500 B. C., who, while poking among the ashes of his old campfire, saw that the once moist clay beneath it had become hard and red. The first bricks which he burned were exceedingly crude in shape, flat on the bottom where the moist clay had rested upon the ground to dry, and rounded upon the top. Although the form was suggestive of the rectangular, the bulging sides gave it a somewhat circular appearance, as soft mud if placed upon the ground to dry, would assume. These early bricks were small and thin, measuring about 20 centimeters in length and 5 in thickness, yet as time progressed they rapidly grew to about twice that size.

The modern manufacturer who stamps his name upon the bricks from his kiln, is but imitating the brickmaker of 6,000 years ago. The earliest known mark which appears upon the surface of the ancient brick was made by pressing the end of the thumb or of a round stick into the soft clay. As the bricks became larger, an interesting system of markings was adopted by the royal builders. The first mark of the series consisted of but a straight line drawn lengthwise along the surface of the brick; the next generation varied the mark by a diagonal line, forming a St. Andrew's cross. The fourth generation drew two parallel lines lengthwise upon the surface of the brick; the fifth drew them diagonally, and thus the series continued with three, four and five lines until the dynasty came to an end.

Not far from 3800 B. C. the Semites invaded Babylonia, and Sargon, the king of about that date modified the brick to a square shape, a form which has continued in the Orient to the present time. He also discarded the ancient system of brick marks to adopt a stamped impression of his name and titles. His son, Naram Sin, finding the larger bricks of Sargon, which measured 42 centimeters square and 9 in thickness, too cumbersome, reduced them to about 32 centimeters square. A thousand years later, or about 2800 B. C., the size had been reduced to about 30 centimeters, with the thickness of 6 centimeters. Thus they remained to the end of the Babylonian empire, and the palaces of Nebuchadnezzar at Babylon were entirely constructed of them.

The brick inscription which first appeared in 3800 B. C., sometimes engraved, but more frequently stamped, was not placed upon every brick of a structure. Naram Sin marked a few of his bricks with the brief legend, "Naram Sin, the Builder of the Temple of Ishtar." Of later kings the inscriptions, which were longer, appeared upon a greater number of bricks. I found in the Bismya temple about one of every twenty bricks of Dungi, of 2750 B.C., inscribed with nine lines. Nebuchadnezzar stamped nearly every brick in his numerous vast constructions with a shorter inscription, which read:

"Nebuchadnezzar, king of Babylon;
The restorer of the temples Esagil and Ezida;
The first born son of Nabopolassar, king of Babylon."

The mason of about 2800 B. C., while laying the square brick, found that to end the courses evenly, it was necessary to break a brick in halves. The manufacture of half bricks then began, and thus arose a brick of the shape and approximately the size of those employed in our own country and in Europe. Together with the half brick, as architecture became more complicated, the Babylonians employed other forms for binding the corners of walls, building columns and wells, and for ornamentation. Some were circular or semi-circular; some were wedge shape with a rounded base, or with the point missing; some were square, with one or more edges concave or convex, and of others a square from one corner had been omitted.

In laying the bricks those of a plano-convex shape, which were employed about 4500 B. C., were set in the wall upon one edge, and held in place with bitumen, the black pitch which comes from the hot springs at Hit upon the Euphrates, or more frequently with mud. While the use of both bitumen and mud continued, lime from the edge of the Arabian plateau was employed before Nebuchadnezzar's time. It is now the common cement of Mesopotamia.

Thus the brick and the brick stamp arose. Several thousands of years were required for its evolution from the lump of clay to the form which the Babylonians regarded as perfect. In durability and in the variety of shapes the skill of the early brickmaker has never been surpassed. At Bismya we found bricks from 4500 B. C. as perfect as upon the day they were made, and our large desert house was constructed mostly of them. Our desert well was walled up with bricks 5,000 years old, and they will still be perfect long after the ordinary brick from the modern American kiln shall have crumbled to dust. In the latter days of Babylon, after the process of glazing had been discovered, huge designs of animals in various colors were represented in relief upon the brick walls, and so perfect was the design that each brick was molded as carefully as the sculptor now shapes the various stones which are fitted together to form a richly carved monument.

To the archaeologist this discovery of the origin and development of the brick and their stamps is of more than usual interest. It not only increases his knowledge of the life of early man, but, what is more valuable, it presents him with a clue by which he may determine at a glance the comparative, if not the absolute age of the ruins of the many burned Babylonian cities if only the fragment of a brick remains.—Prof. Edgar J. Banks, in Scientific American.

ACCORDING to Canada's Acting Trade Commissioner at Leeds, England, there is an increasing demand in that country for hardwood flooring, mainly rising out of the revived interest and enthusiasm universally shown towards roller-skating, which is said to have resulted in the formation of nearly 130 joint stock undertakings during the last twelve months to operate roller-skating rinks in different parts of the United Kingdom. The importers are experiencing a steady demand for suitable timber for use in the erection of new rinks and for the purpose of repair in those already built, and desire to ascertain what Canadian shippers have to offer in this direction.

BUILDING STATISTICS FOR JUNE.—Increase per cent. Greatest Ever Recorded in Canada.—Average Gain 102 per cent.—Winnipeg Shows Largest Volume of Business. ∴ ∴ ∴

FROM A STANDPOINT of building progress, June was a month of universal gains and no decreases. Extraordinary high percentages were attained in all sections of the country and the average increase for the month, 102 per cent, as based on the comparative figures supplied CONSTRUCTION by seventeen of the twenty cities reporting, exceeds any of the big successive gains made heretofore this year, and is probably the greatest advance ever recorded in the building history of the Dominion. Two cities exceeded the two million mark, another had over half that amount, and ten additional places registered totals varying from one to six hundred thousand dollars, for permits issued during the month.

Winnipeg shows the largest volume of new work undertaken, her total being $2,041,645, as against $802,200 for the previous June. Toronto is second in this respect and Montreal next, their figures being $2,011,545 and $1,170,790, in order named, as compared with $1,055,405 and $559,972, for the corresponding period of last year; the relative increase in all three cases being 154 per cent., 90 per cent. and 109 per cent., respectively. The remarkable rapidity with which these three cities are growing, while clearly seen in the comparative amounts of the past few months, can more fully be realized when compared with the growth of the larger cities in the United States. None, in fact, aside from New York, Chicago and one or two of the other large cities, are making greater headway, and even these places are not showing a greater proportionate expansion.

The largest increase per cent. for the month has been recorded by Moose Jaw, which comes to the crest of the wave with a striking gain of 1056 per cent. This place, it will be noted, was one of the three to show a falling off last month, her loss being 19 per cent.

Regina, of the same province, shows an advance of 61.53 per cent., while Saskatoon's enormous total, that of $149,000, although no figures for June, 1908, were submitted, makes it quite plain that this thriving city has met with no reversal.

In Alberta, Calgary and Edmonton still continue to forge strongly ahead, each adding to their former increases by another relative advance of 37 per cent. and 106 per cent.

The second largest increase for the month is noted in the case of Brandon, which over-reaches last year's figures for the corresponding period by 157 per cent.; while other western cities of much larger magnitude, which show a decided advance, are Vancouver and Victoria, both augmenting the aggregate amount of their previous consecutive monthly gains by a further gain of 104 per cent. and 21 per cent., respectively.

Reports from various centres throughout Ontario indicate plainly that building operations are going on at a tremendous rate. In addition to Toronto's increase, Fort William reclaimed herself from her decrease of 5 per cent. in May, by a gain of 94 per cent. Peterboro made an increase of 119 per cent.; London 106; Berlin 56; and Hamilton 5 per cent. Windsor's total investment for the month was $48,550, while the value of the permits of Port Arthur amounted to $17,600. Fort William's aggregate total for the first six months of this year, that of $2,000,000, is one-third again as great as she recorded for the whole of 1908, and equally as good a showing has been made in several of the other cities of the province.

Rapid strides forward are also evidently being in the extreme eastern section. Both the reports from Halifax and Sydney show a most wholesome condition. The former's gain for the month is 7 per cent., while the latter's increase of 130 per cent. after the unusually active month in May, is really remarkable.

All the cities in the list send in encouraging reports which express the outlook as being decidedly favorable.

	Permits for June, 1909.	Permits for June, 1908.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.	$25,000	$16,000	56.25	.....
Brandon, Man.....	52,235	20,320	157.06	
Calgary, Alta.	202,710	147,700	37.24	.....
Edmonton, Alta. ...	201,790	97,645	106.65	.....
Fort William, Ont...	307,125	158,175	94.16	.....
Halifax, N.S.	66,830	61,890	7.98	.....
Hamilton, Ont.	195,959	185,425	5.41	.....
London, Ont.	127,629	61,800	106.51	.....
Montreal, P.Q.	1,170,790	559,972	109.08	.....
Moose Jaw, Sask. ..	118,500	10,250	1056.09	.....
Peterboro, Ont.	44,322	20,195	119.47	.....
Port Arthur, Ont...	17,600	.....	.....	.....
Regina, Sask.	121,650	75,310	61.53	.....
Saskatoon, Sask. ...	149,000	.....	.....	.....
Sydney, N.S.	22,360	9,700	130.51	.....
Toronto, Ont.	2,011,545	1,055,405	90.59	.....
Vancouver, B.C.	682,270	333,400	104.64	.....
Victoria, B.C.	90,120	74,010	21.76	.....
Windsor, Ont.	48,550	.....	.....	.....
Winnipeg, Man.	2,041,650	802,200	154.54	.....
	$7,482,485	$3,689,397	102.81	.....

A LETTER TO "CONSTRUCTION."—Architect F. S. Baker Writes Quoting Mr. Ernest George, President of R.I.B.A., on Subject of Architectural Education and Registration. ∴ ∴ ∴

JUST NOW while the matter of improving the condition of architecture in its relation to the public is receiving so much attention, and a federation of all the Canadian bodies with this object is pending, I feel that the recent speech of Mr. Ernest George, the President of the Royal Institute of British Architects, throws considerable light on the subject.

Mr. George's utterances, coming as they do from a man who is recognized throughout the profession as one who has devoted himself to the art side of architecture, are agreeably moderate, and yet from the common sense point of view, he very forcibly points out the benefits which would accrue from the proper training and registration of architects.

At the R.I.B.A. dinner, which was held in London on Wednesday, 26th of May, Mr. George in reply to the toast "The Royal Institute of British Architects and Allied Societies," said in part:

That since their gathering last year the most important event in their history, has been the granting by the King of the Supplemental Charter for which they applied. This enables them to make rules for the better ordering of their own house, for the regulation of themselves, and, it was to be hoped for the benefit of the community. This revision of the Charter and By-laws was the result of movement that stirred, if it did not divide their camp.

Architects, especially those in the provinces, found that work which should come to them, too often went to auctioneers, who ventured to include architecture in their sphere of usefulness. This was a difficulty, but it must be met by the architects keeping their own work at a high level, and by a growing perception of what was good on the part of the public. To have all architects registered has been proposed—though this would not prevent the employment of outsiders; they would also, he held, have to admit all sorts and conditions of men in practice. The Institute preferred to insist that in future all should enter through the schools, obtaining the diploma or certificate which should distinguish the architect from the quack, and they looked for further legislation to accentuate the difference. The training would come gradually by the wise organization of the training schools, bringing all men into line, and demanding that a standard of efficiency should be attained by those who would enter their Guild. This would be the preparation for Associateship, and Fellows of the Institute would be chosen only from those who had passed through the schools with a sound knowledge of the constructive art, thus insuring the public against ignorance and incompetence. No board of examiners could guarantee that a man was an artist. The subject of examination had had serious consideration, and on the Educational Board, professors of the universities were working with their best men.

Till of late the Institute had not been an educational body, having helped only by the award of the Pugin and Travelling

Studentships. A distinct advance, however, had been made in the system of training, and young men would now start with a better equipment than their seniors enjoyed, and he hoped they would do better work. Students of ability were coming to the front every year and carrying off the Institute scholarships. It would be a grand thing if some of them had the opportunity of carrying their studies further in a higher school, acquiring a knowledge of what is really great in art. A special school had been suggested for these diploma men, among whom a distinctive prize—a Prix de Rome—would be awarded. It was felt that Englishmen should have their School of Rome and be under the influence of the noblest monuments, as well as Frenchmen, Germans and Americans, who already had that advantage. The Council had been conferring with the existing British School of Rome, and had received a cordial invitation to co-operate in any project. The present arrangements of that school did not, however, accommodate the Institute students, nor meet the requirements that had been formulated for the architectural school; but the Institute Committee, who were considering the subject, would shortly have, he hoped, a definite proposal to bring forward.

Hitherto, the general public had declined to know anything about architecture as a fine art; a good building had not always been appreciated, nor a bad building found out; but there were indications of a growing knowledge in these matters, and of a higher criticism, to which architects would, he felt sure, respond. Technical schools would increase knowledge and power among skilled craftsmen, but they were not a substitute for a good system of apprenticeship. There was danger that those who gained a smattering of the arts in such schools would expect to become painters, sculptors, or architects, and so swell the ranks of the useless unemployed. **A good mechanic was a nobler object than a bad architect.**

In passing, Mr. George referred in terms of approval to Mr. Burns's Housing and Town-Planning Bill, and to the generous endowment by their guest, Mr. W. H. Lever, of a school of architects for the special study of town-planning. Architects ought to be willing, he considered, in the interests of their art, to sink some of their individuality for the sake of obtaining in towns continuity, harmony, symmetry, and balance.

The President also urged the advisability of securing copyright for architects, mentioning that a good client recently showed him with pride a group of cottages that looked curiously familiar, though in strange surroundings. "These," said the client, "are copied from those you did for me on the other side of the park." The chairman added that he had not the heart to tell his informant, good, easy man, that he had committed an act of piracy. He concluded by remarking that the Institute was in a healthy and prosperous condition, having now the largest membership on record, there being 2,300 on the roll. They had now seventeen allied societies in the United Kingdom, three in South Africa, one in Canada, and one in Australia. The Institute possessed, moreover, an increasing influence, which, he trusted, had been used for the general good."

I am, yours very truly,

June 22, 1909. F. S. BAKER.

CONCRETE IN ORNAMENTAL WORK.—The Advantages It Offers as a Medium of Artistic Expression.—Economy a Factor in Its Use.

THE APPLICATION OF CONCRETE to practical utilitarian and decorative purposes, during recent years has amply demonstrated how admirably this material is adapted to meet either or both of these

Concrete Garden Furniture.

requirements. While probably this cannot be said of all concrete work, sufficient has been done to fully convince the most skeptical, both as to its constructive merits, and its importance and value as a medium of artistic expression.

With the growing demand for suburban and country homes and the accompanying desire for more artistic environments, the use of concrete, owing to its plastic nature, texture and durability, and the opportunity which it offers for the economical embellishment of lawns and gardens, is coming much into evidence. In this respect, its use embraces not only statuary, garden furniture, fountains and urns, but ornamental walls, pergolas, bridges and balustrades. In fact, an entire estate, so far as buildings and structural features are concerned, might

Garden Seat in Concrete.

well be of concrete, from the dwelling to the least of objects intended to ornament a garden or lawn.

One of the chief factors in the development of ornamental work in concrete has been the economy of its production. After a mold is made, the cost becomes the veriest trifle, as compared with stone or marble. As an artistic medium, concrete is quite as good as stone or terra cotta, and, considering its greater economy, it may be employed in many cases where the cost of cut stone would be prohibitive and terra cotta unsuitable.

Monier, to whom the engineering world owes so much, made his first combination of concrete and steel in the form of a garden vase. Whether or not he adopted this for the mere purpose of structural investigation or had

An Artistically Designed Lawn Table.

conceived in it one of the uses to which concrete was especially adapted, it has, nevertheless, followed that his experiment suggested and gradually developed into the utilization of this material for landscape ornaments in a great variety of patterns and design.

In Italy the utilitarian and decorative possibilities of concrete have long been demonstrated. From the structural element of aqueducts, and of domestic and civic

building, culminating in the monolithic Pantheon at Rome, to the balustrades, fountains and the statues for their enrichment, the adaptation has been perfectly made; and many of the splendid Italian examples have served as an inspiration for much of the excellent work done on this continent.

Both in Canada and the United States the prejudice which formerly existed against artificial stone is gradually dying out. Many architects who, at first were loath to experiment with it have since become familiar with its better qualities, and are specifying this material in their best work. It is now to be seen in some of the finest public and commercial buildings, schools, churches, theatres, and residential structures where it consistently serves every structural and ornamental requirement.

The representative concerns and studios engaged in the manufacture of concrete stone are employing the very best of skilled modelers, so as not only to give their products the highest character of workmanship and individuality of treatment, but also to guarantee that the design of the architect will be accurately and faithfully reproduced. The material itself, in this respect, places no limit

A Substantial and Attractive Garden Vase.

to the resources of the worker. If he is of the faith that rejects all that is modern and original, and admires only the masterpieces of the old world, the plaster mold will furnish him with an almost exact reproduction of designs wrought by hand. In fact the most intricate and elaborate patterns, which may have involved months or years of toil on the part of their creator, may be duplicated in concrete in a few days.

Obviously no architect or intelligent owner will raise a question as to the strength and durability of concrete. The point generally in debate relates solely to the architectural treatment and the appearance of finished surfaces. To secure the proper results particular attention must be paid to securing the right firm to do the work, it being realized that desirable results can be obtained with this material, but that great skill and experience are required to secure results that are uniformly pleasing and of the character to be desired.

The fact that ornamental work with cement can be done for not more than two-thirds the cost of stone, and frequently even cheaper, that it is often more available, and requires less time to execute, combine with it other

Conrete Flower Urn.

qualities to complete a series of advantages which destines concrete to be one of the most accepted material of the near future. Montreal, Toronto, and many other cities thrughout the Dominion have many excellent examples of its use in decorative work, which show that it is rapidly winning the recognition which it deserves.

The illustrations shown herewith of the use of concrete in ornamental work, were reproduced from photographs kindly loaned CONSTRUCTION by the Canadian Art Stone Company, Toronto, and are representative of the excellent class of work which this company is producing.

AUTOMATIC SPRINKLERS. ∴ ∴

ALTHOUGH much has been said in these columns anent the danger of fire and the necessity of employing the proper methods and materials in the construction of public, commercial and manufactuirng buildings, there is still another factor to be considered in the equipment of every well protected building and that is the automatic sprinkler system.

It matters not whether a building is fireproof or otherwise, such a system is essentially an important requisite. If non-combustible, there is still the contents of the building to safeguard. If otherwise, then the protection is doubly necessary.

The main feature of the sprinkler system is its de-

pendability, promptness and thoroughness in operation. Working automatically, positive in action and always ready for service, it not only practically precludes the possibility of a fire gaining any headway, but effectively extinguishes the flames within the immediate area in which the fire started. Only 165 degree Fahrenheit is necessary to release the sprinkler and set it in operation. At this temperature the fuse of the nipple melts and the pressure on the sprinkler head cause it to revolve at a velocity capable of throwing a heavy shower of water in every direction, the area covered by each sprinkler head in this respect being approximately 10 feet square. The releasing of each sprinkler, however, is entirely independant of the others, so that no water is thrown or damage done except at the point where it is needed. Another feature that may be mentioned in this connection is an alarm device so arranged that should a fire occur in the area protected by a sprinkler the alarm would be sounded simultaneously with its release, thus bringing the service of the fire department to render additional assistance should it be required and to stop the flow as soon as the flames are extinguished.

But apart from lessening the fire hazard, there is another advantage, equally as important, which the automatic sprinkler affords, viz.:—the reduction of insurance rates. So great an economy does it effect in this respect that the cost of such a system is practically offset in a few years' time. As a specific instance, we might mention that in that Jamieson Building, corner Queen and Yonge sts., Toronto, the automatic sprinkler system installed by the General Fire Equipment Company, Toronto, resulted in a saving that within two years was sufficiently great to cover the complete cost of its installation.

It would be interesting to go more fully into the history of the sprinkler and trace its developement from its inception nearly a century ago up to the high standard it has attained to-day; but suffice it to say that since 1872 when the present type of automatic sprinklers came prominenly into use, it has been so unanimously endorsed by insurance companies, merchants and manufacturers that hundreds of millions of dollars are now under their protection in all parts of the world. So unqualifiedly are they approved, that the insurance companies have established departments to regulate their manufacture and installation and have carried the science of automatic fire protection so far that there is now scarcely a possibility of a serious fire where they are installed, as their inspectors are continually making tests in their own labratories and in the factories where the sprinklers are made.

Possibly the best time to install sprinklers is when a building is being erected, especially where it is desired to conceal the pipes. The installing engineer can then work in conjunction with the architect and arrange the sprinkler heads so that they in no way will interfere with the decorative scheme. However, it may be added that quite often the pipes can be successfully concealed after a building has been completed, as is to be seen in Ryrie Bros.' store, Toronto, where the sprinkler heads are arranged so that they in no way mar the ornamental ceiling.

This system was also installed by the General Fire Equipment Company and is but one of the many important contracts which they have executed without causing inconvenience or annoyance to the occupant of the building, the job being carried out without any delay, and the character of the workmanship excellent.

This company is in receipt of letters from merchants and manufacturers in all parts of the Dominion, attesting to the efficiency of their sprinklers and the thorough manner in which they have been installed. A copy of these letters will be sent to anyone interested upon request to the General Fire Equipment Company, 72 Queen st., East, Toronto.

AN AGGRESSIVE AMERICAN IN CANADA.

OUR FRIENDS on the other side of the border tell us with a certain degree of pride that they have adopted some of our Canadian sons and of them made highly prosperous citizens, and with the same national pride we point to instances where young Americans have found their way to Canada and become heart and soul engaged in the great work of industrial development which is the world's marvel at this present day.

One of the most striking examples of a young American "making good" in Canada is Mr. W. H. Ford, of Montreal. Mr. Ford was born in Charleston, S.C., Sept. 1, 1879. Some twenty-four years later he decided that the cement industry was about of the proportions to provide him with a life work, and consequently on Jan. 1, 1903, he engaged with the Carolina Portland Cement Co., Charleston, in the capacity of travelling salesman. One year later he was promoted to the position of assistant manager of sales with headquarters at Atlanta, Ga. Two years from that date found him general manager of the Kosmos Portland Cement Co. at Louisville, Ky. Another two years, after a most strenuous and successful career, however short, Mr. Ford was made vice-pres. of the Wm. G. Hartranft Cement Co., with headquarters at Philadelphia. Shortly after this event he came to Canada and located in Montreal incharge of The Hartranft Canadian business, which company disposes of the entire output of The Vulcan Portland Cement Company.

W. H. FORD.

Mr. Ford is one of the many young American business men who early foresaw the coming great development of Canada, and lost no time in associating himself with Canadian business circles, where he quickly became known as a most alert business man and one of the Dominions most active and enthusiastic promoters.

Mr. Ford in conversation says he is of the opinion that Canadian resources and business possibilities are sufficiently great to occupy the undivided attention for the next fifty years of the keenest men on the continent.

OPENS TORONTO OFFICE. ∴ ∴ ∴

THE DENNIS WIRE & IRON WORKS CO., Ltd., of London, Ont., have recently opened a branch office in the Pacific Building, Toronto. Mr. C. R. Ebernard will be in charge of this end of the business. This step was deemed necessary owing to their increased business in Toronto. Already the advisability of this move has been demonstrated by the dispatch with which Toronto orders have been executed.

New Department

We have decided to establish a New Department in "Construction," commencing with the August number, to be known as a "Correspondence Department," in which will appear letters from our readers, discussing current building topics, asking questions, and general comment.

Correspondents may be assured that their contributions will be dealt with by the very best authorities obtainable on the several topics that will be ventilated in this department.

We earnestly request our readers to take a lively interest in this new departure and send along their questions and comments. While it may occur from time to time that all letters may not be dealt with in the issue immediately following their receipt, owing perhaps to the volume received, still it can be depended upon that they will receive our attention in the same relative order as they are received.

Address all correspondence to

THE EDITOR, . .
"CONSTRUCTION,"
Saturday Night Bldg., Toronto.

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July Building Operations

BUILDING RETURNS for July from nineteen centres, while showing a falling off in six places—the largest number of decreases recorded for any month so far this year—nevertheless registers on the whole an average gain of 13.98 per cent. Altogether the situation, as based on comparative figures supplied CONSTRUCTION can be regarded as being most satisfactory, as despite the set-back experienced in five Western cities and the loss noted in the case of Halifax, the gains made in other sections are of such proportions as to leave no doubt as to the substantial progress which is being made at present, and which will in all probability be made for some time to come.

The biggest loss for the month is in the case of Brandon, where a slump of 63 per cent. has been experienced. Winnipeg shows a decline of 32 per cent. Edmonton is third, with a deficit of 25 per cent.; Vancouver next, by a falling off of 13 per cent.; while Regina fails by 11 per cent. to equal her amount for the corresponding period of last year.

These reversals, as affecting the West, cannot, however, be viewed with any degree of alarm, as it was only reasonable to expect, after a protracted period of unprecedent and consecutive gains, that a temporary break was bound to occur. Winnipeg, Edmonton, Vancouver, and Brandon more than doubled their amounts in the preceding month, while Regina registered an increase of 61 per cent., and, in view of this fact, and the big advances made in each case during the first five months, the loss experienced will in no way materially detract from their season's total. All five places, as well as Halifax, which fell back to the extent of 22 per cent., report the immediate outlook as being bright, and show unmistakable signs of an unusually active fall.

Apart from the losses mentioned, a most wholesome condition in general prevailed, in many cases the gains being equal to or better than those registered in the previous months. Victoria had an exceptionally brisk period, her gain of 250 per cent. placing her at the top of the list, while Calgary's increase of 190 per cent. shows conclusively the uninterrupted growth which this city is undergoing. Saskatoon also has evidently made substantial headway as her total of $176,315 (not included in following table), although no comparative figures were submitted, clearly indicates a month of tremendous activity.

In Ontario the advance was both steady and strong. Toronto not only had a gain of 43 per cent. but her total of $1,754,105 for permits issued shows the largest volume of business for the month of any city in the Dominion, and Peterboro followed her gain of the preceding month, with another increase of 244 per cent., the second highest gain per cent. noted. London advanced 114 per cent.; Berlin 106; Hamilton 31; and Stratford 10 per cent. Fort William, which failed to submit the amount for the corresponding month of 1908, issued permits for new buildings to cost $186,235; while the month's totals for Port Arthur and Windsor were $114,260 and $33,650 respectively, and it is quite likely that both these latter places are considerably ahead of their previous figures.

Farther east, Montreal has jumped forward by an increase of 63 per cent., the sixth consecutive gain this year; and Sydney materially adds to her big advance in June and July by another increase of 82 per cent.

As regards fall operations, it may be said that never before at this season of the year has there been so much work in preparation in the architect's offices, or in immediate prospect generally, as at the present time; and reports at hand from all sections of the country give every assurance that fall building activities this year will be without a parallel in the past annals of the Dominion.

	Permits for July, 1909.	Permits for July, 1908.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.	$25,000	$12,000	108.33	.....
Brandon, Man.	20,480	55,854	.....	63.33
Calgary, Alta.	182,280	62,650	190.94	.....
Edmonton, Alta.	274,355	368,765	.....	25.60
Fort William, Ont.	186,235	.....	.....	.....
Halifax, N.S.	48,635	62,461	.....	22.13
Hamilton, Ont.	205,475	156,250	31.50	.....
London, Ont.	73,808	34,600	113.31	.....
Montreal, P.Q.	712,126	435,405	63.55	.....
Peterboro', Ont.	43,195	12,233	244.92	.....
Port Arthur, Ont.	114,260	.....	.....	.....
Regina, Sask.	51,300	58,165	.....	11.80
Stratford, Ont.	14,760	13,400	10.07	.....
Sydney, N.S.	17,750	9,745	82.14	.....
Toronto, Ont.	1,754,105	1,221,000	43.66	.....
Vancouver, B.C.	549,307	636,120	.....	13.64
Victoria, B.C.	372,120	106,070	250.82	.....
Windsor, Ont.	33,650	.....	.....	.....
Winnipeg, Man.	950,800	1,401,250	.....	32.14
	$5,295,486	$4,645,968	13.98	.....

R.A.I.C. Convention

ARCHITECTURAL REGISTRATION bids fair to be one of the most important topics for discussion at the next Annual Convention of The Royal Architectural Institute of Canada to be held in Toronto on Oct. 5, 6, and 7.

Registration has been one of the big subjects with this organization since it first applied for its charter. Embracing as it does, a membership from every province in the Dominion, as well as from every architectural organization in Canada, there is a wide diversity of opinion

among the members on the most important subject of compulsory architectural education.

When the organization was first mooted, its promoters aimed to make it a close corporation, but were unsuccessful for two reasons; first, the Dominion Government did not feel that it had the power to grant a close corporation charter to such an organization, and that such power rested entirely with each of the several provinces; secondly, a number of members were not in favor of endeavoring to create a monopoly in the profession of architecture, and, as stated by some, not willing to submit to the control of the profession by any individual organization or clique of men.

However, there are those who still maintain that close corporation is the one desirable thing to be sought. There are others who have extreme views in the other direction; they believe that there is no reason why any legislation should be sought, aiming toward the establishment of a legal standard of qualification. There is also a large number of members who believe that there should be some standard of qualification established by each individual Provincial Government that should be complied with by every man who aims to call himself an architect; that such examinations should be conducted by a Provincial Examining Board, appointed by the Government, with or through the advice of the Provincial Association; that these examiners should further be responsible to the Government, and not to any individual architectural association.

As has been stated in CONSTRUCTION on a good many occasions, we believe that some legal standard of qualification for the profession should be established, but that no individual Architectural Association should be empowered to exercise such a prerogative; that if the Government were induced to limit the use of the title architect, such action could only be taken in the interests of the general public; that,even though the granting of a close corporation charter would be justified, and would be in the interests of the profession generally, to secure such class legislation in the Province of Ontario, would as this time be absolutely impossible. We, however, do maintain that a Licensing Act, placing the power of examining in the hands of the Government, such as obtains in several States in the American Union, and is now being proposed in England, would not only prove more practicable, but would be of such character that the Provincial Legislature could undoubtedly be induced to deal with such a measure. It is to be hoped that, under no circumstances, will the Royal Architectural Institute of Canada, be induced as a body, to again endorse the close corporation idea.

Duty on Foreign Plans

ANOTHER IMPORTANT SUBJECT to be dealt with at the Convention of the Royal Architectural Institute of Canada, will be the matter of customs duties on foreign building plans. The present tariff is not only inadequate, but the conditions under which duties are collected, are such as to encourage the devising of many schemes which make possible the smuggling of foreign plans into Canada. The regulation under which architects' plans are appraised, is absurd. It is as follows: *"The rate duty on drawings, blue prints and building plans, is 25 per cent. ad valorum. Specifications are free as Mss., if written or typewritten. Special plans of buildings, or blue prints thereof, are to be valued for duty at the charge usually made by the architect for the drawings, without the specifications. This charge may be fixed for duty purposes at 1 per cent. of the estimated cost of the building to be erected."*

The last sentence is what renders the whole regulation next to valueless. Every architect realizes how absurd it is to fix an architect's charge for plans at 1 per cent of the estimated cost of the building to be erected. The manner in which the duty would work out on a $100,000 building would be as follows: 1 per cent. of the cost of the building, for the architects fees, would mean $1,000., and 25 per cent. of the architect's fees would mean $250 duty. In other words, the duty on the plans for a $100,000 building, would be but $250. It is this one phrase establishing the fixed charge at 1 per cent for duty purposes that the architects will aim to have changed.

Every architectural organization in the country has been confronted with the extremely unfair manner in which foreign architects, especially those from the United States, have been permitted to come in and secure Canadian work, and it now appears as if this new Dominion organization will undertake its first big task.

Toronto, the "City Beautiful"

THE REMARKS of Mr. F. W. Fitzpatrick, of Washington, D.C., who has for some time interested himself in promoting the "City Beautiful" idea in the United States, on the subject of Toronto as a model of attractive homes and a paragon of cleanliness, should prove most interesting.

"Throughout the United States we are hard at work in an endeavor to clean up and beautify our cities. Architectural societies are making educational efforts along these lines, ladies' societies are giving practical demonstrations by actually cleaning the streets, and school children are planting grass and flowers where tomato cans used to thrive. It is an upheaval, a reformation, and certainly a much needed one. Where there is dirt there is generally also crime, and where physical ugliness reigns you'll as frequently find ugliness of morals, a debased taste in living, in thinking, all around.

"It would be a splendid object lesson, an incentive to do things well and right, an eye-opener if more of us could visit Toronto. There we would find practice, not merely precept, and we would also see the advantages of doing things right always instead of by spasmodic jerks. That city needs no reformatory preaching and exhortation; there is no occasion for its women to go out and clean the streets. Pretty nearly everything there is not only being done right, but has been done so for lo, many a year. The people are used to it, they see no reason for the astonishment of their visitors. Cleanliness and good sense seem to come naturally to them.

"The streets are thoroughly cleaned, and moreover, the people help to keep them so by not littering them and throwing garbage, waste paper and what not in them. The stores are clean, the hotels, even unto their kitchens and sculleries, the shops, everything; meats and foods for sale are under glass, and vegetables are not piled upon the sidewalks for customers and dogs to paw over or otherwise defile. The cleanliness of the city is attractive and hygienic.

"There are not the usual unsightly and monotonous rows of houses with filthy backyards and a dozen blades of sickly grass in front; each family has its home, with some lawn and flowers all about it, behind as well as in front. There may be a few millionaires' palaces, but there are attractive and substantial and most artistic homes galore, homes of happy, contented, cleanly people, not a city that has been forcibly scrubbed-up here and there, for one special occasion or because the best element in that city can no longer stand its accustomed filth, but a clean city that was clean yesterday and the day before, and because all its people are clean and will stand for nothing else and would tolerate nothing else.

"Yes, undoubtedly, there is no more satisfying and attractive and clean city upon this Continent—and prob-

ably any other Continent—than is Toronto. And the most restful, beautiful and artistic section is that model city is Rosedale, at least, I think it is so, for it is both consistent and charming; the epitome of suburban beauty.

"We may have to consult sanitarians and skilled scavengers as to how we are to remove the outer coating, the years' accretions of filth in our cities, but it is to Toronto we should go for lessons as to how to *stay clean.*"

While we agree with Mr. Fitzpatrick that Toronto's streets are kept exceptionally clean, and that its wholesale streets, both as regards the architecture of the buildings and the condition of the streets, are to be unequalled in any city on the American continent, and also that Rosedale is an ideal suburb; also that Toronto's residential streets generally, and the general character of the average homes, compare most favorably with those of any city of its size in the world, we are inclined to believe that Mr. Fitzpatrick has, undoubtedly, never taken a carriage ride up University avenue from Queen street. When he viewed the City Hall, he must have approached it from the east and not from the west. There is one thing, however, that Mr. Fitzpatrick's compliments for Toronto signifies, and that is that the beauties of a city are never fully recognized by its own citizens, and that far away pastures look green. Some of the statements that have been made by some of the more enthusiastic members of the Toronto Guild of Civic Art, with regard to the eye-sores of Toronto, are particularly interesting, as compared with the views of Mr. F. W. Fitzpatrick, whose exceptionally broad experience as an architect and as a "City Beautiful" specialist, makes him a man who knows.

Building 2000 Feet High

A NEW YORK man has perfected the plans for a colossally tall tower building, which is to rise 2,000 feet above the street level and cost about $60,000,000. F. O. Semsch, chief engineer for Ernest Flagg, architect of the Singer building, is responsible for the design of the tallest building probably ever conceived by man, and rising to the supreme limit allowed by the laws of New York City.

By the building code of New York, the eastern metropolis, the maximum pressure under the footings on a rock bottom, if caisson foundations are used, is not to exceed fifteen tons a square foot. When that point has been reached, and not till then, the building department says "Enough." But it makes no stipulations as to the number of stories that may have been heaped up ere this point was reached.

Mr. Semsch found that 150 stories in a building 2,000 feet in height practically would be the limit. Assuming a lot 200 feet square, Mr. Semsch calculated his structure to have walls twelve inches thick at the top and 140 inches, or almost twelve feet, thick at the bottom. They would weigh 203,000 tons if built of brick, while the floors would add 213,500 tons. The "live" floor load would be 100,000 tons, making a total of 516,500 tons. This, distributed over the 40,000 square feet available for footings would result in a pressure of thirteen tons a square foot, which, with wind and other incidental pressure, easily would bring the total pressure to the maximum of fifteen tons a square foot. Since the overturning centre of pressure would be 1,000 feet above the street level, the overturning moment would be 6,000,000 tons.

The dead weight of the huge mass would be so great that there would be no danger of overturning. Opposed to the overturning moment of 6,000,000 foot tons there would be a moment of stability of 51,650,000 foot tons, making the overturning moment not quite 12 per cent. As designed, this mammoth building practically would be ten fifteen storied buildings placed one on top of each other. The Equitable Life company's new building, the plans for which have been filed, will rise 909 feet above New York's street level.

Future of the Engineer

THE PESSIMISTIC VIEW regarding the future of the average engineer which is occasionally expressed seems to be based on wholly erroneous assumptions. The standard of efficiency in every trade and profession is constantly rising, and it is doubtless approximately true that promotion to the higher places in engineering work requires greater technical fitness and more executive ability than ever before. On the other hand, the field for engineers is widening so rapidly that it is difficult to follow all its extensions. This Journal has no sympathy with the assertion that an engineer who acts as a salesman for a manufacturing company loses all right to call himself an engineer. Much of the progress that is being made in some engineering lines is due to these men, who come in touch with the problems of many purchasers and utilize their special engineering knowledge to help their solution. Moreover, it is not conceivable that an engineer who has achieved success in his technical work loses all interest in it when he assumes an executive position. The chief engineers of two great undertakings have recently stated that no small measure of the successful prosecution of their work was due to the fact that in each case the executive over them was a man who had deservedly won a prominent position as an engineer before taking up administrative duties. As a matter of fact, engineering is changing its boundaries and its nature as rapidly as the demand for engineering work is increasing. The field is enormous, and no one can foresee in what direction its ramifications will extend most rapidly in the next few years.

REFERRING TO THE CLINKER BRICK RESIDENCE illustrated in the previous number of this magazine, and accredited with being the first structure of its kind erected in Toronto, Mr. Edmund Burke, of the architectural firm of Burke, Horwood & White, writes CONSTRUCTION, under the date of August 7, in the following interesting vein, and throws additional light on the early use of this material, which at one time was regarded as being wholly inferior in character, and of little or no value. No architect or builder for many years ever thought of specifying such bricks, and even the brick makers themselves had doubts as to their adaptability, believing at the best that they were only fit for secondary work of a utilitarian nature.

"I was surprised to observe that you have credited the Sanderson house, corner Crescent road and Cluny avenue, as the first clinker brick residence in Toronto.

"My house was the first one in which such bricks were used, and was built, at least, a year previous. I still remember the peculiar look upon the face of the Don Valley representative when I selected such bricks for my residence when visiting their yards. He stated that such bricks were practically culls, and that they had little use for them. I fancied I saw a pitying smile pass over his face when I told him that I would take them. I also remember the shake of the builder's head when I informed him of what I had done. I also remember the time I had in teaching his men how to lay the bricks.

"They were looked upon as quite a curiosity at the time by all passersby, many of them wagging their heads with a superior air, as much as to say, that a man who is building that house is a fool, or a faddist."

Entrance Hall, looking towards library (on left) and Dining Room (on right). Home of Mr. H. T. Bush, Port Hope, Ont. The walls are done in soft rich yellows and marked into panels with a border design in gold, black and red; the hangings are of rich crimson and gold satin, while the tones of the rugs and stair carpet carry out the color scheme of the walls.

Dining Room, Home of Mr. H. T. Bush, Port Hope, Ont. Here the walls are covered with gold hopsacking paper, outlined with a panel decoration and finished at top with a medallion effect in red and gold, the crimson curtains and rich rug greatly adding to the general scheme. A pleasing feature is the fireplace, having built-in cupboards on either side with leaded glass doors.

"Inglebush," the Home of Mr. H. T. Bush, Port Hope, Ont., recently remodelled after plans by Mr. J. J. Laferme. This residence, which was built more than fifty years ago for Senator Seymour, is situated on an ideal site, beautifully wooded, and located on an elevation which affords a magnificent view of the surrounding country.

RESIDENCE OF MR. H. T. BUSH—A Home with Superb Grounds and an Admirably Appointed Interior Scheme—Wall Decorations, Hangings and Furnishings in Perfect Harmony—Bathrooms a Feature of Interest—Description of Various Rooms. ∴ ∴ ∴

"INGLEBUSH" the place is called, and the name as applied has a fitting equivocacy that makes it peculiarly appropriate. The term is not only fully expressive of the character of the grounds, but the word *ingle* finding a synonym in *home,* and the *final* of the compound spelling with its four letters the *name* of the owner, gives the appellation a most pertinent and significant meaning.

The place in question is the home of Mr. H. T. Bush at Port Hope, Ont., and its beautiful wooded site, comprising two acres, which nature has generously adorned with spreading elms and maples and covered with a luxurious carpet of velvety green—a truly delightful spot which, from its elevated position, overlooks the town and encompasses a magnificent view of the surrounding country for a distance of fifteen miles.

The house, which is approached from the west by a macadamized driveway that sweeps gracefully past the entrance porch, is a structure of the square type with thick substantial wall—a most interesting example of the old solid type of brick masonry—built some fifty years back for Senator Seymour, so long ago in fact that the identity of the original architect seems to have been completely lost. Since the house was acquired by the present owner, it has undergone certain alterations, including the complete transformation of the interior; the remodelling and redecorating being done in accordance with plans and designs made by Mr. J. J. Lafreme, of Paris, France, a personal friend of Mr. Bush, and a member of the Paris Chapter of the French Academy of Architects.

While outside, the house beckons invitingly as one approaches, its chief charm and interest lies within the interior. Not because of costly appointments or any unique feature in plan, but because of the absolute harmony in its scheme of interior decoration and furnishings. Very often the excellent work of an architect, even where unlimited funds are available, suffers from the owners' selection of hangings and furnishings which mar the beauty of the decorative scheme as originally intended. But in "Inglebush" it is quite different. Here one finds an exquisite appropriateness and perfect consonancy in the decorations and appointments which gives each room a distinct individual feeling, and yet results in an interior which is most satisfactory and pleasing in its entirety.

Passing through the porch one enters the spacious hall where the walls are done in soft rich yellows, and marked into panels with a border design in gold, black and red. The hangings are of rich crimson and gold satin, and carpeting the polished floor, and white enamelled staircase which winds leisurely to the second floor, are a series of beautiful rugs carrying out the color scheme of the walls. Handsome wrought wall shields and a gracefully draped statue surmounting the newel at the base of stairway, further enhances the general effect; while through artistically designed windows, opening from the library and dining room, comes filtered rays of light which shed a

Editor's Note.—The residence illustrated in this article is the home of Mr. H. T. Bush, President and General Manager of the Standard Ideal Company.

Living Room, Home of Mr. H. T. Bush, Port Hope, Ont., looking toward the front. The ivory and dull green which predominate the color scheme work out most successfully, and together with the rich green hanging, rare floor rugs, and mahogany furniture, make this a truly livable room.

Living Room, Home of Mr. H. T. Bush, Port Hope, Ont., looking towards the rear and showing arched opening to bay window or sun parlor on the right. This is practically two rooms which have been formed into one by means of a large square-arched opening, with a large column on either side.

soft radiance over the whole and renders it particularly alluring. Under the staircase is a secret plan for the small plate safe, and also lavatory facilities.

Opening from the hall, at the left, is a small but cosy library with rich Oriental decorations, styled "the Prince of Babylon," and carried out in soft reds, greens and yellows. The panelling is strikingly exquisite, being marked off and forming squares at the top with rich centre decorations. Above the moulding is a very effectively designed border, while from the centre of the ceiling is suspended a craftsman lantern with four pendants enclosing electric bulbs. The bookcases are built-in, and in keeping with the scheme are the dull flat black of the woodwork, the yellow of the hangings, and the leather upholstered furniture.

The living room has a southern exposure, and occupies the entire portion to the right of hallway. It is unusually large and rectangular in shape, being practically two rooms formed into one by a large arched opening with a column on either side. Here the predominant tones —ivory and dull greens—work out most successfully, and with hangings of rich green velvet, rare rugs and mahogany furniture, make it a truly inviting and livable place. A pleasing feature, and one of its chief attractions, is a big bay window forming a delightful sun parlor at the side.

Library, Home of Mr. H. T. Bush, Port Hope, Ont., with its "Prince of Babylon" decorations, a rich Oriental scheme, carried out in soft reds, greens and yellows Here the woodwork is a dull flat black, the hangings of yellow, and the furniture upholstered in leather.

At the rear of the living room, a white enamelled arched opening, with large pillars, gives access to the dining room, which can also be reached directly from the entrance hall. The walls in this room are covered with gold hopsacking paper, outlined with a panel decoration and finished at top with a medallion effect in red and gold. Crimson curtain, rug and couch, in accord with the mahogany furniture, lend a warm glowing effect; and an unusually large, beautiful brick fireplace claims the instant attention of one on entering. Off the dining room is a most attractive out-of-door living room or veranda, equipped with everything necessary for summer comfort. The kitchen, pantries, maids' sitting and dining rooms are in an adjoining wing to the north, and are carried out in a soft yellow shade that is really the keynote of the entire lower floor, outside of the living room.

Upstairs the house displays the same harmony of decorative detail as that which characterizes the floor below, and each room is designated according to the tone of its color scheme. Ascending the broad staircase one enters the yellow room, a guest chamber, decorated in yellow of a very dainty shade with a small border of roses forming a panel effect. A soft yellow rug is thrown on the floor, and together with yellow curtains and bed hangings, contributes materially to make this a bright and cheerful interior. The furniture is of bird's-eye maple, and a full length mirror forms a door opening into a private bath, which is exceptionally well equipped.

Directly across from this is the room devoted to the young daughter, Miss Virginia, and is a fairy room, with a decorative scheme exquisite enough to delight the heart of a child. The wallpaper is blue, with top border of roses, and with the valances of pink and blue chintz, white enamelled furniture and small blue rug, effects a most happy and charming combination.

The room immediately over the large living room, and embracing a continuance of the bay window, is devoted to the use of Mr. and Mrs. Bush, and is an interior of unusual size and beauty. The walls are in ivory with trellises of roses forming panels and bordering at top. Silk curtains, and rich rugs, in pale green, mahogany furniture and twin bed in brass complete the appointments, and result in a room that is very attractive. Two wardrobes, built in on either side of a large window, and each having a pier mirror, produce the added charm of a small bay effect. A door opens directly from this room into a bathroom equipped with every luxury for comfort and sanitary convenience.

Two other guest chambers are worthy of note. One all in pink with panels of flowered chintz, the same being used for bed draperies and curtains. The closet is built-in with a pier mirror, and the room is furnished with a green rug and mahogany bedroom suite. A smaller guest room adjoins this, and is done in ivory and green with a panel effect of roses with doves perching on the branches. Bird's-eye maple furnishes this room, which, when not in use as a bedroom, is used as a sewing room. Entirely shut off from the main part of the house are the servants' quarters, and here are found cozy rooms, private baths, and a large wardrobe.

In view of the fact that the owner is interested in the manufacture of sanitary plumbing fixtures, it is but reasonable to assume that the bath-rooms are one of the

Owner's Room, Home of Mr. H. T. Bush, Port Hope, Ont. An unusually large and attractive room with walls of ivory having trellises of roses forming panels and bordering at top. The silk valances and rugs are in pale green, the twin beds are of brass, and the furnishings of mahogany. Two pier mirrors, one on either side of a large window, produce the added charm of a small bay effect.

Room of young daughter, Home of Mr. H. T. Bush, Port Hope, Ont. A fairy room, exquisite enough to delight the heart of a child, done in blue with rug to match, pink and blue chintz hangings and white enamelled furniture.

important features of the house. In this one is not mistaken, for the equipment and facilities for toilet purposes are such as to provide every requisite for sanitary use and convenience. The large bath-room, opening from the hall and owner's chamber, is especially model in its

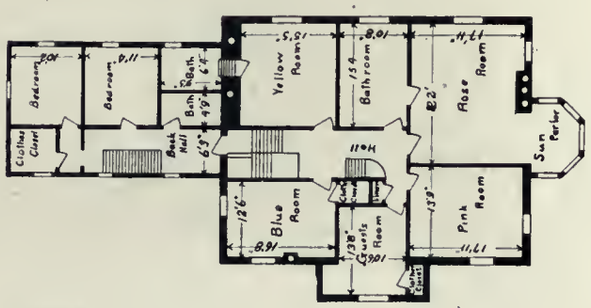
First floor plan, Home of Mr. H. T. Bush, Port Hope, Ont.

appointments. Here the delicate pink tile of the high wainscot, the snowy white fixtures and nickel trimming impart an effect that is at once inviting, wholesome and refreshing. At the end are double doors of glass, with an art glass transom, leading into two compartments containing the closet, and a splendidly equipped shower which are separated by a glass partition with nickel frame, and lighted by an oblong dome of art glass. The floor plan, sectional drawings and diagram of this bath-room, showing the location of the various fixtures are published herewith, and will be found to be of more than ordinary interest.

TRAINS ARE NOW RUNNING over the big steel bridge on the C.P.R. cut-off at Lethbridge, the final details of construction having been completed by July 22. The Dominion may well boast of this immense structure, as it is a Canadian product in design, material and workmanship, and one of the greatest bridges in the world. It is expected that the bridge across the Old Man River, another Canadian designed and built structure, which is also being erected on the cut-off, will be ready for traffic by the first of September.

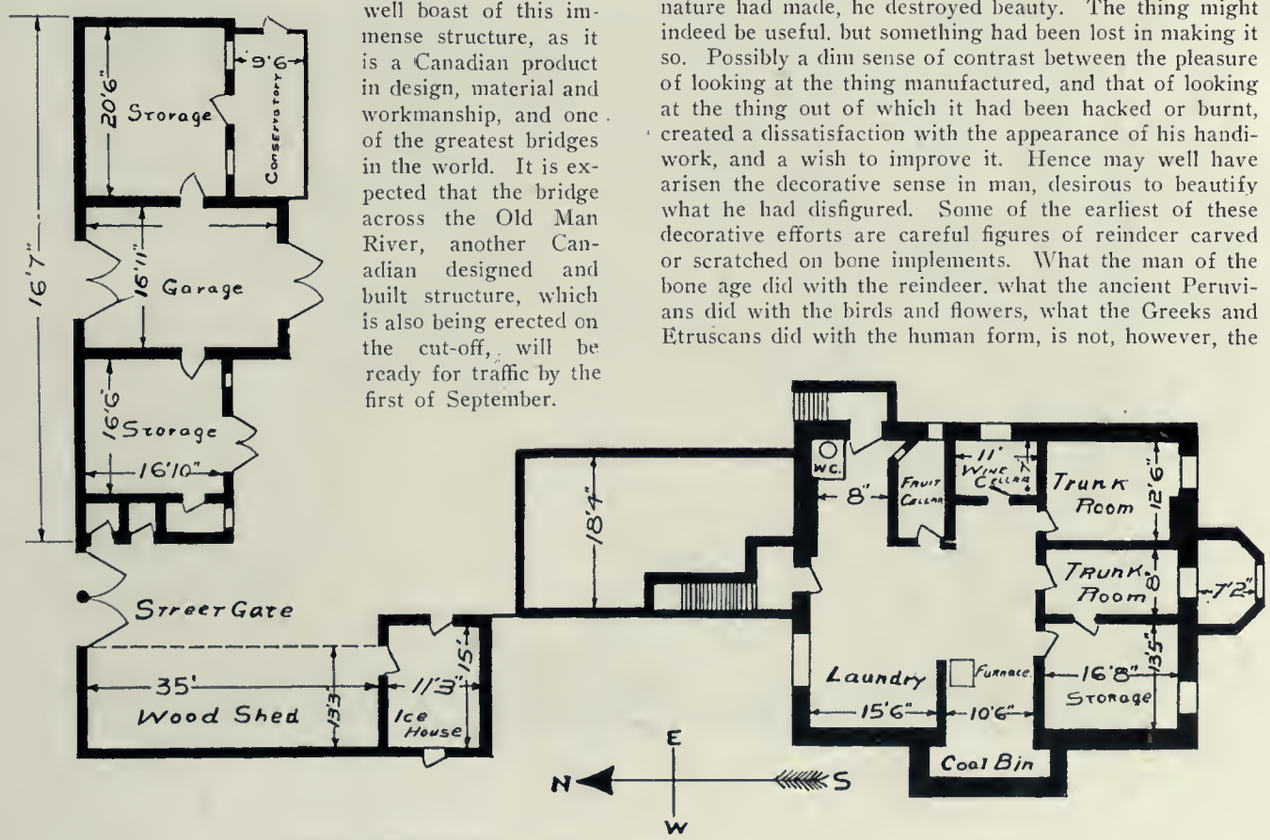
ORIGIN OF DECORATIVE SENSE.

AN INTERESTING DISCUSSION concerning the origin of the decorative sense was noted in one of the French publications. The article is by a noted authority on house decoration and consequently his opinions should carry considerable weight, at any rate they offer food for reflection. Our early ancestors, the apes, if we can judge from their undeveloped posterity, appear to have had no decorative sense. This, like many other faculties, moral as well as artistic, now possessed by human beings, must have been dormant during the Simian period. That it was transmitted to us cannot of course be doubted, or how could we have obtained it? The birds have it very strongly, according to Mr. Darwin, and there can be no doubt that the oyster, though rather careless as to the front view of his house, shows exquisite taste in the decoration of his "interior." He is the prototype of those daily lessening human beings who ground their disregard of architectural beauty on the plea that you do not live on the outside, but inside your house. Our taste in dress is doubtless inherited from the birds, our taste in wall papers from the oyster. Whether, however, we accept the



Second floor plan, Home of Mr. H. T. Bush, Port Hope, Ont.

Darwinian theory or not, we must allow that uncivilized human beings are very like apes, and that the decorative sense, dormant or not in the monkey, is one of the first to show itself in man. Nor is this unnatural, for when he, to suit his own purposes, began to alter things that nature had made, he destroyed beauty. The thing might indeed be useful, but something had been lost in making it so. Possibly a dim sense of contrast between the pleasure of looking at the thing manufactured, and that of looking at the thing out of which it had been hacked or burnt, created a dissatisfaction with the appearance of his handiwork, and a wish to improve it. Hence may well have arisen the decorative sense in man, desirous to beautify what he had disfigured. Some of the earliest of these decorative efforts are careful figures of reindeer carved or scratched on bone implements. What the man of the bone age did with the reindeer, what the ancient Peruvians did with the birds and flowers, what the Greeks and Etruscans did with the human form, is not, however, the



Plan of basement and outhouses, Home of Mr. H. T. Bush, Port Hope, Ont.

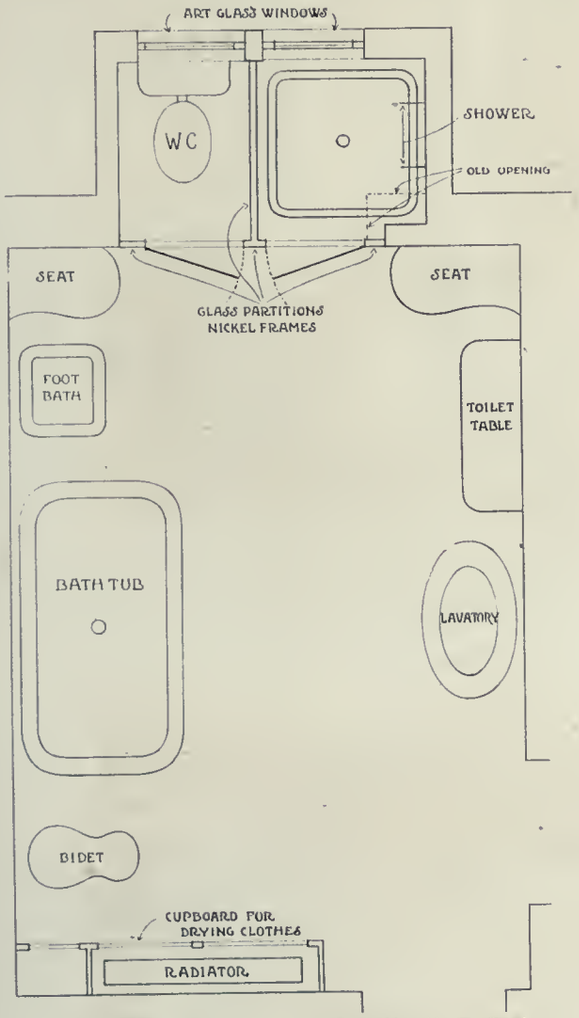
Yellow Room, or guest chamber, Home of Mr. H. T. Bush, Port Hope, Ont. So designated from the dainty soft yellow tone of the walls, which are effectively panelled by an exquisite border design in roses. A soft yellow rug, yellow curtains, appropriate hangings and bird's-eye maple furniture all tend to make this a bright, cheerful room. The private bath-room is seen through the open door which, when closed, forms a full-length mirror.

Guest Room, Home of Mr. H. T. Bush, Port Hope, Ont. A tastefully decorated room, done in pink with flowered chintz panels, the latter also being used for the curtains and bed drapery. The furniture is of mahogany and the rug is a soft green with an effective pattern, while at one end of the room a pier mirror forms a door opening into a built-in wardrobe.

most elementary form of decoration. Odd scratches and marks with a sharpened flint on wood, with the end of a stick or finger nail on pottery, rude combinations of the curve and straight line are the purest form of art—art for art's sake. But whatever the first manifestation of the artistic sense, it was essentially decorative, and was as instructive as the desire to walk in a child.

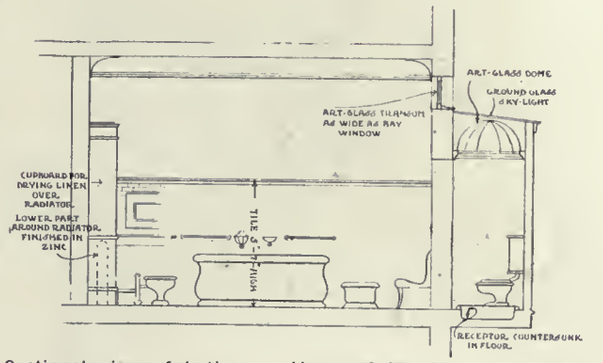
THE SPELL OF EGYPT. ∴ ∴ ∴

BUILDINGS HAVE PERSONALITIES. Some fascinate as beautiful women fascinate; some charm as a child may charm, naively, simply, but irresistibly. Some, like



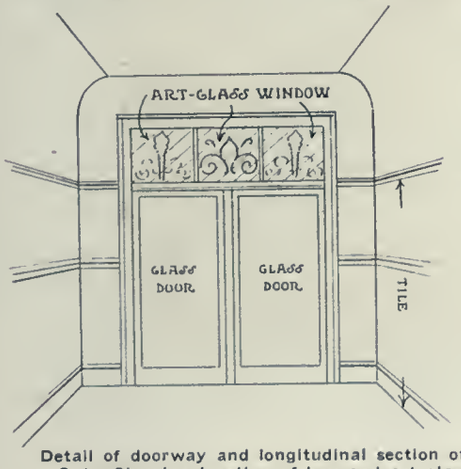
Floor plan of bathroom, Home of Mr. H. T. Bush, Port Hope, Ont.

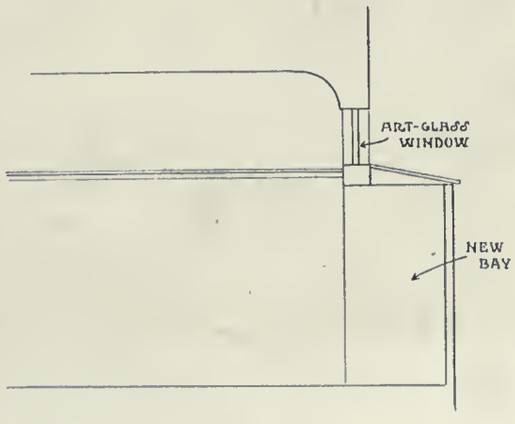
conquerors, strike awe to the soul, mingled with the almost gasping admiration that power wakes in man. Some bring a sense of heavenly peace to the heart. Some, like certain temples of the Greeks, by their immense dignity, speak to the nature almost as music speaks, and change anxiety to trust. Some tug at the hidden chords of romance and rouse a trembling response. Some seem to be mingling their tears with the tears of the dead; some their laughter with the laughter of the living. The traveler sailing up the Nile, holds intercourse with many of these different personalities. He is sad, perhaps, as I was with Denderah; dreams in the sun with Abydos; muses with Luxor beneath the little, tapering minaret whence the call to prayer drops down to be answered by the angelus bell; falls into a reverie in the "thinking place" of Rameses II., near to the giant that was once the mightiest of all Egyptian statues; eagerly wakes to the fascination of record at Diel-el-Bahari; worships in Edfu; by Philæ is carried into a realm of delicate magic, where engineers are not. Each prompts him to a different mood; each wakes in his



Sectional view of bathroom, Home of Mr. H. T. Bush, Port Hope, Ont.

nature a different response. And at Karnak what is he? What mood enfolds him there? Is he sad, thoughtful, awed or gay? An old lady remarked in my hearing, with a Scotch accent and an air of summing up, that Karnak was "very nice indeed." There she was wrong. Karnak is not nice. No temple that I have seen upon the banks of the Nile is nice. And Karnak cannot be summed up in a phrase or in many phrases; cannot even be adequately described in a few or many words. Long ago I saw it lighted up with colored fires one night for the Khedive, its ravaged magnificence tinted with rose and livid green and blue, its pylons glittering with artificial gold, its population of statues, its obelisks, and columns, changnig from things of dream to things of day, from twilight marvels to shadowy specters, and from these to hard and piercing realities at the cruel will of pigmies crouching by its walls. Now, after many years, I saw it first quietly by moonlight after watching the sunset from the summit of the great pylon. That was a pageant worth more than the Khedive's.—From Robert Hichen's "The Spell of Egypt."





Detail of doorway and longitudinal section of bathroom, Home of Mr. H. T. Bush, Port Hope, Ont.—Showing location of bay and art glass window.

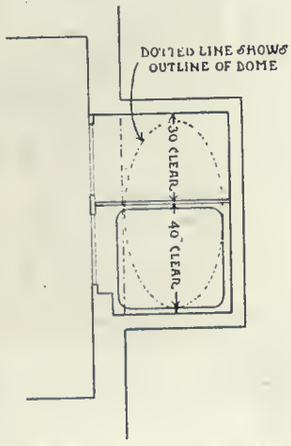


Diagram of dome over closet and shower compartments.

Rendered Drawing of Chicago Post Office by F. W. Fitzpatrick.

Rendered Drawing of Fire Hall by F. W. Fitzpatrick.

Rendered Drawing of Church by F. W. Fitzpatrick.

Rendered Drawing of Parliament Building by F. W. Fitzpatrick.

THE ART OF PRESENTATION.—Importance of Artistic and Accurate Perspective Drawings of Proposed Buildings.—Rendering Should Truthfully Represent Structure as it is to be.—The Work of a Canadian in the United States.

By WM. T. ROGERS.

Canadian architects, as a rule, do not make it a practice to develop, to any great extent, the art of presentation. That is, they do not make it a custom to depict with accuracy a building as it is or as it is to be. Few architects in England or in the United States would expect to get a commission of any importance without first having shown to their client an accurate perspective of the building they propose to erect. Plans and elevations give the untrained mind little conception of the true architctural effect of the structure when completed. It has been even suggested that many of our Canadian architects suffer, in competition with their confreres in the United States, for this very reason. Realizing that there is much truth in this statement, we propose to run a series of articles showing the best of such work by Canadian, English and American artists, through which we aim to show the professional importance of an accurate perspective, a drawing that is the highest perfection of art. The client to whom is submitted a drawing that is artistic and truthful, sees exactly what he may expect, no more, no less.. Mr. F. W. Fitzpatrick, whose work the following article, by Mr. Wm. T. Roger, deals with, is a Canadian (having been born in Montreal) who has gained an enviable reputation in the United States for his ability in the art of architectural rendering. Mr. Fitzpatrick, although now a citizen of the United States, strongly approves of "Construction's" policy in opposing the employment of foreign architects to erect Canadian structures. He believes that, although, in some cases, it may be expedient to call in expert advice or assistance from outside, there is no reason why architects in Canada cannot erect our buildings.—Editor's Note.

SOME DRAUGHTSMEN, particularly the younger ones, just out of the Beaux-Arts, or other such institutions, indulge in the mistaken notion that a renderer drawing is a finality. Their greatest ambition and sole endeavor is to make it resplendent, beautiful, and, usually very untrue. As a matter of fact, architectural drawings are, in the main, mere instruments, written directions, so to speak, as to how the completed building shall be. Unlike a picture of a landscape or an historical subject, the architectural drawing is but the means to another end, and, therefore, the poetic license, the latitude allowed and expected in the one should be conspicuously absent in the other. Seldom is a perspective or pictorial drawing made of a completed building, photography is resorted to when a presentation of the latter is desired. The architectural picture, therefore, is almost invariably of something that is to be, and one of its primal and essential requirements is that it shall be as nearly photographic of the composition that is imagined, but that some day is to be as nearly a reality as it is possible to make it.

Not so long ago French, Italian, and German architural artists were looked upon as the leaders in that art. Of late, whether they have degenerated, or the men on this side of the water have vastly improved, is immaterial, but the fact remains that the best of judges unanimously agree that we of the United States and Canada have developed a class of such artists that stand head and shoulders above their Eupopean confreres. The European School has become almost exclusively impressionistic. Their drawings are vague, can mean anything, and their draughtsmen fondly but mistakenly imagine that they are great masters, and that a few splotches of paint and an uncertain line or two will tell the whole story, provided the "pictures" be but signed with their august names.

This criticism, however, applies more particularly to our Latin-European friends. The English draughtsmen hardly sin in the same way. They run more to woodenness of touch, a harshness of detail that reminds one of the straight edge and ruling pen, too forcefully. The drawings of T. Raffles Davidson and of Collin Campbell Cooper are exempt from this, however, and those two English artists are to be classed with the architect on this continent, who have shown us the best that has so far been produced in architectural rendering.

In Canada and the United States there are perhaps twenty-five men whose work in that special line is especially commendable, men who make drawings that show a building just exactly as it will appear when completed, and do so with ease and facility in drawings that besides

Rendered Drawing of Government Buildings by F. W. Fitzpatrick.

Rendered Drawings for Commercial Buildings by F. W. Fitzpatrick

being what might be termed portraiturely correct, are most pleasing and artistic in themselves. Of that group, so our most artistic architects agree at least. Some of the most prominent of the leaders are Fitzpatrick of

Rendered Drawing of Government Building by F. W. Fitzpatrick.

Washington, Guerin of New York, Hawley of New York, and Enders of St. Louis. With these used to rank Lautrup of Chicago, Ellis of New York, and Anderson of San Francisco, three men of splendid ability, but who have passed to the Great Beyond within the last few years.

Most draughtsmen who excel in this pictorial phase of architectural drawing are what might be called exclusively, artists; that is, their work is invariably in rendering pictures of others' designs. Fitzpatrick differs from them in that nearly all his pictorial work is of his own designs though many are made in association with practising architects. These pictures are, therefore, what might be called children of his own creation, and he is as versatile and able an architect, in the fullest sense of that broad term, as he is an artist —a rare combination. He differs from most of these artists, too, in that his growth has been continuous and lasts well. With most brilliant men such a career is more or less meteoric. They take the world by storm, and are everything to-day, and to-morrow you hear nothing more about them.

Fitzpatrick's drawings were remarkable, popular and highly prized twenty-five years ago; to-day, though he has many other interests, has a most extensive practise as a consulting architect, and has won National fame as a writer, an organizer and a leader of popular reforms, he is still at the very zenith of his powers as a draughtsman, and easily retains his laurels as the most skilled of them all.

It would be most interesting if CONSTRUCTION would publish a series of master drawings that would graphically illustrate the art of rendering. It could easily obtain selected works from each of the great draughtsmen for such a series, and that series would be a whole education for the younger generation, a work of the very greatest benefit to the profession that CONSTRUCTION serves. This may help to start such a series.

It is my pleasure and privilege to know Mr. Fitzpatrick personally, and to have access to his sketch-books and files. The illustrations that accompany this brief review will tell the story of his artistic achievements better than can any words of mine.

Francis W. Fitzpatrick was born in Montreal forty-six years ago. He developed artistic talent early in life, studied art and architecture in Canada and abroad, and worked under some of the old-time leaders in Canada, but soon sought the larger opportunities that the United States afforded in those early days.

Some of his precocious but masterly work is shown in the designs and drawings he made, and in some cases the supervision of the work, too, in the early 80's of the grand altar of Notre Dame's in Montreal, the exterior of St. James (R.C.) Cathedral, the Canadian Pacific Railway buildings, and Sir George Stevens' magnificent residence. He did splendid work in the West, State Capitols, Court Houses, and other important buildings

Rendered Drawing of Church by F. W. Fitzpatrick.

of that character in his own name, and as designing associate with other artists. All this time he was reeling off superb drawings of this work, for he always designs in perspective and colors. The architectural journals of

Rendered Drawings for Commercial Buildings by F. W. Fitzpatrick

those times fortunately preserve the record, in illustrative plates, of that work of his. In '96, he was made one of the principal officers in the United States Federal Building Service, and contributed a very large share of the taking of Governmental architecture out of the "Slough of Despond" in which it had wallowed for some years previous. He designed much of the Government's important work and left it an inheritance of beautiful drawings. In 1904 he resigned in order to give more of his attention to the consultation practise he had built up.

This work that he still carries on, despite his many other exacting duties, is virtually a silent partnership with architects in private practise, in Canada, in the United States, in Mexico, and even in far off Australia. Naturally, he only gets the best of everything architecturally.

No architect will go to him with a little house or any the lesser matters that are brought into the office. It is in the larger problems, the more important buildings, and particularly in competitions that architects enlist his assistance. This, of course, keeps him keyed up to the very highest pitch and in the closest touch with the best that is going on all the time.

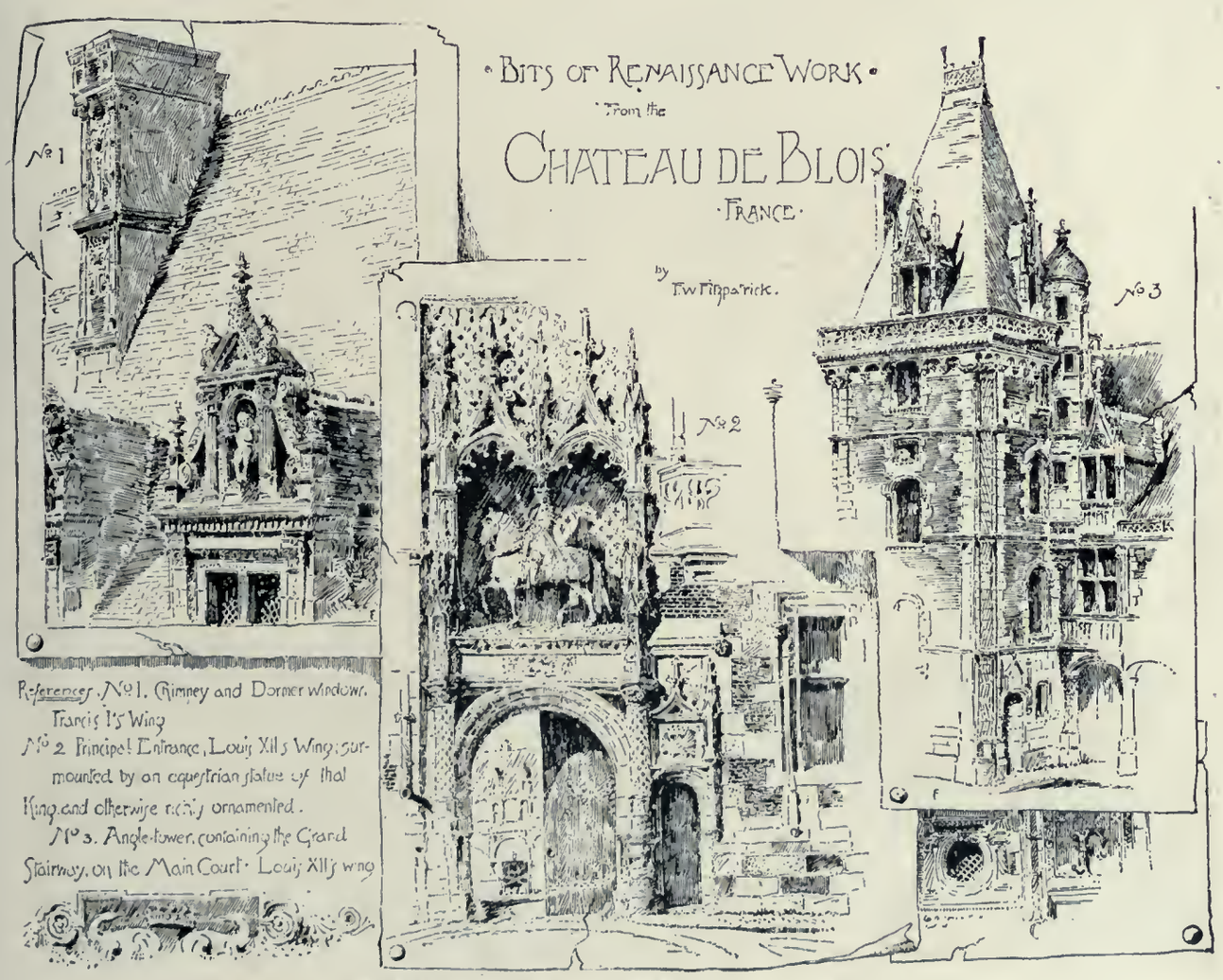
One architect may have one Parliament Building or Capitol once in his life time, but five or six architects or a dozen having such commissions, will call upon Fitzpatrick for assistance in the course of a year. He is associated with specialists in engineering, sanitation, lighting, etc., so that through him expert assistance is given in all those lines, but he personally takes care of the design, the scheming out, the solving of the architectural problem, and the presentation of that solution in artistic and convincing form.

Naturally, the number of drawings, pictures he makes is legion, and as "much practice makes perfect," superb as his drawings have always been, the latter ones stand forth as pre-eminently his best work, and, though never satisfid with it himself, he typifies the epitome of true progress in that his last is always his best.

ARCHITECTURAL ENGINEERS AND ARCHITECTS the country over, says the Pittsburgh Gazette-Times, took a lively interest in the dismantling of the Murtland Building at Smithfield street and Sixth avenue, which was torn down recently to make room for Pittsburgh's largest office building.

The building was only twelve years old, yet it was one of the first steel frame structures in the country to be dismantled, and furnished the experts in that kind of construction a chance to prove that their theories regarding the durability of steel have been correct. For the steel in the Murtland Building showed no signs of deterioration; the material was in just as good condition when uncovered to the elements as it was when it was erected twelve years ago. The rivets were tight and even the grillage upon which the beam columns rested, and which was under the ground, was in perfect order.

The structure was eight stories high, with a basement, the ground area being 20 x 60 ft. The amount of structural steel in the building was about 150 tons.



Pen Sketches of Chateau de Blois by F. W. Fitzpatrick.

Students' Residences, Toronto University, showing the end buildings which flank quadrangle on the right and left. Messrs.. Eden Smith and Son, Architects.

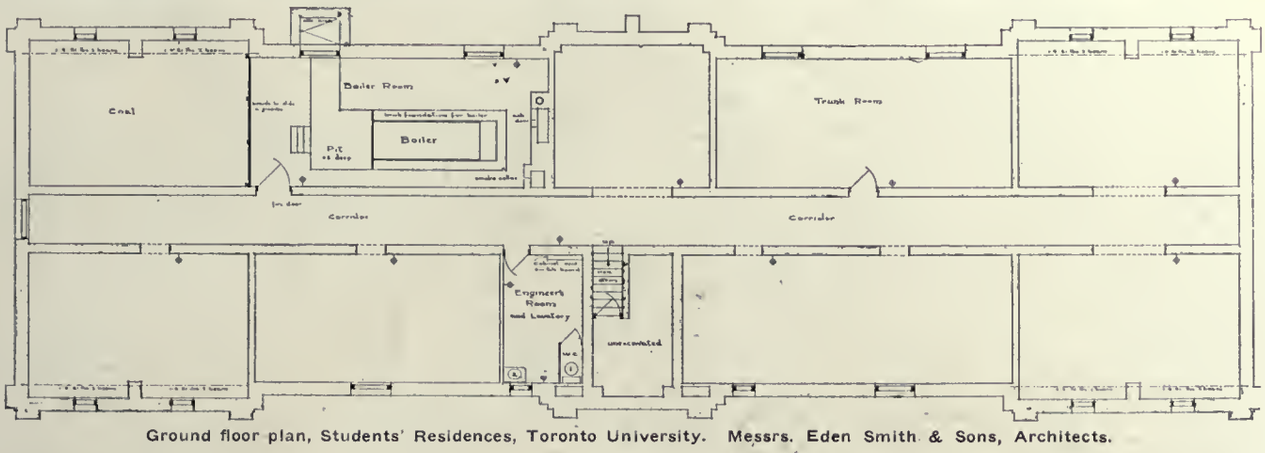
STUDENTS' RESIDENTIAL BUILDINGS.—New Group at Toronto University Comprising Three Successfully Planned Structures.—Their Plan and Construction.—Built for Male Students.—All Rooms Have Outside Exposures.

TO HOUSE A COMMUNITY in itself, and still to provide a distinctively private little home for the individual members who comprise it, so that each may benefit from a broader spirit of fraternalism, and yet grapple with the intricacies of high learning in unmolested privacy, is the task which the architect undertakes when designing a student's residential building for any of the greater universities.

Such a building is vastly diverse in character from the purely *morphean* abode with its presiding domine, as some of the dormitories of the early school have impressed us. It combines as economic, sociological and domestic phase which the other conspicuously lacks, in that it is the students home, his study, meeting place and social world, all in one—the place where he spends the major portion of his time during the long terms of the scholastic year. Consequently a building of this type must of necessity be well designed, carefully planned, fittingly appointed and provided with every reasonable facility which will contribute to his comfort and convenience, so as to exert a wholesome influence, and encourage him to readily cultivate, appreciate, utilize and respect the environments within which he dwells.

The successful solution of the architect's problem, therefore, lies in the designing of a structure that will adequately meet the students' social, domestic and scholastic requirement by providing him with a central place in which he can commingle with his fellow students outside of the class room, and still be assured of the ad-

Students' Residences, Toronto University, showing central building and end building on the left. Messrs. Eden Smith & Son, Architects.

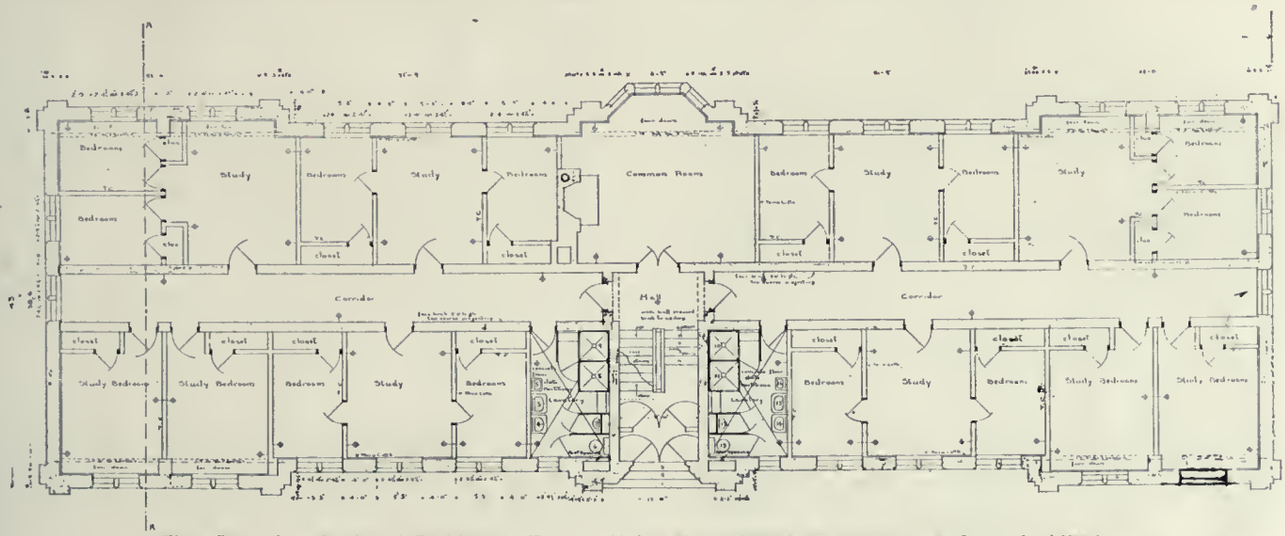


Ground floor plan, Students' Residences, Toronto University. Messrs. Eden Smith & Sons, Architects.

vantages of undisturbed study in the pursuit of his university course.

Three interesting buildings, designed by Architects Eden Smith & Sons, and comprising a group of university residences, were erected on the grounds of the Toronto University within the past year. These buildings are most successfully planned, and all three are similar in design, construction and arrangement. They are arranged around a qaudrangle which has a roadway forming the line of demarcation on its open side. The general architectural effect is derived from straight, broad lines, perfect proportions, simple surfaces and a well balanced door and window arrangement.

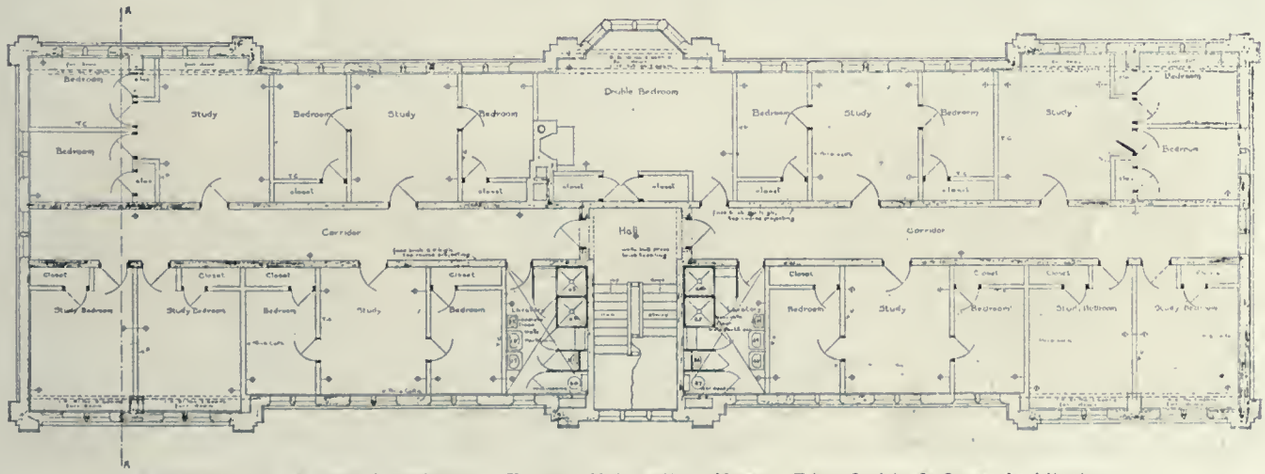
In each case, the entrance, located at the centre and having a wide splayed arched opening, together with the wall above it up to the roof line, is executed in red New Brunswick stone; this material also being used for the ashlar work to the first floor sills and the cut stone trimmings throughout. The upper portion of the walls is of red pressed brick and the roof, sloping gradually at the front and back, is of green slate with copper gutters and flashes.



First floor plan, Students' Residences, Toronto University. Messrs. Eden Smith & Sons, Architects.

At the centre and both ends the wall extends above the eaves so as to face three gable projections which come forward at these points on either side, and which tend to give the buildings their strong sense of equipose.

On the inside, each floor contains two independent sets of rooms, which are either studies with two bedrooms opening off them or combination study bed-rooms. These suites and combination rooms are arranged on



Basement plan, Students' Residences, Toronto University. Messrs. Eden Smith & Sons, Architects.

either side of a corridor which extends from one end of the building to the other, this disposition giving each room the advantage of an outside exposure.

All the doors and wood trimmings are of quarter cut oak, stained and waxed, the floors are of maple, and the walls of the bed-rooms and studies covered to a height of six feet with painted burlap. On the ground floor opposite the entrance is a large general sitting room having an open fireplace, which the students can enjoy in their spare time. The lavatories are finished in cement plaster and cement floors, and equipped with shower baths and modern plumbing. The basement contains the heating apparatus and engineer's rooms, with switches and other controlling devices.

In construction the structures are about as fireproof as it is possible for modern building science to make them. The floor system throughout is of reinforced concrete built according to the Kahn System, and the partitions

Main Entrance, Students' Residences, Toronto University, showing detail of stone and brick work. Messrs. Eden Smith & Son, Architects.

are of either brick or hollow terra cotta tile. The corridors and stair openings have brick walls, the stairways themselves being built of iron and having reinforced concrete landings.

The heating is the one pipe system, the structure being heated from the two boilers contained in the south building. The wiring is in conduits and the lighting of the corridors, lavatories and bed-rooms, is controlled by switches in the Engineer's room.

The locks throughout are master keyed so that a key will only open the front door, the corridor, study door and bed-room of the student to which it belongs. There are the usual building master keys and grand master keys.

GOTHIC GEOMETRICAL PLANNING.

MANY ARCHITECTS SCOUT THE IDEA of proportion in Gothic buildings altogether. They say that it is useless to design the building on paper according to strict geometrical rules, as the foreshortening in perspective and the differences of planes will destroy the proportions in execution; but, on the contrary, we know that Greek and Roman buildings are equally satisfactory in drawing and in execution, says a writer in the Architect and Contract Reporter. There is no good architecture without good proportion, for without proper proportion architecture is merely indifferent building. All the best buildings of the best Gothic period, such as Ste. Chapelle, Amiens, and the cathedral of Lausanne, were designed on certain principles of proportion, and this can be proved by measurement. This fact has attracted the attention of many eminent architects and writers on architecture. The first to call attention to it was Cæsar Cesariano, the translator of "Vitruvius," who proved clearly that Milan Cathedral was designed on the lines of a combination of squares and triangles. This idea was developed by Kerrich in a paper in the nineteenth volume of "Archæologia," who applied the form of the vesica piscis to many ancient examples with great success; to the plans of Bath Abbey Church, Croyland, Lincoln, Hereford, and other cathedrals and churches. Hawkins, in his book on "Gothic Architecture," published in 1813, recapitulated the evidence in favor of the system of proportion. Professor Cockerell, in a paper read at a Winchester meeting of the Archæological Institute, showed that the vesica gave William of Wykeham the guiding lines for the plans of his chapels, but he found that the equilateral triangle did not apply to the sections of all the chapels. In the Lincoln volume of the same institute there is a paper by Mr. Penrose on the "Proportions of Lincoln Cathedral," which he proves to have been originally designed on the system of squares called pariquadrats.

But Viollet-le-Duc in his essay shows conclusively that triangles of various forms characterize generally the buildings of successive periods. In the round arched styles the rectangle was used; in Early Pointed, what he terms the Egyptian one, in which a perpendicular line drawn from the apex equals two and one-half to four parts of the base; in later periods the equilateral triangle together with the Egyptian.

In the church of St. Sernin, at Toulouse—a noble Romanesque edifice with double aisles, the interior of which strikes everyone who enters it on account of its fine proportions—he found that on dividing the ground line into 20 parts 5 of them gave the half width of the nave, 2 the thickness of the pier, 4 the width of the inner aisle, 2 the thickness of the second pier, 4 the width of the outer aisle, 2 the thickness of the wall and 1 the projection of the buttress. An Egyptian triangle springing from the outer base line gives the springing of the vault of the nave and the abacus of the arches of the aisle, and an equilateral triangle opening from the centre of piers of the arch meets this in the center of the arch and gives the height of the nave arches. In the Ste. Chapelle he shows that two equilaterals give the slope of the arch over the windows; that another, based on the window sill, gives the springing of the groining, and that others govern the entire composition internally and externally.

IN OSAKA, JAPAN, which was recently swept by fire, is a building that is of interest on account of its age, if for no other reason. It is the chief public building and one of the three Imperial palaces of the Empire. The date of its erection goes back to the year 1593.

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 Toronto, August, 1909 No. 10

Current Topics

THE GENERAL SCHEME of wharves and warehouses which the Canadian Pacific Railway has in view for Victoria Harbor, on the Georgian Bay, embraces the largest elevator in the world, one with a storage capacity of 12,000,000 bushels. Operations on the immense plant will start in the near future. It is also the intention of the C.P.R. to in time connect Victoria Harbor with Montreal by a double track railway which will be practically level for the entire route.

* * *

CANADIAN MATERIALS will be used in the construction of the Chateau Laurier to be built at Ottawa, and Canadian workmen will put it up, says THE EVENING CITIZEN of that place in quoting Mr. T. T. Amos, the local representative of the Geo. A. Fuller Company, a New York concern, who have been awarded the contract for its erection. In the same item the CITIZEN states that "Ohio Sand Stone has been decided as the material for the building." It will undoubtedly surprise many Canadians to learn that Ohio has been annexed to the Dominion. "Consistency, thou art a jewel!"

* * *

IN THE MATTER of local building legislation and civic organization, Edmonton is moving ahead in a manner much to be admired. Recently the council adopted a new building code enlarging the power of the city architect and demanding a better type of structure in general, and now comes a move on the part of the Board of Education to create the office of Building Inspector of Public Schools, the appointee to devote his whole time to the services of the board. The duties of the position will consist of the drawing of plans for and the supervision of all new building, the planning of all necessary alterations to existing structures, the looking after of all repair work, and the managing of the school properties in general. The salary attached to the office will be $2,000 per annum.

THE OLDEST TEMPLE IN THE WORLD, so far discovered, has been unearthed by excavators at Bisya, in Central Babylonia. The walls of the tower were first uncovered and the summit cleared. The first inscription on the surface was of brick stamped with the name Dungi, which goes back to 2750 B.C. A little lower appeared a crumpled piece of gold with the name Param Sim, who lived in 3750 B. C. Just below were large square bricks peculiar to the reign of Sargon, 3800 B. C., and who was probably the first Semitic king of Babylonia. A large platform was discovered 2½ yards below the surface, which was constructed of peculiar convex bricks such as were used in building 4500 B.C.

* * *

THE CHANGE OF AIR in a closed room due to the porosity of walls and the leakage of air around windows and doors has been investigated by Arthur D. Little, of Boston. This room, having a contents of 615 cubic feet, was in the second story of an ordinary frame dwelling house with clapboarded exterior walls. The interior walls and ceilings were plastered and papered, the single window was made as tight as possible by means of putty and the interior door was fitted with weather strips. Notwithstanding these conditions, which one might assume would very materially limit the rate of ventilation, it was found that through perfectly natural causes the air was changing at the rate of one and eight-tenth times per hour. This fact was shown by measurement of the rate of disappearance of carbonic acid.

* * *

SIXTEEN HORSES, with haunches firmly set and every muscle strained, pulling an immense steel girder, was one of the recent sights on the streets of Toronto. The girder was one of a pair which is to be used to support the gallery of the new Shea's Theatre, and it was being conveyed on a low, broad wheeled, truck of fifty tons capacity, from the works of the Canada Foundry Company at the head of Lansdowne avenue to the corner of Victoria and Richmond streets, where the playhouse is being erected. The weight of this huge steel member is 48,000 pounds, or twenty-four tons. It is 70 feet in length, four feet wide, and twenty-four inches in depth, and is the biggest girder that has ever been carted through the streets of Toronto. At the present time there is in the shop of the foundry a girder which is probably the largest ever manufactured in Canada. It has been built for the swing span of a bridge at New Westminster, and weighs one hundred tons, the length being 232 feet, and the width 12 feet.

* * *

"A GREATER AND BETTER CITY than ever before." This is the slogan which emanates from fire-stricken Cobalt, where those who are conversant with the aggressive and business-like spirit of this thriving mining community, say that the town will rise from its ashes in a truly Phœnix-like manner. From now on a new order of things will be in force. The town's fire department and water supply and sanitary systems are to be brought up to a high standard of efficiency. Stricter building laws and rigid supervision over all new structures are also to obtain. To quote Mayor Lang: "Everything will be done to satisfy the insurance companies and assure the erection of buildings which will not only be substantial and safe, but a source of civic pride in general character." The mayor's statement is a most encouraging one, and if followed out will mean progress, permanency and economy to the town. As regards the rebuilding of the burned district, His Worship adds that the rapidity with which operations will be carried on, will only be limited by the capacity of the builders and contractors to do the work As soon as the mining companies are prepared to issue leases, the town will go up like magic.

A RUST-PREVENTING COATING for iron, used by a German manufacturing company, consists in coating iron and steel ware first with lead, then electrolytically with zinc, and finally heating this coating, so as to obtain an alloy of the two metals which has the same potential as zinc.

* * *

PROCEEDINGS HAVE BEEN INSTITUTED against the G.T.R. by Architect Bradford Lee Gilbert, of New York city, who asks for the sum of $119,453.23 for services rendered in connection with the preparation of the original plans for the Chateau Laurier and Central Station, which were subsequently rejected for plans prepared by a firm of Montreal architects. The writ in action was recently filed in the High Court at Ottawa, where the structures are to be erected, by Mr. Harold Fisher, who will look after Mr. Gilbert's interests. The contention of the plaintiff is that the ideas he evolved in planning the buildings were appropriated and incorporated in the accepted designs. The outcome of the case is being awaited with interest by a large number of architects throughout the country.

* * *

AT THE FORTY-THIRD ANNUAL meeting of the National Board of Fire Underwriters, recently held in New York city, President J. Montgomery Hare made an address, in which he stated that a comparison with statistics of losses in foreign countries shows that the loss per capita in the United States is from 10 to 30 times greater than in the principal European cities. For the last five years, he said, the annual fire loss in this country has averaged $269,200,412, the total for the period being $1,346,022,059, or about three-quarters of a million for each day of the five years. In this period the figures were largely increased by the San Francisco conflagration, but even taking the two years since then the losses have kept well above the $200,000,000 mark. Without counting losses from forest fires, the destruction of property in 1907 by fire totaled $250,084,709, and in 1908, $217,885,850. The figures for this year give no promise of improvement, President Hare said, having reached a total of nearly $53,000,000 for the first three months.

* * *

IN THE SMALL SIZED CITY where there is only business enough for one enterprising and studious architect the gentleman who occupies that position is somewhere near the most important man in the community, says ROCK PRODUCTS. The tone and character of the whole town is in his hands, for he models the buildings for the business district as well as for the residence portion, and it is remarkable that a large number of the towns have nearly all their buildings designed by one brain, that of the local architect. He takes a personal pride in his work, really claims the work for his own and frequently gives his best work at small cost for the sake of obtaining for the completion of his plan of beauty some missing link which he could not otherwise secure. The people of the community should be loyal to such a man and not take their large appropriation to some big city and hunt up a stranger who has not given his life work to the town and his best study to its artistic development. The builders of every community should realize that we do not build for ourselves alone, but for the whole community, and respect the plan and ideals of the man who gives up his life to the study of pleasing effects and symmetrical combinations for the various localities which go to make the town a handsome and presentable whole to the stranger within the gates, and incidentally the captain of industry comes along occasionally to make big investments which redound to the benefit of every property holder represented. The architect is loyal to his town and each community should be loyal to its architect.

A DWELLING HOUSE which is in some respects unlike any other ever constructed in this country, if not in the world, is located in the city of Memphis, Tenn. It is a two-story structure with heavy projecting cornice and dormer windows, and has the lower story built of stone in blocks and chips collected by the owner in every State in the Union and in many foreign countries. In its walls are pieces of rare marble from Greece and Italy, sandstone from Norway, onyx from Mexico and odd specimens from Australia, Ceylon, Egypt and other distant lands. These materials, which are set in cement reinforced with steel rods, include many examples of gold bearing quartz, ores of silver, copper and iron, together with curious bits of jasper, sardonyx and basalt. It is stated that the walls contain more than 50,000 separate pieces, and the effect produced by the play of the rays of the sun upon them is both novel and brilliant.

* * *

THE DOUBLE SWING BRIDGE at the Libau, Germany, harbor entrance provides a main shipping channel with a minimum clear width of 210 feet and consists of two similar swing bridges seated on pivot piers, 128½ feet apart on centers. The total width of the waterway is 435 feet, so that three channels are provided, the two smaller ones being, roughly, 70 feet wide in the clear, the center of the pivot piers being placed 89 feet from shore. The bridge carries a single-track street railway line, a roadway on each side and the usual footwalk. The two pivot piers are each built as a circular tower of masonry with a diameter of 30 feet from the foundations, 50 feet below water level, to the surface. Above water level they rise in two steps of diminishing diameter, the last one being 22 feet. From this base the masonry is carried up for about 15 feet as a truncated cone with a table 7 feet in diameter, on which the metal cap or pivot is fastened. The weight of each complete half bridge, 325 tons, is transferred to the pier by means of a cross girder, the top member of which rests upon the metal cap. The slopes around the masonry cone. The last step of the masonry cone, allowing the whole, when in position, to revolve pier, 22 feet in diameter, is furnished with a heavy steel of the girder correspond with the slopes of the masonry band or rail, on which the lower members of the cross-girders are supported by rollers.

* * *

AN IMMENSE CONCRETE SEA WALL, built subsequent to the great hurricane which in 1900 killed thousands of persons and wrecked every building at Galveston, Texas, prevented history from repeating itself on July 21, when that city was again visited by a storm which was equally as furious in its onslaught as the one which brought disaster nine years ago. Not a single life was lost in the city proper, and the damage to property, considering the potency of the elements, was comparatively slight. The action of the wall in beating back a sea whipped by a seventy-eight mile gale, has given the city a feeling of confidence which it has never before enjoyed. The force of the impact was so great that the spray from the immense waves shot sixty feet into the air. The wall, which is 17 feet high, extends along the gulf side of the city. On the top of the wall is a boulevard wide enough for driving six carriages abreast. When the wall was designed and built grave doubts were expressed as to the practicability of the plan, and also as to the strength of the material. It was feared that the work would be wiped out before an onslaught of the sea such as formerly destroyed the city. The recent storm, however, fully vindicates the design, the dimensions and the material, and demonstrates the strength and durability of concrete as a material in such important structures. There are many cities of the seaboard sadly needing seawall protection of this very class. Such a wall along the water's edge at Toronto would eventually save the city thousands of dollars, besides giving it a driveway and water front of which it could be justly proud.

New Transportation Building, Canadian National Exhibition Grounds, Toronto. Built during the past year at a cost of $95,000. In size it is 337 feet long and 153 feet wide. The walls, which are of red pressed brick with Roman stone trimmings, are carried on a solid concrete foundation, while the roof is of the steel truss type, thus making the building practically fireproof. Mr. Geo. W. Gouinlock, Architect.

CANADIAN NATIONAL EXHIBITION BUILDINGS—Group of Interesting Structures in which the Arts, Industries, and Natural Resources of Canada are Annually Displayed—Brief Comments on Their Construction—Built in the main of Non-Combustible Materials.

TORONTO has the most beautifully situated and largest exhibition grounds in the world, and, incidentally, it may also be said, the finest type of permanent exhibition buildings. This is the consensus of opinion of the legion of American visitors who annually find the Canadian National Exhibition a cynosure of attraction, and also the expression of the many travelers from abroad, who have in journeying through the Dominion on business or pleasure, includes this important event in their itinerary. And well may this be said, for both the grounds, which cover an area of 260 acres and extend a mile and a half in length, and the substantial character and magnitude of the buildings are such as to readily impress one with the importance, the greatness and the vastness of it all.

From the time when it was first established, twenty-seven years ago, until the present day, the Exhibition has undergone a complete transformation. Each year has seen the erection of new buildings, and each year has also seen it brought up to a higher standard, with better accommodations, and conducted on a more stupendous scale than ever before. Gradually the original frame structures have been replaced by larger and more modern buildings The fire which a few years ago destroyed the old Main Building, Crystal Palace, and the grand stand, made progress in this direction, for, while the Exhibition Board had long recognized the value and economy of safe and permanent construction, the fire more fully pointed out the absolute necessity and importance of employing none but steel, brick and stone and such non-inflammable materials in the erection of all future buildings. As a result, the entire Exhibition proper, with the exception of the cattle

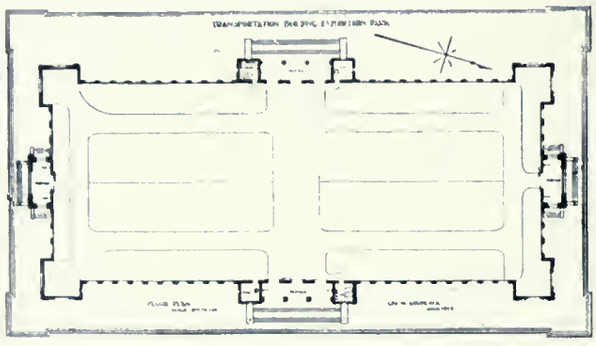
New Grand Stand, Canadian National Exhibition Grounds, Toronto. A steel and reinforced concrete structure which is capable of comfortably seating, in chairs, 17,000 people. The immensity of its size can be imagined from the fact that it is 725 feet long and 100 feet wide. It was erected at a cost of $240,000, and is the largest covered and most complete fireproof grand stand in the world. Mr. Geo. W. Gouinlock, Architect.

Industrial Building, Canadian National Exhibition Grounds, Toronto. This building is in the form of a double H, and is 231 feet long by 340 feet wide over all. Access to the interior is obtained through eight separate entrances, the central one being elaborated with a columned portico. The structure is built of cement concrete, brick and stone, with steel trussed roof having a large dome at centre. It contains 74,000 superficial feet of floor space, and cost, complete, $95,000. Mr. Geo. W. Gouinlock, Architect.

sheds, is to a large degree a fireproof city with splendid facilities for display, and a daily floating population of form 50,000 to 100,000 for two weeks of every year.

But even with the many new buildings and additional facilities, the increasing demand for accommodations has been such as to completely tax all available floor space. The growing number of United States and European firms who find it expedient to exhibit annually, is most significant, as it is not only the surest indication of the great importance of the Exhibition, but an unmistakable sign of the universal growth and prosperity which this country is experiencing.

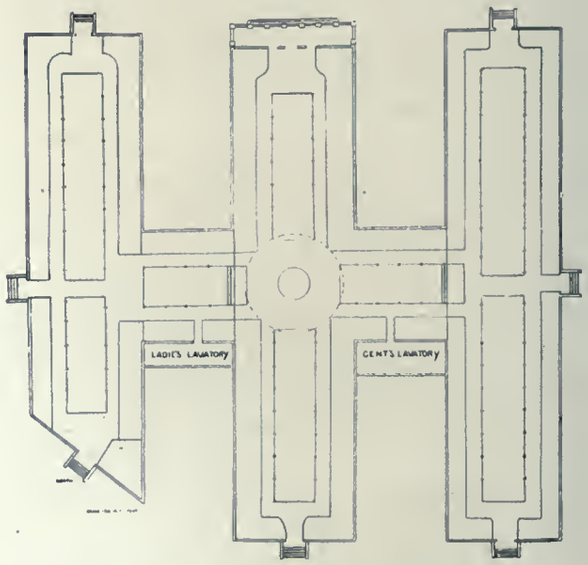
Within a fortnight (August 28 to September 11) the Exhibition will again be in full swing, and the public for the first time will have an opportunity of seeing the new Transportation building, a structure of magnificent di-



Floor plan, Transportation Building, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Gouinlock, Architect.

mensions, which was erected during the past year, at a cost of $95,000. This building is constructed of red pressed brick and Roman stone trimming of a buff tone, the foundation being of solid concrete, and the roof supported with columns and steel trusses. Architecturally, it is one of the most successful structures of the entire Exhibition group. There are four entrances having approaches of granolithic steps, the two at the centre of the building being adorned with large pillars which form a colonnade on either side. The dimensions of the structure, which is 337 feet in length and 153 feet wide, give it an immense interior which is well lighted and ventilated by lantern lights arranged around the roof and controlled by a patent operating device. As its name would imply, the building is to be used for the exhibit of transportation facilities, such as automobiles, carriages, launches and other types of conveyances, and it will undoubtedly prove to be one of the most attractive places within the Exhibition grounds.

There is no structure of the many to be seen, that is more interesting in its general construction than the new grand stand, which is the most complete fireproof and largest covered structure of its kind in the world. An

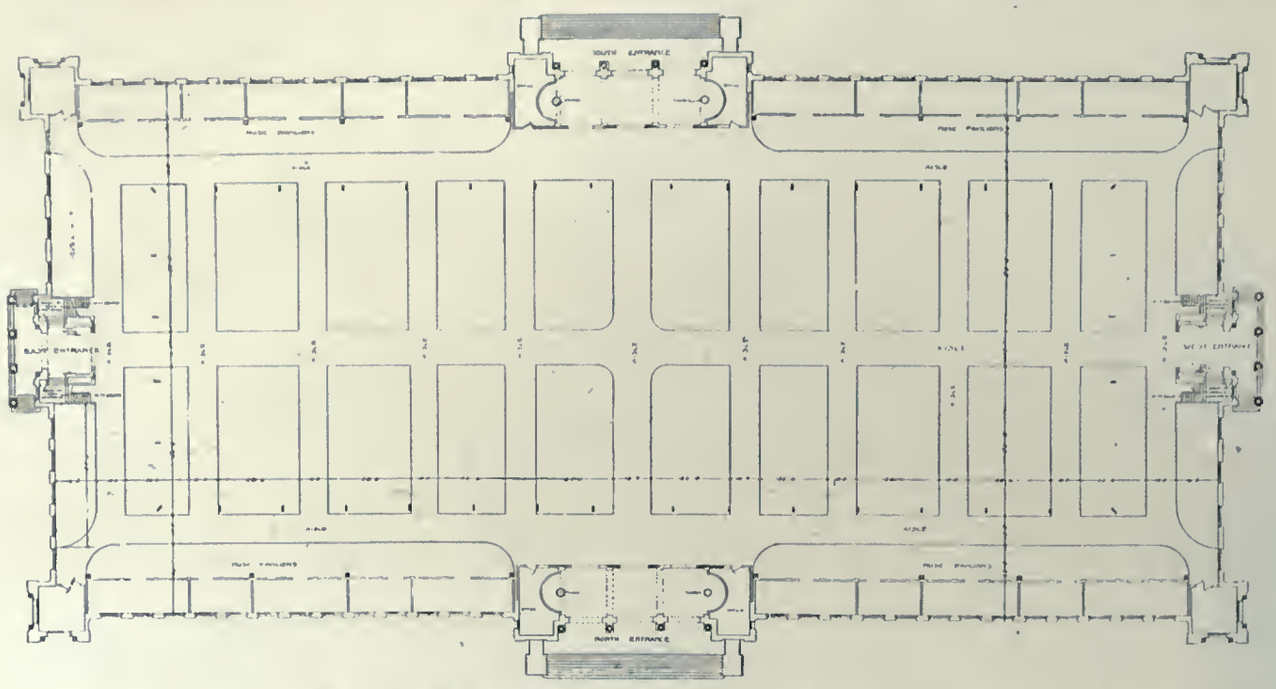


Floor plan, Industrial Building, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Gouinlock, Architect.

idea as to the immensity of its size can be obtained from the fact that it will comfortably seat 17,000 people in chairs, and with it great standing room and emergency seating capacity, can provide accommodation for an additional 10,000, should the occasion demand. The structure is built throughout of steel and reinforced concrete, and its cost complete was $240,000. It is built to conform with the contour of the track which it adjoins, and from end to end is 725 feet, its width being 100 feet. The record time in which this grand stand was erected is a most substantial proof of the ability of Canadian firms

Manufacturers and Liberal Arts Building, Canadian National Exhibition Grounds, Toronto. Constructed of brick and steel, and having large arched trusses spanning the central portion. It is 450 feet long by 250 feet wide, and is utilized for exhibiting the finer class of manufactured goods. The cost of this building was $110,000. Mr. Geo. W. Gouinlock, Architect.

Art Gallery, Canadian National Exhibition Grounds, Toronto. An absolutely fireproof building, with walls of brick and stone, and floors and roof of reinforced concrete. Erected at a cost of $40,000. It is 120 feet long by 82 feet wide, constructed in quadrangular form, and will readily permit of future extensions. Mr. Geo. W. Gouinlock, Architect.



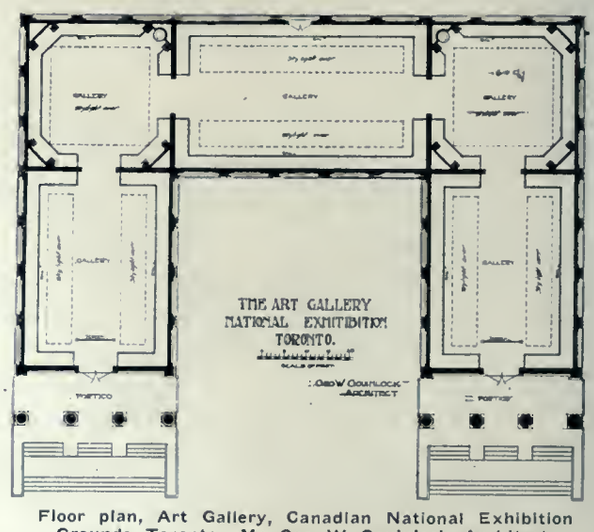
Floor plan, Manufacturers and Liberal Arts Building, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Goulnlock, Architect.

to execute important contracts in expeditious and thorough manner. Three months from the date the contract was awarded, Messrs. Holmes & Son (Toronto), and the Hamilton Bridge Company, who carried out the work, turned this completed structure over to the Exhibition Board; and the careful attention given to constructive details and the thoroughness of the work in general made it an accomplishment, which to say the least, is a credit to the building interests of the Dominion.

A building, which not so much on account of its architectural treatment, as its general ararngement and utility of plan, that is worthy of note is the Industrial Building—formerly known as the Process Building. This building is in the form of a double H., and is 231 feet long by 340 feet wide over all. The principal facade faces the west on the main thoroughfare, and there are eight entrances, the central one of which being elaborated by a columned portico. Over the central portion of the structure is a large dome, and the lighting is so arranged as not in any way to interfere with the placing of exhibits. The building is constructed of cement concrete, brick and stone, with steel trussed roof. It contains 74,000 superficial feet of floor space, and was erected at a cost of $95,000. The entire space is devoted to demonstration of the process of manufacture, and it is daily the gathering place of thousands of interested visitors.

Farther east and more towards the centre of the grounds is the Manufacturers' and Liberal Arts' Building, an immense structure of brick and steel, with a pleasingly detailed exterior. The roof is of the arched type, with large steel trusses spanning the central portion, above which rises a low spreading dome. This building is possible the largest and most costly on the ground, its length and width being 450 feet and 225 feet respectively, and its construction involving an expenditure of $110,000. The vast space afforded by these dimensions is utilized exclusively for the exhibiting in finer class of manufactured goods. The entrance at either end have columned porticos, while those on either side at the centre are flanked by large rustic brick piers capped with ornamental plinths and spheres, executed in cut stone. In the basement of building, at the east and west ends, are moderately equipped lavatories for the use of the public.

Owing to the important character and high value of its exhibits, the Art Gallery, which has much from an architectural viewpoint to commend it, has been built so as to be absolutely fireproof. Here each year the work of Canadian artists are shown, and here also are exhibited annually rare and valuable paintings from the leading galleries of England, as well as from the collection of private individuals. As a painting or work of art which is once destroyed is lost forever, the wisdom of the Exhibition Board in adopting only non-inflammable materials in the construction of this building, cannot be over-esti-



Floor plan, Art Gallery, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Goulnlock, Architect.

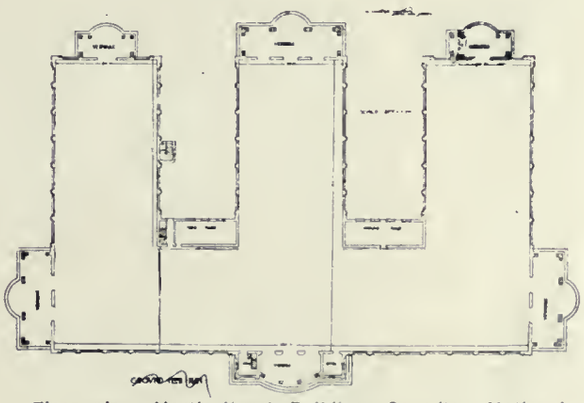
mated. The walls are of stone and brick, and the floor system and roof—the latter having a skylight over each of the three sections—are built of reinforced concrete. The building represents an outlay of $40,000, and it is 120 feet long by 82 feet wide, being constructed around a quadrangle having the main thoroughfare on the open, side, and so planned as to permit of future extensions.

Upon the site of the old Crystal Palace now stands the new Horticultural Building in which are housed the agricultural, horticultural and floricultural departments. This structure was complete just prior to the opening of the 1907 Exhibition, and it is conceded to be one of the finest,

Horticultural Building, Canadian National Exhibition Grounds, as seen from the main approach. One of the most successfully designed buildings in the entire Exhibition group. It is of red pressed brick construction, with gray stone trimmings, trussed steel roof and concrete floors, and cost, complete, $97,000. Mr. Geo. W. Gouinlock, Architect.

if not the handsomest building on the grounds. The walls are constructed of red pressed brick with gray stone trimming, and the roof is supported by a system of steel trusses; while around the entire building, on either side of the windows, are a series of Ionic columns carrying a simple entablature, above which rises a low balustrade agreeably detailed. The plan of the building is in the shape of a double U, thus giving it three distinct sections which are connected to each other by the portion of the building across the front. Six advantageously placed entrances readily give ingress and egress to and from the interior, while over the central portion towards the front is a large well-proportioned dome which brings the entire structure up to an agreeable height. The dimensions of the building are 253 by 155 feet over all, and the cost of its construction was $97,000. In the basement are facilities for the reception and potting of plants, and the floors throughout are built of concrete.

As regards uniqueness in design and individuality of plan, the Railway Exhibit Building, which is occupied jointly by the Canadian Pacific, Canadian Northern, and Grand Trunk Railways, offers a most attractive study. Here the problem of providing three great corporations with equal facilities has been most successfully worked out. The structure, which cost $45,000, is in the form of a trefoil, and the general design is such as to be far removed from the conventional type of exhibition buildings. The interior is most equitable in its lay-out, being arranged into three equal sections, so that each company get just as much as the other and no more. These sections, which are octogonal in shape, open into each other by means of arched doorways, and each section is provided with seven booths and individual offices, as well as separate entrances from the outside. In construction, the building is of red pressed brick with art stone trimmings, the roof being of the steel truss type, and each section



Floor plan, Horticultural Building, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Gouinlock, Architect.

Horticultural Building, Canadian National Exhibition Grounds, Toronto, showing the projections which give its plan the form of a double U, and which provide separate sections for the agricultural, horticultural and floricultural exhibits. The building, over all, is 253 feet long, by 155 feet wide. Mr. Geo. W. Gouinlock, Architect.

having a large dome, which gives the whole a well balanced effect.

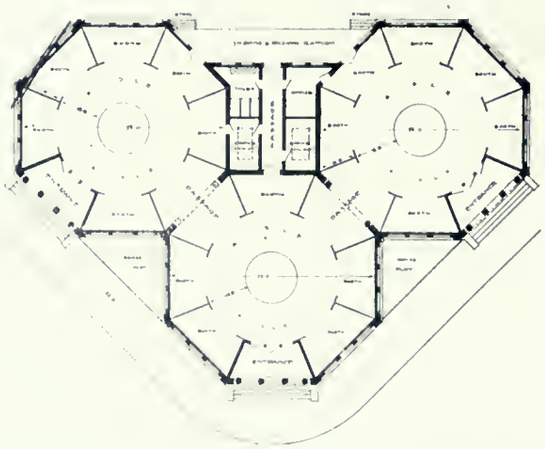
Another structure of interest is the Press Building, which was erected at a cost of $15,000, so as to provide better accommodation for the representatives of the local and outside papers. It is built in the modern Classic style,

Railway Exhibit Building, Canadian National Exhibition Grounds, Toronto. A structure that is unique in design and arrangement, being in the form of a trefoil and removed from the conventional style of Exhibition buildings. Mr. Geo. W. Gouinlock, Architect.

having large, bold Ionic columns the entire height of the two stories, which are surmounted by an entablature and pediment. The building has a frontage of seventy-two feet and a depth of thirty-eight feet, and is constructed of red pressed brick and art stone. The ground floor is divided into several offices for the use of the various newspapers. There is a rotunda in the centre, from which these offices open, and from which the stairs ascend to the upper floor, which is divided into committee rooms, cloak and toilet rooms.

EXHIBITION OF ARCHITECTURAL DRAWING.

One of the new features this year, and it may be said a most important one, will be an exhibition of architectural drawings; and for the first time in the history of the Canadian National Exhibition, the public will have an opportunity of viewing a collection of the best work of Canadian architects in this respect. This exhibit



Floor plan, Railway Exhibit Building, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Gouinlock, Architect.

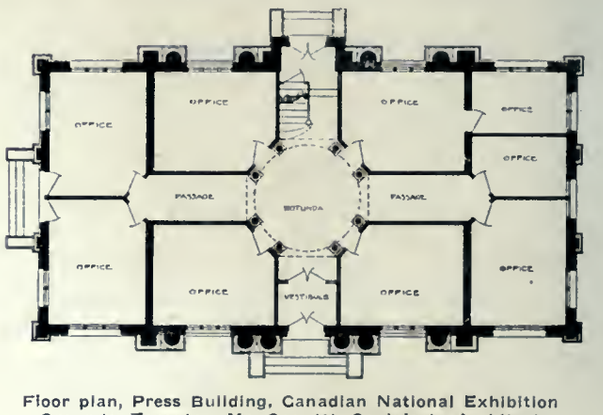
is to be held in the building of Fine Arts, where Room 2, generously assigned by the management for this purpose, has been completely re-decorated, so as to consistently give atmosphere to an exhibit of this nature. The importance of this event cannot be over-estimated, as it means much to the profession and layman alike, in that the latter will have an opportunity of studying the work of Canadian architects, and of realizing how capable they are of meeting our architectural needs, without the assistance or employment of foreign practitioners. Furthermore, it will exercise an influence in educating the public to understand, appreciate, and desire good architecture in the erection of their buildings. The Exhibition authorities have liberally set aside a sum sufficient to pay all cost of transportation, and in order that the affair may be representative in every way, they have placed the entire matter into the hands of the Ontario Association of

Press Building, Canadian National Exhibition Grounds, Toronto. Designed in Modern Classic and built of red pressed brick with art stone trimmings. Mr. Geo. W. Gouinlock, Architect.

Architects, whose committee is at present sparing neither time nor effort to make it an unqualified success.

If the architects will rise to the occasion as they should, and lend their support and co-operation, there is no reason why this exhibit should not develop into a national *salon*, at which the drawings of Canadian architects will be annually hung, and which thousands of people will find their greatest opportunity to attend.

The exhibit in the main will consist of well rendered colored and pen and ink drawings, although a limited



Floor plan, Press Building, Canadian National Exhibition Grounds, Toronto. Mr. Geo. W. Gouinlock, Architect.

space will be available for the display of photographs of noteworthy buildings. Owing to the somewhat limited space at their disposal, and the desire to make a presentable exhibit, the committee reserves the right of selection, but an effort will be made to give every work of merit a place upon the walls.

Undoubtedly the importance of this event will fully impress itself upon the architects throughout the Dominion and influence them to exhibit their work, and render every effort to assist the committee who are spending and will spend many hours of voluntary labor in order to do their part towards making the exhibition a success.

IMPERIAL TRUST COMPANY'S NEW BUILDING—A recent Adaptation of Renaissance Style in Bank Building Design—Facade Built Entirely of Manufactured Stone—Character of Structural Parts —Interior Practical in Plan. ∴ ∴ ∴ ∴ ∴ ∴

BOTH FROM THE VIEW POINT of design, and as a building in which the use of manufactured stone as a medium of architectural expression is seen to advantage, the new home of the Imperial Trust Company, Toronto, located on the south side of Richmond street, just west of Yonge, is a structure that is particularly worthy of note.

The facade of this building, which is massive in character, is designed in the Renaissance style, with columns of the Ionic Order supporting the entablature, which in turn is surmounted by a stone balustrade having an elongated stone panel at the centre, upon which is carved the year in which the institution was founded. At either side the walls are carried forward to the sidewalk line, and decorated at the ends with simple and direct panelling, which together with the large columns, gives the building an appearance which is at once dignified and reserved. The main entrance, which is effectively detailed and has bracket electroliers on either side, also exhibits this feeling, and has been designed so as to be in keeping in scale with the dimensions of the whole; while the heavy cast iron grilles and wrought iron gates of the windows and doors result in a sense of security which is necessary and befitting to a building of this kind.

New building of the Imperial Trust Company, Toronto. Note the general detail of the facade, which is built entirely of manufactured stone. Messrs. Chadwick and Beckett, Architects.

The construction of the front, in that it is composed entirely of Roman stone, is especially interesting, as it shows how admirable artificial stone, in skilful hands, meets the most exacting architectural requirements. The particular stone used in this building is composed of a special grade cement and marble, moulded in sand, and is re-carved after the final set, thus revealing the aggregates. Throughout, the material is rich and uniform in texture, and the arrises of the columns and detail in general, are executed in a sharp, clearly cut, and superior manner.

The height of the columns are 33 ft. 9 in. over all, and their diameter is 4 ft. at the base. The sections are 3 ft. high, and are hollow, an 18-in. hole running from top to bottom, thus making them considerably lighter to handle, but without in any way sacrificing their strength. The lower column sections weigh two and a half tons each, and the weight of the cap two tons. Heavier stones than these are the two end pieces of the cornice, which are over three tons each, and the column bases which weigh slightly less. The main architrave is not solid, the front and back having ledges, formed by the mouldings on the inner sides, which carry the panelled soffit. These front and back pieces span the distance between the centres of the two middles columns, and are each 20 ft. 2 in. long; they are reinformed by a light "I" beam, cast in the stone. The architrave carries only its own weight, the frieze, cornice and parapet being supported by heavy "I" beams, resting on the column caps.

Inside the entrance is the main banking room, an interior 56 by 50 feet and 41 feet high, which obtains a well diffused light from a stained glass dome thirty-five feet in diameter, and framed with an enriched plaster frieze containing one hundred and fifty electric lights.

The lower part of the wall is finished in a tobacco brown, the middle portion in a strong buff, and the upper portion in cream, with all enrichments wiped in old ivory and the salient features picked out in gold leaf.

The floor is of marble mosaic, with a richly designed border, and the counter, which is of Flemish oak and semi-circular in shape, extends from the rear wall and occupies the entire centre space. The grill work of the counter is bronze metal, and the wickets of the various departments are separated from each other by square, panelled, sectional posts surmounted by electroliers.

At the back, the upper portion of the wall is divided by Ionic columns or pilaster into bays having windows or openings, which gives a mezzanine effect to the second floor.

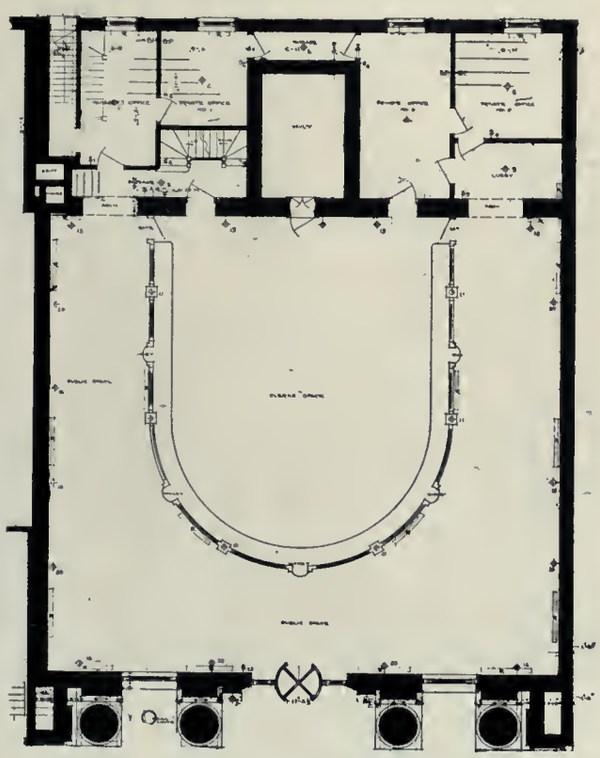
In the rear of the main room are the manager's room and private offices, while on the floor above are the board rooms with woodwork and furniture in San Domingo mahogany, together with modern lavatories and janitor's quarters.

The basement contains a steel safety deposit 50 by 8 feet and 16 feet high, together with silver vault and offices and waiting rooms.

Interior view, Imperial Trust Company's Building, Toronto, looking towards the entrance. The floor is of marble mosaic with ruch border design, and the walls up to the moulding are done in a tobacco brown with a strong buff tone above and cream color finish at top, all enrichment being wiped in old ivory and the salient features picked out in gold. Messrs. Chadwick and Beckett, Architects.

Interior view, Imperial Trust Company's Building, Toronto, looking towards rear and showing location of banking counter and detail of back wall. Messrs. Chadwick and Beckett, Architects.

The building was designed by and erected under the supervision of Architects Chadwick & Beckett, Toronto, and the various branches of the work were executed by the following firms: Mason work, Aldridge & Son; carpenter work, John McKerracher; roofer, G. M. Bryan; plastering, A. Petrie & Co.; painting and decorating,



Ground floor plan, Imperial Trust Company's Building, Toronto. Messrs. Chadwick and Beckett, Architects.

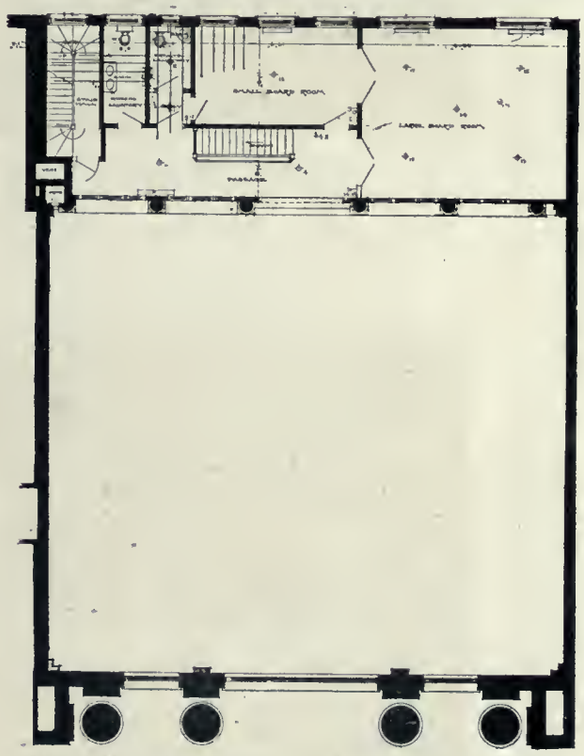
Faircloth Art Decorating Co.; plumbing and heating, Purdy-Mansell & Co.; stone work, Roman Stone Co., Ltd.; steel work, McGregor & McIntyre; mosaic floor, H. M. Robertson Tile Co.; wiring, C. S. Anderson & Co.; electric fixtures, Oxley Enos Co.; grilles, Canadian Ornamental Iron Co.; vault doors, J. & J. Taylor; wrought iron gates, Geo. B. Meadows & Co.

NOVEL HOTEL BUILDING.

NEW YORK CITY is rapidly gaining a reputation for architectural novelties of interest to the designer, the builder and the engineer, and the list of attractions for members of these professions is constantly growing. One of the latest novelties in the architectural line is the new building which will soon rise on the present site of Hotel Metropole, now in process of demolition, at the junction of Broadway, Seventh avenue and Forty-second street, Borough of Manhattan, New York. The unique feature of the structure that is to occupy this site is not so much in its size as in its peculiar construction, the design calling for a building only six storeys in height, but from the centre of it will rise a tower of 30 ft. square and extending 200 ft. above the level of the street, covered by advertisements of various kinds and illuminated at night with such brilliancy as to make the "Great White Way" even more dazzling than at present. The building is designed in English perpendicular Gothic, with long lines to emphasize the height, and with an ornamental cornice with corner pavilions and high battlement. The top of the tower is to be treated in a similar manner, and from the extreme peaks will flutter numerous banners and streamers. The plans have been prepared by Henry Ives Cobb, a well-known New York architect, and every effort will be made to have the structure completed by the end of the current year. All of the skill of the electrician will be utilized to make this tower an attraction as well as a striking feature of the eastern metropolis. Some might urge that the multiplicity of advertising signs on the tower would prove a serious objection, but in refutation of this charge it is declared that the arrangement will be such as to render the display attractive and pleasing to the eye, and will constitute a beautiful architectural effect by day and a tower of light by night.

ARCHITECTURAL DRAWINGS.

IT IS SURPRISING what a number of architectural drawings—especially perspectives—are spoiled for want of artistic treatment, by bad judgment in the management of light and shade, figures drawn badly and out of scale, impossible trees and general accessories all wrong, says a writer in a recent issue of LONDON STUDIO. Some architects, whose work is otherwise splendid, will put in absurd little figures, apparently with an idea to enhance the height of their buildings. And when the building is completed, one often notices a chance natural effect of light and shade, whereas, had the perspective been drawn by an artist familiar with these effects, a fine result would have been obtained, as well as a drawing worth keeping as a work of art. Special "features" of a building often require prominence, and this can only be done by keeping



Second floor plan, Imperial Trust Company's Building, Toronto. Messrs. Chadwick and Beckett, Architects.

the surroundings quiet; but only an artist will understand how to do this. One has only to see the exhibition of architectural drawings at the Academy any year to see how insipid and wanting in artistic treatment most of the perspectives appear. The general average is "stodgy," with what is known as the "Academy treatment." There are a few architects who treat drawings very finely, but they are the rare exceptions. It seems a pity that many excellent designs are spoiled or fail to have justice done to them for want of artistic management. Architects generally suppose that an artist would spoil their details, but this is not so where proper judgment is considered and an artist of proved ability given the work to do. It is to be hoped that the subject will receive the careful attention which its merits would seem to deserve to the end that better results will be reached.

Macdonald Engineering Building, McGill University, Montreal, the south portion of which (located on the right) is now occupied by the Department of Architecture.

Section of Museum of Sculpture, Department of Architecture, McGill University, showing plastic models of life figures and architectural decorative work.

DEPARTMENT OF ARCHITECTURE, McGILL UNIVERSITY —New Quarters in Macdonald Engineering Building—Accommodations and Equipment—An Institution Worthy of the Material Support and Co-operation of the Profession—Views of Its Museums, Etc.

ONE OF THE MOST IMPORTANT TOPICS for discussion before the various architectural associations in Canada, has been the matter of architectural education. It would be impossible to review the condition of the architectural profession generally in Canada at the present time, without being confronted with the necessity for increased educational facilities in architecture. The Toronto University has in their School of Applied Science, established a limited course in architecture, which is conceded by authorities to be entirely inadequate. McGill University, Montreal, has gone a point further, and have established to-day what may be considered the most thorough course in architecture to be obtained in the Dominion.

For a higher education in architecture, it has been necessary for Canadian students, to a great extent, to go abroad, which condition is generally deprecated by Canadian practitioners. Two reasons have been given for the apparent inadequacy of our institutions which aim to furnish architectural education: first, that the Universities have not had sufficient funds to develop this branch of education; and the second, that it seems to have been impossible to secure a sufficiently large number of students to warrant the further extension of this branch of University education.

The Department of Architecture of McGill University entered its new premises in the south wing of the Macdonald Engineering Building, at the beginning of last session. The total loss of architectural equipment, suffered in the fire of April 5, 1907, has been made good to the extent shown in the accompanying illustrations, and, while the accommodation for this department has been greatly improved and increased in the new premises, it has not yet been possible to bring the equipment in slides, casts, diagrams, etc., up to the point at which it was before the fire, for lack of funds.

Immediately after the fire, the Governors voted the sum of $5,000 for re-equipping the department, which, in view of the serious financial position in which the University found itself, was an extremely liberal expenditure. In view of the work now being done in this department, it would not be unreasonable to expect some assistance towards equipment, in the way of subscriptions from members of the profession, who appreciate the importance of the development of this branch of University education.

During the last six years, the expenditure in the teaching staff of this department of McGill University, exclusive of the professor's salary, has been increased from $700 to $2,500, every dollar of which has come out of the general funds of the University. In this connection, it should be remembered that these salaries are little more than nominal honorariums. At present there are twenty students in the department, who come from various parts of the Dominion, and at present the teaching staff consists of the following:

Percy E. Nobbs, M.A., R.I.B.A., A.R.C.A., Design, Aesthetics, Ornament and Decoration.

C. S. Burgess, A.R.I.B.A., History of Architecture, Architectural Drawing.

Philip Turner, F.R.I.B.A., Professional Practice, Building Construction.

E. S. S. Mattice, B.A.Sc., M.Can.Soc.C.E., Structural Design.

M. Beullac, B.Sc., A.M.Can. Soc.C.E., Structural Engineering

Henry F. Armstrong, Assoc. R. Coll. of Art, Descriptive Geometry.

It is most important, if we in Canada wish to develop architects who are equal to the tasks imposed upon them in the building up of so rapidly a growing country as Canada, that considerable more attention should be given to the matter of education. Architects can not only assist by monetary contributions, but by the encouraging of their draftsmen to attend these institutions. It is altogether probable that more money should be contributed by our Universities for the promotion of architectural education, but, until such time as a pertinent demand is made for increased facilities from the

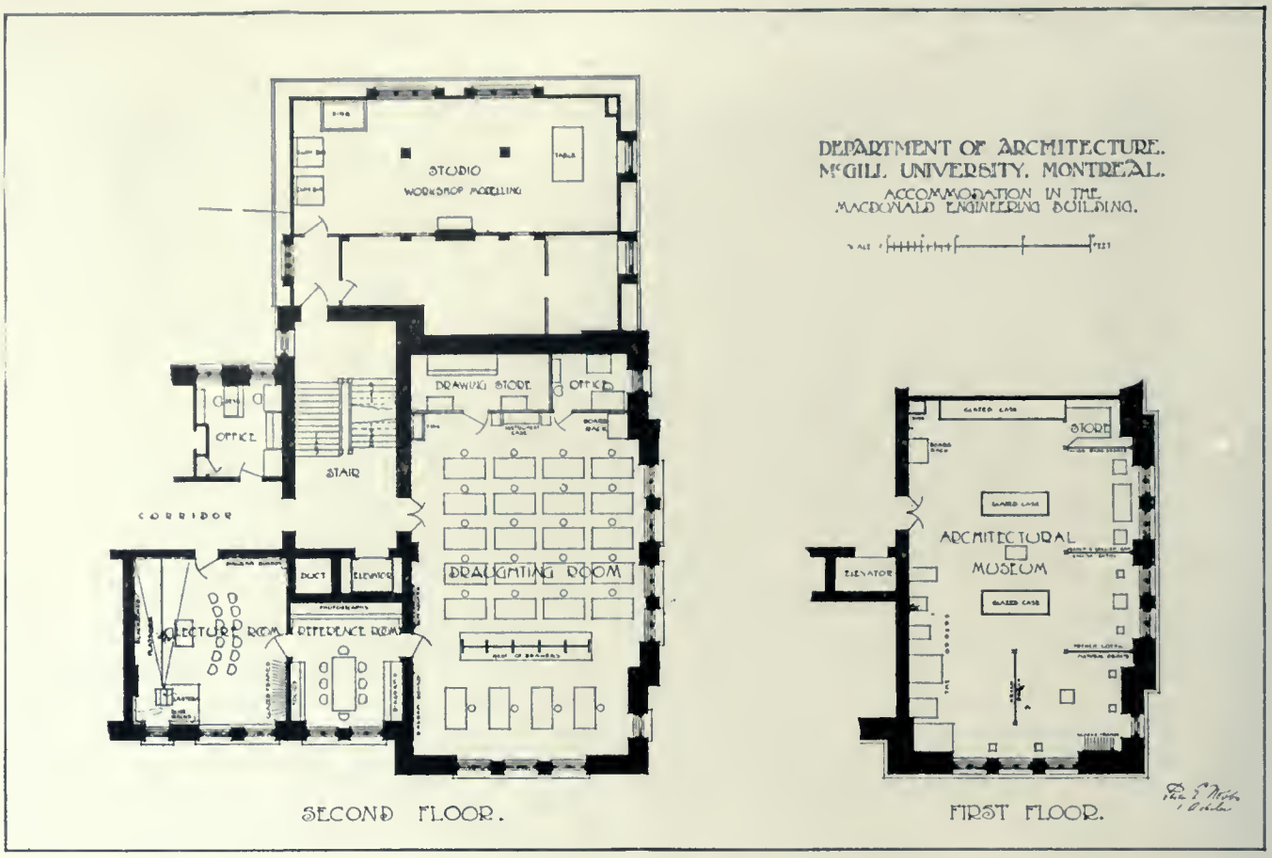
Section of Museum, Department of Architecture, McGill University, in which the student can observe and acquaint himself with the various Orders of Architecture.

Museum of Gothic Art, Department of Architecture, McGill University, in which plastic reproductions enable the student to closely observe the decorative characteristics of the particular style.

Lecture room, Department of Architecture, McGill University, showing detail of brick walls. The cathedral projected on screen by stereopticon lantern shows one of the methods employed in order to enable the student to familiarize himself with the world's best work.

Section of Reference room, Department of Architecture, McGill University, where works on architecture and building construction are provided for reference purposes and supplemental study.

Draughting room, Department of Architecture, McGill University. Here the student is taught the principles of designing and planning, and given an opportunity for practical draughting experience.



First and second floor plan of section devoted to the Department of Architecture, Macdonald Engineering Building, McGill University, Montreal.

application for admission by a larger number of students, it is improbable that anything definite of a material nature may be accomplished.

We have stated that the facilities offered in either Toronto or Montreal are not ideal. By this we do not mean to belittle the efforts put forth by the University authorities, but point out this fact simply to show that much additional support is required by these organizations before we can hope to develop this important branch of education, where it will compare at all favorably with the efforts of universities in other countries. We believe that the appeal made by Prof. Percy E. Nobbs, for additional assistance and support from the architectural profession in Canada, in the further development of the Architectural Department in McGill University, is worthy of the consideration of every practitioner in the Dominion.

TO EXCAVATE ANCIENT CITY. ∴ ∴

THE EARL OF VERULAM, who owns the land upon which was built the ancient Roman city of Veruamitum, has given permission to the Society of Antiquaries to undertake excavations, which will shortly be commenced. The site of Verulamium lies a mile or so from the centre of St. Albans.

Verulamium was one of the most important cities in England at the time of the Roman occupation. With Eboracum (York) it enjoyed the dignity of being a municipium, which meant that all who were born within its walls could claim Roman citizenship. It was situated in Watling street, and the British insurrection under Boadicea culminated here in the massacre of 70,000 Romans.

In 303, or perhaps earlier, St. Alban, the first English martyr, was beheaded on the site of the present St. Albangs Abbey. Not long after the ancient town was forsaken, and the new one—St. Albans—grew up on the hill which had shadowed it.

In the centre of the site of the old city is the Church of St. Michael, the vicarage of which stands in the middle of what was the forum. A few old walls and other fragments are to be seen here and there, but the Roman city lies for the most part buried under a considerable depth of soil.

In the course of centuries earth has been washed down from the hillside and earth worms have been busy, and where once lay the proud and splendid city is now the quiet, flower-filled garden of the vicarage, the fields of the glebe and other pastures and plough lands.

The stones and Roman bricks of Verulamium were of course, much used for later buildings elsewhere. St. Albans Abbey is very largely built from them. But a great deal still remains under the soil. About sixty years ago, and again in 1869 the theatre was partly and temporarily uncovered, and some fine frescoes, pavements and marbles were found. It is the only Roman theatre in Britain, and its dimensions are almost exactly the same as those of the theatre at Pompeii.

In fact, the whole town of Verulamium singularly resembles Pompeii as regards shape—an irregular oval—dimensions and arrangements and positions of streets and buildings. It is slightly larger, its walls inclosing an area of 190 acres. Its excavation ought to provide extraordinary interest. If it is done thoroughly, as no doubt it will be, we shall have within a few miles of London an object lesson of surpassing educational and antiquarian value as to how the Romans lived in Britain two thousand years ago.

THE NEW BUILDING by-law, which has been in course of preparation at Victoria, B.C., for the past three months, has been drafted by the special committee of the city council appointed for that purpose, and the eighty type-written pages of regulations decided upon are now in the hands of the building inspector for revision. The new measure will be confined strictly to building construction, and will not contain the extraneous matter in the present by-law.

NEW PUBLICATIONS. ∴ ∴ ∴

THE ARTS CONNECTED WITH BUILDING. Lecture delivered at Carpenter's Hall, London, (Eng.), by R. Weir Schultz, E. Guy Dawber, F. W. Troup, A. Romney Green, C. F. A. Voysey, M. H. Baillie Scott, Chas. Spooner and J. Starkie Gardner. Edited by T. Raffles Davison, and published by B. T. Batsford, 94 High Holborn, London, with the consent of the Worshipful Company of Carpenters. 224 pp.; 98 illustrations. Cloth bound. Price 5s. net. Postage 5d.

The objects of the lectures contained in this admirable little volume is neither antiquarian, literary or academic. Their institution by the Carpenter Company and their publication aim to stimulate the ambition of the craftsman towards a higher ideal of attainment, and also, incidentally, to awaken a broader appreciation in others as to the possibilities of modern craftsmanship.

The text throughout dwells upon the importance of the arts which contribute to the creation of beautiful buildings, and their proper relation to each other; and it points out that if properly encouraged by the public and rightly directed, these arts should occupy the hands and thoughts of thousands of people, and do much to materially add to the vitality and interest of modern architecture.

The gentlemen who have given these lectures are prominently connected with the architectural profession in England, and are well known for their study of practical craftsmanship and the right use of material in building construction. These men are actuated solely by an earnest desire to see a revival of the best traditions of craftsmanship, believing that beautiful brickwork, plaster, woodwork and metal work can and should be brought within the reach of thousands of comparatively poor people who have now to be content with characterless, commonplace and mechanical productions.

In no way do these lectures convey the impression that either design or craftsmanship in itself is sufficient for good results, but rather that the design and the craftsmen must work in unity of belief as to the right and appropriate use of materials; and it is in the particularly interesting and comprehensive manner in which the importance of this relationship is touched upon in each of the many subjects, which make this complete little volume of immeasurable value to both the architect and craftsman.

Among the subjects treated are: Reason in Building; Influence of Material in Design in Woodwork; The Influence of Tools on Design; Ideas in Things; Ideals in Building, False and True; House and Church Furniture; Decorative Plasterwork; External Woodwork; and Decorative Ironwork.

All in all, the book is complete, thorough, instructive and entertaining. It is a volume which no architect's or craftsman's library is complete without, and yet one which, from the wide and important range of its subjects and splendid illustrations, is a complete library within itself.

BUILDING CONSTRUCTION AND SUPERINTENDENCE. By F. E. Kidder, C.E., Ph.D., Architect Fellow of the American Institute of Architects. Author of Architects' and Builders' Pocket-Book. Revised and enlarged by Thos. Nolan, M.S., A.M., Fellow of the American Institute of Architects, Assistant Professor of Architecture, University of Pennsylvania. Part I., ninth edition, revised, Mason's Work. 628 illustrations; pp. 985. One 8vo vol. Cloth. Price, $6. New York: William T. Comstock.

The first edition of this work was brought out in 1896 and had 421 pages and 260 illustrations, and since then as the different editions have been issued slight revisions have been made and occasional pages interpolated, but meanwhile the art of masonry has advanced until just before his death Mr. Kidder determined that it was necessary to reconstruct the whole work.

His health failing and feeling that his end was drawing near, he requested Prof. Nolan to undertake the work.

This the latter on account of his intimate knowledge of Mr. Kidder's plans and his own personal study of the subject was specially fitted to take up.

For more than a year past Prof. Nolan has devoted his entire time outside of college duties to gathering the material and putting the work in shape for publication, and as a result we have before us the most complete encyclopedia of masonry that has ever been offered to the architect and builder.

As the years have gone by since Mr. Kidder first brought out this work, masonry has grown both as an art and a science, and many new methods, new materials and appliances have been brought to the hand of the builder.

The work when first issued was the most complete representation of masonry that had up to then appeared, and the present edition in like manner represents the latest and best modern practice and all the new ideas and their application as developed up to this time.

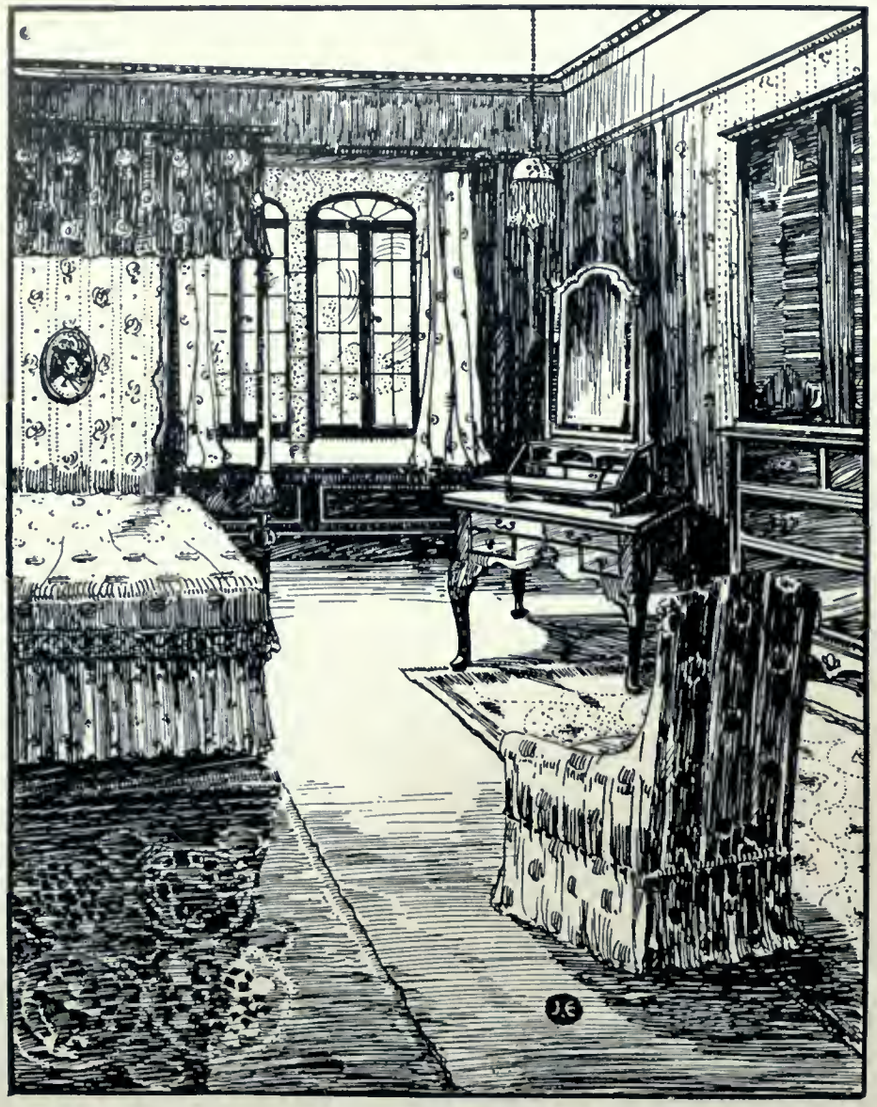
The work bears evidence of the time, labor, thought and persistent effort that has been put forth to collate, arrange and properly classify all the data that belongs to the latest and modern accepted practices.

To quote from Prof. Nolan's preface, "The new edition includes in general a careful examination of every article in the book and a revision of every one in which changes, omissions or additions of data or methods of procedure are deemed necessary or advisable; the omission of some articles and the additions of many new ones, the recruiting of some chapters and the addition of one entirely new chapter, the addition of nearly four hundred new illustrative con structive drawings; the addition of many new tables and formulas . . . and a new and comprehensive index."

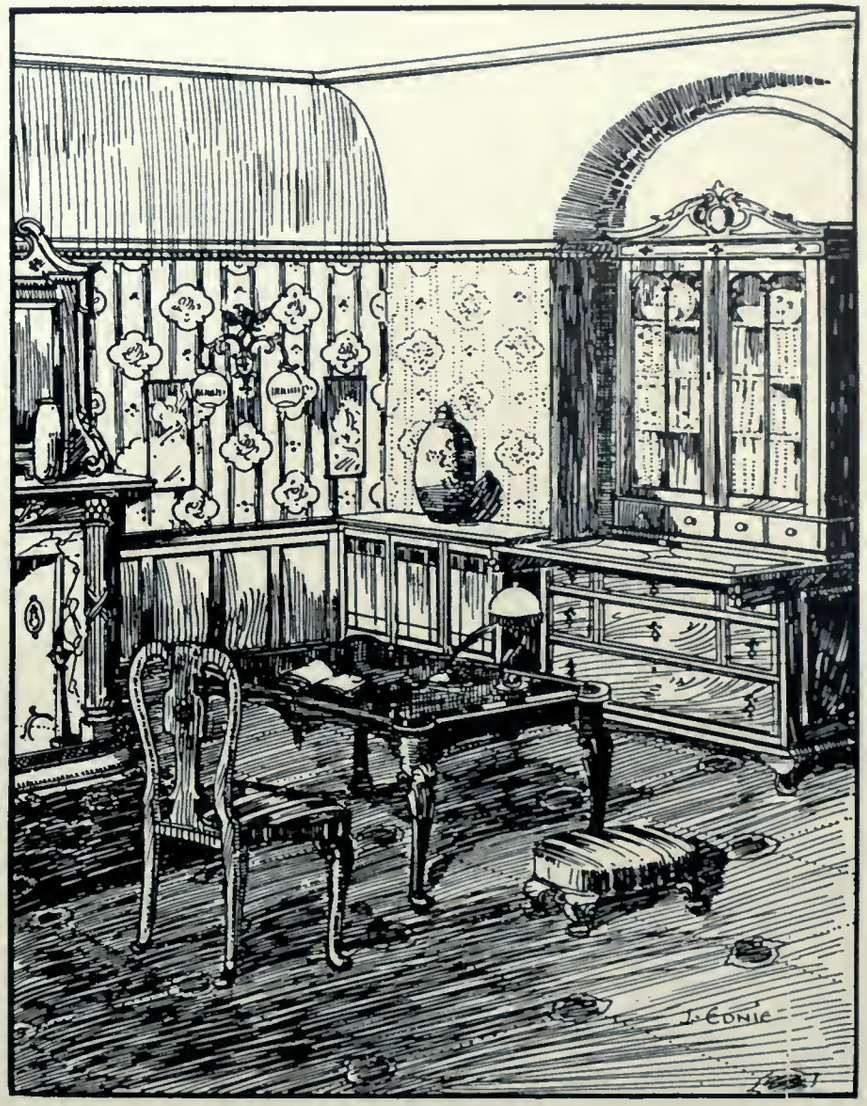
The chapter on "Concrete and Reinforced Concrete Construction" is entirely new and contains much more detailed information than many books on the subject. The chapter on "Fireproofing" is substantially new and has over 200 illustrations. Even in the old stand-by brick great changes have taken place, sand-lime brick being a new building material since Mr. Kidder's day. The chapter on specifications shows many and important changes, such as those on cement and concrete construction, where new specifications are given.

To enumerate the many and important changes that have been made would much exceed the space at our command. Suffice it to say the book will be found thorough and complete, a manual no architect, builder or engineer can afford to be without.

THE GRADING OF THE LAST SECTION of the extension of the Nanaimo Railway, owned by the C.P.R. interests on Vancouver Island to Aberni, will shortly be under way. This section passes along the shores of Cameron Lake over the divide and into Alberni, and calls for considerable heavy rock work. It is estimated that in some parts the work will run up to $60,000 a mile, and it may take 12 months to complete the grade. The tenders have all to be in by September 6. At present the grading of the work is practically completed from Wellington, the present terminus, to French Creek, a distance of 24 miles. A heavy rock cut, not far from Wellington, is the only portion remaining incomplete. Eight miles from the one hundredth milepost to the one hundredth and eight milepost at Cameron Lake was recently let. The section which is now to be let takes the remaining 27½ miles of the route.



Queen Anne Bedroom. A most refreshing interior. Note the grace and beauty of the four post bed with its slim, symmetrical pillars, open end, and old English chintz furnishings. The woodwork is all dark polished mahogany, and the glazed fabric of the furnishings is repeated on walls and in window curtains.



Queen Anne Library, showing a high secretaire with writing flap at table height, and dwarf bookcases around the walls. The centre table with leather top and cabriole legs and claw feet is decidedly characteristic of the period. The floor is covered with an Eastern carpet, the wall hung in striped fabric, and the ceiling plain.

QUEEN ANNE FURNITURE—Decorative Style that Bears Name of Eighteenth Century English Queen—Its Characteristic Feature, and the Strong Influence which it Exerts Over the Furniture of To-day—By J. Taylor.

POLITICAL movements have powerfully affected the course of art. The Roman Conquests carried the arts over Europe; the Arab invasion of the Byzantine cities led to the creation of the Saracenic style; religious and political persecution scattered the artists and draftsmen of the Southern States in Europe, many finding a ready asylum in England, where, under the patronage of an alien prince they influenced the whole character of the domestic arts, until, on the restoration of the native dynasty an effort was made to give expression to the national temperament.

The "Queen Anne" regime is memorable, for the lustre of arms that, like a nimbus reflected the crown; for an illustrious chapter in science and literature, Newton standing on the shore of time with visions of the truth of Eternity; Pope and Swift, Steele and Addison making contributions that have added to the joy and knowledge of every succeeding generation. But the one episode of the reign that for far reaching effect stands out from all others is the union of the crowns of England and Scotland, and the substitution of the arts of peace, for the profession and practice of war. The style that bears the name of the eighteenth century English Queen, dates from about her accession till toward the close of the reign of George II.

It may be described as the beginning of the Mahogany Age, for while walnut was yet vastly popular, the rich-toned timber that was to play such a prominent part in the history of furniture a hundred years afterward, was being freely imported from the West Indian Islands.

Queen Anne, a daughter of the Stuarts, succeeded a foreign prince, and the effort to get away from the paramount Dutch influence becomes apparent. There comes greater refinement, more ingenuity of construction, with fertility in design and freshness in detail. Comfort and convenience become the order of the day, sumptuously upholstered furniture, cunningly contrived desks and escritoires with spring locks and secret drawers date from this period. Other features are the folding card table, quaint mirror frames, interesting four-post bedsteads, and the old Dutch spoon-back chair with an unfamiliar splat, lower and more elaborately carved. The "tall-boy" is likewise introduced, and the chimney piece assumes an aspect familiar to all students of the style.

Let designers turn back to the year 1904, and think of the Trollope Parlor at the St. Louis Exposition; it was a carefully worked-out scheme in the Queen Anne style, down to the smallest detail The silk paneled walls, with pilasters of dark wood, on which the lime tree "Grenling Gibbons" carving in high relief, showed to advantage. The richly upholstered furniture with superb Lyons velvet, the artistic hangings in Spitalfield silk, with all the accessories of a period in which furniture was beginning to assume a greater significance and usefulness, all contributed to the making of perhaps the most notable room at the World's Fair.

In the bedroom illustrated, the most striking feature is the four-poster, with slim, symmetrical pillars, open end, old English chintz furnishings; the glazed fabric being repeated on walls and in window curtains. Compared with the "Elizabethan" bedstead there is a grace and beauty here that is refreshing, and it is to the credit of the new world designer that he draws inspiration from the later period when his mind runs in the direction of the four-poster.

The wood work here is all dark polished mahogany, carefully stained to the mellow tone assumed by early Eighteenth Century furniture, as seen at Hampton Court in England.

We have outgrown the period of elaboration, the simple life induces the simple taste; gathered valances and curtains terminating at the sill have taken the place of folded drapery, and hangings with half a yard of superfluous length for the questionable privilege of tucking them up.

The "Queen Anne" style denotes a return to sanity, if personally conducted by the Dutch artist and craftsman, what matters it? Note also the fine dressing table with cabriole legs, the chest wardrobe with flush framed doors and restrained inlay, the plain, deep fringe on wall, and the general "Colonial" suggestiveness over all.

The library, in English walnut, waxed, is worthy of some notice. It indicates a high secretaire, and dwarf bookcases round the walls. The secretaire has book cupboards above, with flaps to pull down at table height, lower part with chest of drawers, automatically locked with spring catch attached to the writing flap. The centre table is characteristic of the period, with leather top, cabriole legs and claw feet. For the rest the floor is covered with an eastern carpet, the walls are hung with striped fabric, on the chimney piece there is Venice marble, a convenient footstool is in an inviting position, and overhead there is the best of all ceilings, an absolutely plain one.

There can be no more interesting furniture period for the designer than the "Queen Anne" and early "Georgian," for these styles have influenced the best that is to be found in our furniture of to-day.

If to ramble through the historic palaces of France is a revelation of the Eighteenth Century art of that country, to study carefully the well preserved furniture and accessories at Hampton Court, is the best evidence that all the genius of the decorative arts was not confined to the southern side of the English channel.

Queen Anne may have sympathized with the revolutionary spirit that banished her unhappy father from the English throne, but during the twelve years in which she held the reins of power she encouraged and cultivated the domestic arts in a way that did credit to the successor of a Dutch monarch. And after two hundred years the fact is significant, that the style designated "Queen Anne" is more powerful in influencing the furniture of to-day than any since the time of Elizabeth.

All over England, in fine old mansion houses, genuine examples of Queen Anne furniture are carefully treasured to-day, while reproductions are in Eighteenth Century styles of architecture, that are making interesting the face of rural England.

HARDLY LESS IMPORTANT than the destruction of property, in considering the danger of loss by fire, is the factor of risk which cannot be covered in apolicy. When a shop is burned with complete loss the insurance companies make good the property destruction. But they cannot make compensation for the loss of business and the inability to fill orders or to accept them; the destruction of patterns and drawings; and the handicap which this all means in keeping a footing in the trade. The investment of an additional 10 per cent. on buildings, less the saving in insurance premiums and possibly in cost of maintenance, is a small matter as compared with immunity from crippling loss. A great deal of industrial building is contemplated which will materialize this year and next. The men upon whom the responsibility rests might do well to investigate thoroughly the subject as it is now presented by those who contribute to the improved construction.—CARPENTER & BUILDER.

WATERPROOFING CONCRETE.*—Modern Methods of Rendering Block and Monolithic Construction Impervious to Moisture.—The Membrane, Superficial, and Electrolyte Systems.—Experience and Knowledge of Conditions and Locality Necessary in Applying Treatment.

By LUCIUS E. ALLEN, A.B., Chemical Engineer

WHILE THE PRESENT METHODS of waterproofing have been developed within the past few years, it is of interest to know that to the Romans must be given the credit of first successfully manufacturing cement as well as initiating the first methods of waterproofing. Of the early history of waterproofing there is little known, as the literature on the subject is very meagre and therefore it must be taken on faith, and later information. It resembles the question asked of a small school boy: "Which is the largest city in Canada: "Toronto," replied the boy. "Who told you so?" asked the teacher, and the boy promptly replied, "A gentleman from Toronto."

When the Romans invaded Gaul nearly 2,000 years ago, they discovered the mineral cerusite, from which they obtained lead. They soon found that if the lead was rolled into thin sheets and exposed to air and water it soon became coated with a white coating, or white lead, which retarded further corrosion and in many of the foundations of ancient Roman structures these thin lead sheets are to-day found. But this method of waterproofing was too expensive to ever become practicable and other methods were adopted.

Remarkable advances have been made in the past five years in the use of cement and concrete, and with its increased use, new problems of construction have arisen which have been successfully met. As the ultimate success or failure of any article used for construction or building purposes, to meet all requirements under various conditions, depends largely upon the thoroughness with which economical and practical methods have been worked out to meet these conditions, it behooves all those interested in the use of concrete to quickly adopt those methods that have proven successful in practical work. As a famous American has said, "It is a condition and not a theory which confronts us."

One of the most important questions which confronts many concrete workers is that of rendering concrete water and damp proof, and it is this question which I desire to briefly discuss. Bearing in mind that it is a condition and not a theory to be evolved, I propose to consider first the composition or make-up of concrete itself, in order to gain a better understanding of the character of the material to be waterproofed. Concrete is a term which covers many forms of building construction, but may be defined as a solid mass which may be composed of an aggregate of sand, gravel, crushed stone and Portland cement, mixed in a wet or semi-wet condition and placed in forms or moulded into blocks, brick or other monolithic forms. As there are so many varieties of aggregate used in various localities, it is difficult to specify or to define the exact relations in which these elements exist in the finished concrete, and while, with certain materials, the concrete will be porous, water easily permeating through it, with other materials the concrete will be more dense and more nearly waterproof. There is also the question of the proper proportioning and mixing of the materials which in many cases is the cause of poor concrete, and should not be taken as evidence against the use of concrete itself.

Sand.—It is important to use a graded sand of uniform character, neither too fine nor too coarse, and while it has always been said that sand, which contained any appreciable amount of loam or clay, was exceedingly detrimental to good concrete, many good authorities now claim that a certain amount of clay, if properly mixed with the sand, is not injurious, and in fact will make a more impermeable concrete than with clean sand.

Crushed Stone.—As the aggregate may be made up of fine or coarse crushed stone or gravel, the proportions of sand to the aggregate should be properly made, always bearing in mind to obtain as low a percentage of voids as possible. It is also important that the crushed stone be clean and that the amount of dust be as small as possible. As an instance of the injurious effect of any considerable amount of limestone dust in crushed stone, the speaker had occasion to inspect an important job where the contractors were making complaint that there was a fine white dust in the cement which rose to the surface of the concrete after work was stopped at the close of each day. In this particular job the concrete was mixed very wet, and there being such large porportion of limestone dust of lower specific gravity than the cement, the limestone dust rose to the surface and left a scum which it was necessary to remove in order to secure a good bond.

Cement.—It is very important also to use a well seasoned and high grade Portland cement in all work where it is desired to obtain a damp proof wall. It is especially desirable that the Portland cement be as finely ground as possible, as the finer the cement is ground, the more dense the concrete will be, and will also carry more sand than the coarser ground cement.

Classification of Processes.—It can be no longer denied that concrete may be rendered waterproof, and that structures built of that material may be made dry, and as comfortable to live in as if made from brick, wood or stone. In discussing the various methods now in use, I propose to follow the classification usually made, as the classification adopted logically determines the treatment to be followed. The classification may be based, first on the method or mode of construction, second the nature or kind of structure, and third, the nature of the material employed.

The first classification may, for convenience, be subdivided into three methods: First, "The Membrane System"; second, "Superficial Coverings"; third, "Integral" or "The Electrolyte" system.

The Membrane System consists of an unbroken shield of bituminous material, which may or may not be reinforced with a fabric of felt, burlap or other material, and is particularly intended for that part of the structure beneath the ground level, i.e. for foundation work, also for floors of bridges and dwellings and for roofs.

The second, or "System of Superficial Coverings," may consist of one or more layers of damp resisting or waterproof material, and is adapted particularly to the super-structure of buildings, to prevent percolation through lining of sewers conduits, etc.

The third, or "Integral or Electrolyte System," is that in which the concrete mass is itself impregnated with any substance which renders it impermeable to water and dampness and may be employed more generally than any other system.

It is possible and is many times advisable to combine one or more methods in the same work wherever the expense warrants it, and the character of the waterproofing is absolutely essential and delrable.

Mr. Myron H. Lewis, C.E., has tersely outlined the materials used in the "Membrane Method." The materials employed are coal tar pitch, asphalt, and bituminous compounds made in special formulas. The reinforcing materials consist usually of wool felt saturated with coal tar, asphalt, or special compound, or treated burlap, which may be used either singly or supplementary to each other. The materials are placed in the walls or floor to be waterproofed, in one or more layers, the number to be determined by the character of the work and the hydrostatic pressure to be resisted. Where the waterproofing is thoroughly protected from the changes of temperature and no danger of cracking from this cause is anticipated, coal tar may be used owing to cheapness. Where the waterproofing is situated in a structure near extensive sewers or polluted tidal waters, asphalt may be attacked and coal tar indicated. Asphalt, however, is more elastic. Special compounds are on the market which are acid, alkali, and gas proof, and may be applied in a cold liquid form. It is also most important that the waterproofing layer or membrane be continuous. During the construction this class of waterproofing should be protected from the heat of the sun, until it is thoroughly hardened. To sum up the use of the Membrane Method the following rules should be carefully followed:—

1. No waterproofing, especially for difficult and water-pressure work, should be undertaken when the temperature is below 25 degrees F.
2. Allow sufficient time, room, and accommodations in which to properly apply the materials.
3. Design the structure to properly receive waterproofing for the design will either make impossible proper waterproofing or will invalidate the best materials after they are in place.
4. Specify always that the waterproofing shall be done only by experienced and skilled labor.
5. Thoroughly protect the waterproofing during and after application.
6. Inspect waterproofing at all times during application.
7. Do not depend upon guarantees.
8. Do not use a set or standard specification.

The second method of waterproofing, which may be termed a method of Superficial Covering, may consist of one or more applications or layers of a damp resisting medium on the surface of the concrete mass. This application may consist of a wash or liquid, which may be brushed over the concrete surface and which is gradually absorbed by the concrete filling up the pores in the same manner as white lead covers and fills a wood surface. While there are many compounds on the market based on this method, some of which are quite satisfactory, the best concrete engineers do not consider this to be as lasting as either the Membrane Method or the Integral System. The reason for this is that a large number of these coatings if exposed to severe weather conditions, will gradually become chipped or will scale off, leaving the concrete nearly as porous as it was before being treated. In many cases also the compound used is detrimental to the concrete itself, as a large number of these compounds depend upon some chemical reaction between the compound itself and the concrete. Profs. Hauenschild and Kessler, well known German chemists, invented Fluosilicates of Magnesia, technically termed Fluate. It has been used in Europe quite extensively and the Paris Opera House, the Kaiser's Palace in Potsdam and many other buildings have been treated with Fluate with marked success. It requires, however, a year or more to become entirely efficient.

The "Integral Electrolyte" system can, I believe, be more generally used than either of the other two systems, and if

*Paper read at Toronto before the first annual convention of the Canadian Cement and Concrete Association.

properly used will give the best results. This system of waterproofing depends entirely upon the use of a medium which may be mixed with the concrete itself, filling the voids in the mass, and rendering the concrete impermeable to dampness and water. There is only one way to both insulate and damp proof a building constructed of concrete, whether it be of blocks or solid concrete, and that is to render the concrete absolutely impervious to moisture. If this be done, not only is moisture prevented from entering the block, but the air contained in the cells of the block or wall is protected against pressure from the outside; that is confined in small cells, which is acknowledged by all authorities to be the best known conductor possible to obtain. If we attempt to waterproof from the inside alone and allow the dampness to pass through the outer wall and thence through the air space and reach the back side of the waterproofing membrane, we do not secure the efficiency that may be possible by rendering the entire mass absolutely impervious to moisture. The absorption of moisture by stone, brick, cement or concrete ultimately results either in decay or disintegration so that if the concrete can be made impervious, it prevents the mechanical action of water passing through and among the particles of concrete, thereby disintegrating the mass and also the action of chemically charged moisture, which is responsible for the ultimate decay of all building material. In the case of concrete blocks, if it were possible to trowel and finish off the face of the block the same as a sidewalk is finished, there would be very little penetration of moisture, but this is in many cases impractical. It seems, therefore, that the simplest, most practical and least expensive method is to impregnate the mass either with a liquid or solid substance which will render it absolutely impervious to moisture. It must also be borne in mind that whatever material is used, it must not be of such a nature as to discolor or injure the concrete. I desire to take up briefly some of the various methods and materials that are now being used for this purpose. There are many excellent waterproofing compounds, some in liquid form and others in a powder which may be easily mixed with the concrete and which if properly used will give very good results. Care should be taken in the selection of waterproofing compounds, so that no compound which has not proven successful by long usage be used. The base, or principal component, of many of these compounds is some organic resinous acid which combines with the free lime liberated and in solution to form a resinate of lime. There are also many compounds containing paraffine or bituminous bases hydrated lime, etc.

Mr. Richard H. Gaines, of the New York City Board of Water Supply, has secured excellent results in waterproofing concrete by the substitution of five to ten per cent. of the cement by weight of dry and finely ground colloidal clay, using a small percentage of alum solution in the water used for the mixing. He has shown that the permeability reduces almost to zero by increasing strength of solution to five per cent. and an increasing strength up to two and a half per cent. solution, and a decrease for greater strength of solution. The addition of colloidal clay shows a reduction in permeability to zero and material increase in strength for 5 to 10 per cent. of clay. The use of both produces similar results. In this case the clay acts as a colloid; and is of a jelly-like nature, coating the grains of sand and filling all voids. The compressive strength of one to three mortar brisquettes at 28 days was 1,635 pounds per square inch. The substitution of five per cent. of colloidal clay in the cement increased the compressive strength to 2,350 pounds. The tensile strength was increased from 205 pounds without clay to 258 and 335 pounds with 5 and 10 per cent. of clay respectively. There are doubtless many classes of work where it would be possible to use a good clay, which would be much cheaper than some other kinds of waterproofing material. There has been a large amount of work done both experimentally and in actual work with the use of hydrated lime as a waterproofing medium and for many kinds of concrete work this is undoubtedly one of the simplest and most efficient methods of waterproofing concrete. It has long been known that if small proportions of lime putty were thoroughly incorporated in concrete that the resulting mass was much more waterproof than with cement and sand alone, but until the last few years it has not been possible to secure lime in a commercial hydrated form suitable for this work. It is not only difficult but disagreeable to secure a good mixture of lime putty and concrete and the best results are obtained when the lime is mixed with the Portland cement dry before the water is added. I desire to show herewith the results of some long time tests made with the use of various mixtures of Portland cement, sand and hydrated lime which were made by Dr. E. W. Lazell, Consulting Engineer, Philadelphia, Pa., and these tests show conclusively that there is gain in tensile strength with the use of hydrated lime and the porosity is reduced to zero under a water pressure of 30 pounds per square inch. An excellent example of waterproofing concrete with the use of hydrated lime is given by Mr. Bertram Brewer, City Engineer, Walthom, Mass., in the construction of a two million gallon re-inforced concrete reservoir. Five per cent. of Hydrated lime was added, rendering the reservoir waterproof. Mr. W. Purvis Taylor, Engineer of Tests, City of Philadelphia, Pa., also corroborates the results of the use of hydrated lime for waterproofing concrete. For the manufacture of concrete blocks, walls, reservoirs, cisterns and concrete dams, there is no better or cheaper method of waterproofing than the use of a reasonable amount of high Calcium hydrated lime properly and thoroughly mixed with the Portland cement. The principle upon which the hydrated lime renders the concrete impervious to moisture depends largely upon the physical action of the hydrated lime in filling up the voids and rendering the concrete mass so dense that water or moisture cannot penetrate through it. On the other hand there is little, if any, chemical action between hydrated lime and concrete and wherever the surface is exposed to the action of air or water there is a gradual carbonization of the lime to carbonate of lime, so that its waterproofing qualities increases with age instead of diminishing, as with many other superficial coatings.

In summing up the various methods of waterproofing concrete, it must be borne in mind that there is no set rules to go by, neither could one waterproofing material be used under all conditions and in all places. On work of any great importance competent engineers should be secured to draw up specifications covering the class of waterproofing to be used for the building of the structure, and the resulting work should be carefully inspected, as much harm and expense may be caused by the improper use of the waterproofing material if improperly used. As the use of concrete is entering into so many new channels the modern user of concrete should adopt, and put into practice and become experienced in the use of such waterproofing methods and materials as his particular work may require. I desire to emphasize this fact, that as users of concrete in its various forms, we cannot ignore the absolute necessity of recognizing the vital importance to this industry of properly protecting and waterproofing concrete. As the construction of concrete houses and buildings becomes more common, the public will demand that they be as damp proof and healthful to live in as if constructed from wood, stone or brick. It therefore behooves architects, concrete engineers and builders to study this question carefully so they may be prepared to successfully meet the many problems of waterproofing concrete.

SPECIFYING SHEET METAL WORK.

MORE OR LESS DISCUSSION has recently developed regarding the manner in which the sheet metal work in connection with a building is often covered by the average architects' specifications, which in many instances are made to include in combination form tin, slate and galvanized ironwork, together with metal ceiling in either copper or steel, as may be desired. It has generally been recognized ever since metal ceilings, siding, wainscoting, etc., were first devised that they constitute a different line of sheet metal work from that regularly conducted in the average sheet metal shop. Manufacturers who specialize in the production of sheet metal products for the interior of a building have found that dissatisfaction frequently results from the custom of architects to combine sheet metal work in the manner indicated, and many who turn out artistic ceilings, siding, coves, friezes, etc., are endeavoring to induce architects and builders to separate the two classes of sheet metal work and specify them accordingly, so that separate bids may be tendered therefor. It is well understood that the average shop making a specialty of skylight work, the roofing, etc., is not always properly equipped to advantageously take up the business of installing metal ceilings and other sheet metal work now widely used for the interior decoration of buildings, whether they be intended for dwelling or for business purposes. On the other hand, many of the establishments making a specialty of interior sheet metal work are not always in a position to do outside metal work. It is, therefore, well not to lose sight of the fact that the metal ceiling industry stands by itself, and that specifying this class of work by a separate clause without any connection with the tin, slate, galvanized iron or gravel roofing feature would prove advantageous in many ways. It should be borne in mind, too, that there are establishments in the country which have made a special study of metal ceiling and copper work for interior finish and which would not be able to submit figures made up in the combination form to which incidental reference has been made. By recognizing the fact that while the material is sheet metal its application is a special division of the industry and entirely different from the ordinary sheet metal work as turned out in the roofing and skylight shop. Certainly the desired change in practice would still leave the one shop open to bid for both kinds of work, if such a course seemed desirable to the proprietor. There is always some friction on the line of cleavage, and it is probable that considerable energy must be expended before architects recognize the merit of the separation of the two classes of the work. Whether or not sheet metal workers generally will aid manufacturers of specialties to induce architects to separate these two classes may be a question, but it is certain that most of the labor will fall upon manufacturers of interior sheet metal decorative panels and ceilings in their visits to architects.—*Carpentry and Builder.*

MACHINERY AND TRADE

LARGE GAS PRODUCER PLANT.

WHAT WILL BE by far the largest gas producer plant in Canada is shortly to be installed by the Colonial Engineering Company, 222 St. James street, Montreal, for the Dominion Light, Heat and Power Company of that city, the contract for the plant having just been closed. The contract provides for 1,000 h.p. Hornsby-Stockport gas engine equipment which will generate power for the purpose of public and private lighting and commercial uses, in accordance with the franchise granted to the Dominion Light, Heat and Power Company at the last session of the Quebec Legislature, by which the company is authorized to produce and sell electric current for all purposes.

The equipment will consist of three 250 h.p. twin cylinder Hornsby-Stockport gas engine units and two 125 h.p. units. The station will be the most modern one of the kind in the Dominion, if not on the continent, the building to be of concrete construction throughout, and 3-phase 60-cycle alternating current will be generated. Under the contract between the Colonial Engineering Company, Limited, and the Dominion Light, Heat and Power Company, this plant is to be in operation by December next, and considering the fact that the Colonial Engineering Company has already made fourteen very successful installations in the Dominion, it is expected that this plant will be a success in every respect, and, when completed, will attract the attention of the engineering fraternity not only in Montreal and Canada, but from elsewhere.

Anthracite pea coal, coke or charcoal will be the available fuels. There will be no unsightly chimney; no smoke nuisance, no unpleasant odors or disagreeable noises of any kind.

It is understood that a number of very prominent Montreal capitalists are behind the enterprise, and in view of the proposition which the Colonial Engineering Company has recently put before the City Council of Montreal concerning the cost of its street lighting and what the Colonial Engineering Company is prepared to do, the installation, operation and results obtained in this 1,000 plant will be watched with great interest.

The Colonial Engineering Company have also just secured a contract from the C. S. Hyman & Co., of London, Ont. (the Hon. C. S. Hyman, formerly Minister of Public Works) for the installation of 275 h.p. Hornsby-Stockport gas engines for their large tannery in London, and have guaranteed to produce the power, including fixed charges, for $18.80 per year per h.p., which, it is said, will be $4.70 per annum per h.p. less than the city of London itself will have to pay the Hydro-Electric Commission.

TO EXHIBIT INTERESTING MODELS.

ONE OF THE PROMINENT ENGLISH FIRMS who will exhibit at the Canadian National Exhibition this year is Major & Co., Ltd., of Hull, Eng. This firm are the manufacturers of "Solignum," the wood preservative and stain which is now being extensively used in this country. We learn from Mr. Sturgeon, the Dominion representative, that they are building a stand in the north-east corner of the Process building, where the various uses of this preservative for inside and outside work will be demonstrated. A feature of the exhibit will be three valuable models—an English residence, a farm building, and a railway station—which are being imported from England for the occasion. These models will undoubtedly prove of great interest to the architects, contractors and builders who will be in attendance, as they not only show the successful and artistic results which can be obtained by the use of "Solignum," but also the additional advantage of its wood preserving qualities.

TEST OF CONCRETE BEAM.

AN INTERESTING TEST of a reinforced beam, one of 600 structural members of the same length and size, used in the construction of the power house of the Shawinigan Water and Power Company, at Shawinigan Falls, Que., and made in accordance with the "Siegwart System," by La Compagnie Alpha, engineers and contractors, 17 Place D'Armes Hill, Montreal, is shown in the accompanying illustration. This beam, measuring 9 ft. in length, 4¾ inches deep and 10¼ inches wide, was subjected to the test when it was thirty-five days old and, although designed and guaranteed to carry only a safe load of 100 lbs. per square foot, no manifestation of a fracture appeared until the superimposed load, which consisted of bags of cement, attained the weight of 490 lbs. per square foot.

Test of a Siegwart Beam.

Loads.		Per sq. ft.		
9	Bags cement	= 100 lbs.	1-16 in.	deflection.
17	" "	= 190 "	3-16 "	"
26	" "	= 290 "	13-32 "	"
35	" "	= 390 "	5-8 "	"
40	" "	= 445 "	29-32 "	"
44	" "	= 490 "	1 3-4 "	" (beginning to break on under side)

After load was taken off deflection was 1 1-8 in.

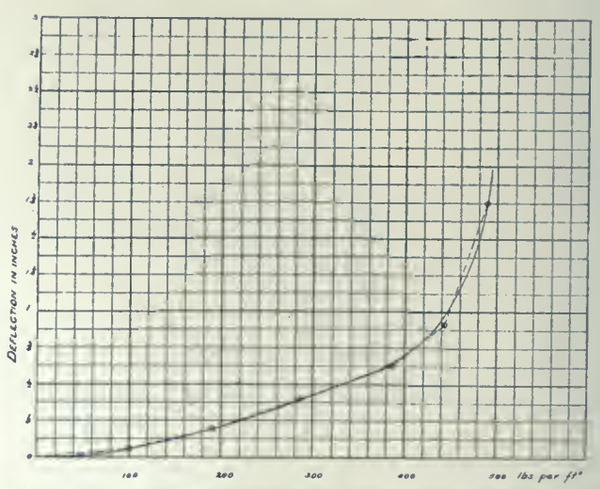


Diagram of Deformation of Siegwart Beam designed for the Power House of the Shawinigan Water and Power Company.

Although La Compagnie Alpha is a new firm in the field, they are fully prepared to estimate on important work, and to execute contracts in any part of the Dominion. Their staff of engineers is composed of men with a broad contracting experience, who are at the services of the architects and builders, and in view of the highly creditable manner in which they carried out the work at the power house of the Shawinigan Water and Power Company, the company bids strongly to become an important factor in the engineering and contracting field of Canada.

Information regarding the "Siegwart Beam and Method of Fireproof Floor Construction," together with estimates, etc., will be cheerfully furnished by La Compagnie Alpha to any interested party.

EXTENSION TO PLANT.

IN ORDER TO MORE FULLY meet the requirements of their rapidly growing business, the B. Greening Wire Company have under construction at their works in Hamilton, a new building which is to be devoted exclusively to the manufacture of wire rope. This addition to their already extensive plant will be a one-storey concrete and brick structure, 124 ft. by 112 ft., with a roof of saw tooth construction, and foundation and flooring built of solid concrete, so as to adequately withstand the weight of the heavy machinery and large reels of cable which it will be required to bear. The company has placed orders for additional rope machinery of the latest design, and the equipment of the new factory is to be model in every respect. Architect W. A. Edwards, Hamilton, who has charge of the work, expects that the new building will be completed and the machinery installed by the first of November, when the present rope mill will be utilized as an extension to the wire working branch of the business. This arrangement will provide much needed facilities for this rapidly expanding department, and will enable the company to better take care of the increasing demand for their wire guards, garden fencing and borderings, factory lockers, and other kindred products which they manufacture. The company has recently issued a series of splendid catalogues which are of inestimable value to architects and builders in specifying or selecting materials of this kind, and which will be sent to any address upon request.

ACTION TO PROTECT PATENT RIGHTS.

AN ACTION HAS BEEN BROUGHT by the Trussed Concrete Steel Company in the United States District Court in Chicago, against the Monolith Steel Company of Washington, D.C., and one of their clients, a Chicago contractor, for alleged infringements of patent rights. This suit has been instituted by the company as a test case, with a view of prosecuting any firm or firms manufacturing or marketing reinforcing rods, having *rigidly connected shear members* in imitation of the "Kahn Trussed Bar." In order that Canadian architects and builders may properly protect their interests from any attempt to invade the Dominion with these infringements, the company has sent out notices relative to their action in the matter, together with a declaration of their intentions to hold to a strict accounting every contractor or owner who employs rods, which in any way structurally encroach upon the patent features of the Kahn System.

WELL KNOWN FIRM INCORPORATES

THE EADIE-DOUGLAS COMPANY, Montreal and Toronto, owing to the large increase in their business, has been incorporated by Dominion Charter under the name of "Eadie-Douglas, Limited." The officers and directors being: H. P. Douglas, president; Shirley Ogilvie, vice-president; H. G. Eadie, secretary-treasurer, (all of Montreal); J. W. Woods, director, Ottawa.

CEILING MATERIALS IN SOUTH AFRICA.

PLASTERED CEILINGS are not common in South Africa, as in Canada, and to lath and plaster the inside of a building is unknown in that country. It was usual, until the introduction of metal ceilings, to use matched ceiling boards or leave the overhead beams exposed with only a coating of stain and varnish or paint to decorate them. The extent to which metal ceilings can be considered a boon to South Africa will be best understood when it is remembered that all timber suitable for ceiling boards must be imported from countries over-seas, as South Africa produces none which can be used for that purpose.

It is estimated by those in the trade that for the past five years the average annual importations by Cape Town merchants amounted to 4,800 squares of 100 sq. ft., or 480,000 sq. ft. It is also estimated that 500 squares, or 50,000 sq. ft., are consumed in the Transvaal per month. Metal ceilings are becoming more and more used in South Africa and are being put up in mercantile buildings, offices, schools, churches and many private houses. As they come into competition chiefly with ceiling boards, the aim of the firms handling them is to sell as near as possible to the price of ceiling boards. The advantages of metal ceilings over ceiling boards is now generally recognized, and where expense is not too closely considered the metal is being used exclusively.

Ceiling boards sell in South Africa at $3.04 to $3.65 per square of 100 sq. ft., and the landed cost of metal ceilings is $3.41 to $4.87 per square. The present customs tariff admits ceiling boards of British origin into the South African customs union free, and those from foreign countries at 3 per cent. ad valorem, while metal ceilings of British origin are charged 12 per cent. and foreign 15 per cent. ad valorem. This gives the ceiling boards a very considerable advantage, but it is thought that when the customs traiff is revised, the two will be placed on an equal footing, as both have to be imported and both are used in the erection of houses, to reduce the cost of which is believed by every one to be essential.

Metal ceilings have been imported from both Canada and the United States. U.S. Consul-General Julius G. Lay, Cape Town, is informed that Canada gets more than double the amount of the trade enjoyed by the United States.

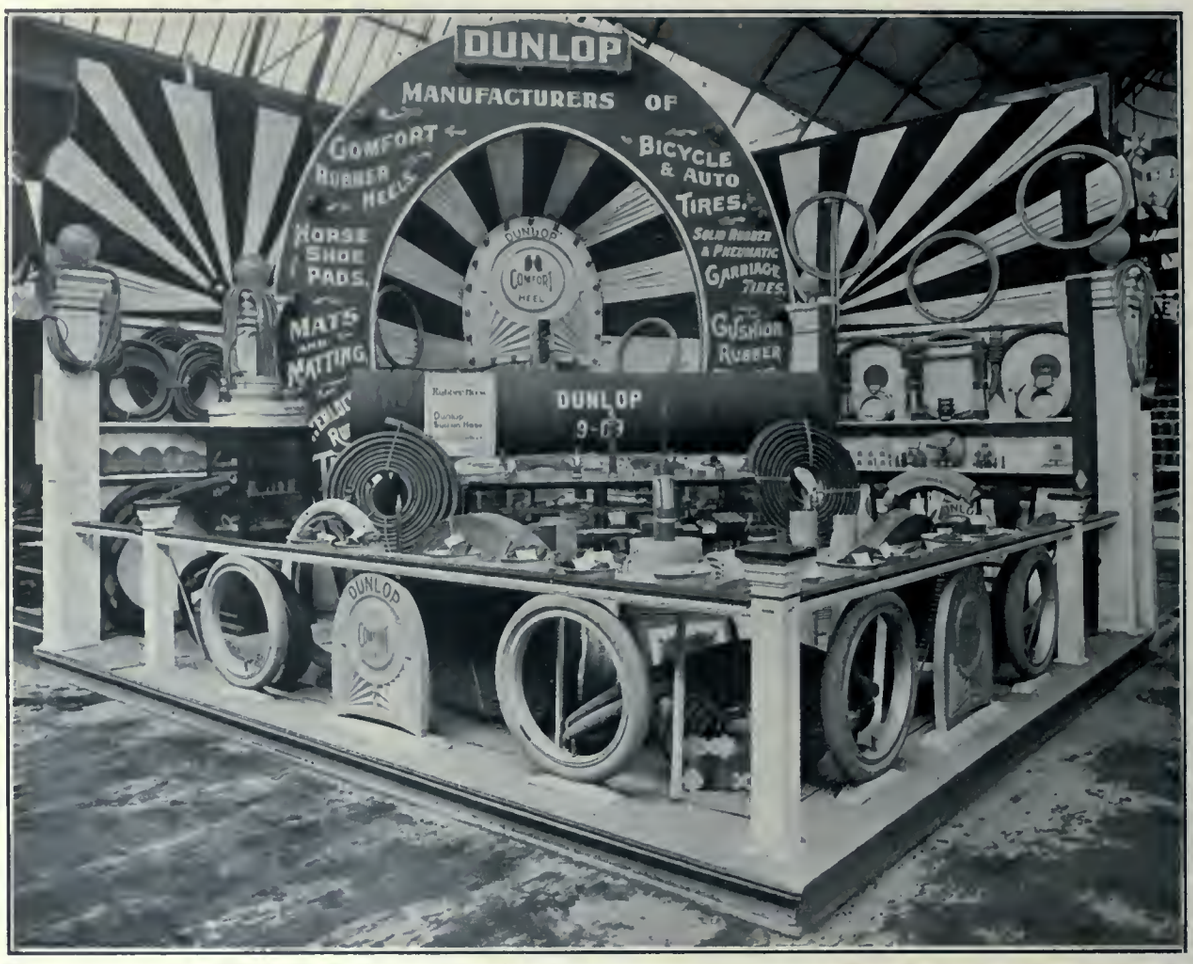
PAINTING OVER CEMENT.

ACCORDING TO THOSE WHO KNOW, it is not safe to paint over the surface of cement until it has stood exposed to the weather for a year or so, unless the surface has first been sized with acid water to kill the alkali, and even then there is said to be some danger of bad results. A writer in a recent issue of The Master Painter points out a method, however, which has the sanction of many good painters. It is as follows:

Slack half a bushel of fresh stone lime in a barrel and add in all 25 gallons of water; when slacked and cold, add 6 gallons of the best cider vinegar and 5 pounds of the best dry Venetian red. Mix well and then strain through a fine wire strainer. Us it when about the consistency of thin cream. Give the cement surface a coat of this and after standing a day or so apply a coat of red lead and linseed oil paint. After this has dried the surface may be painted any color desired.

Some jobs require two coats of paint over the red lead paint. In this case make the second coat serve as filler and paint both. This second coat may be made with plaster paris and oil of the consistency of buttermilk. Then break up some white lead and oil to make a paint the same consistency as the plaster paint. Take equal parts of each of the two mixtures and "box" them together, and thin to a working consistency with turpentine. This second coat should be applied as heavy as possible, or as heavy as can be spread well. After this coat is dry, apply the next and finishing coat of paint, which should be quite glossy, or about the same as the last coat on outside woodwork.

The object in giving it this plaster paint is to prevent the running and wrinkling of the paint where considerable paint is to be applied to the surface. And it must be made to dry quickly.



The above photograph of the Dunlop Tire and Rubber Goods Company's exhibit in the Main Building at the Toronto Exhibition will give readers of "Construction" an idea of the activity of the Dunlop Company in mechanical and general rubber lines. The Dunlop Company also had an extensive exhibit in the Transportation Building.

The work of building an addition to the Dunlop Rubber Works on Booth Avenue was begun this week. The new building will be detached and thoroughly fire proof. The equipment will be for the manufacture of automobile tires and mechanical rubber goods, the two departments which have encroached most on the present available factory capacity.

Building Progress in August.

WITH THE BEGINNING of the fall season at hand, there is every indication that the remarkable building progress made during the spring and summer months, will continue uninterrupted throughout the remainder of the year. In the east, west and central portions of the Dominion, plans have been formulated for a large number of important projects to be carried out within the immediate future, and unless adverse weather conditions come to blight the present prospects—and the steady manner in which the season has set in would indicate otherwise—the declining months of 1909 will in all probability prove to be the greatest fall building period Canada has yet recorded.

As regards August, the last of the summer months, operations were exceedingly active. Comparative figures, as supplied CONSTRUCTION from seventeen of the twenty centres reporting, place the average gain for the month at 34 per cent., a fraction in excess of one-third more than was registered for the corresponding period of 1908. The West, with one exception, has fully recovered from the slump experienced in the preceding month; the losses noted, but four in number, are scattered; and the general situation as based on the returns, well balanced, strong and active.

The biggest loss for the month has fallen to the lot of Stratford, where a decline of 89 per cent. has been recorded. Halifax is second in this respect, with a falling off of 81 per cent.; while Fort William and Edmonton lagged behind their figures for the corresponding period of last year to the extent of 4 per cent. and 3 per cent. respectively. This brief respite on the part of Fort William seems quite in order in view of the exceedingly strenuous manner in which she has been forging ahead since the beginning of the year; and as for Edmonton, the loss may be explained by the fact that several important jobs were held up pending the outcome of certain labor troubles which gave promise of an early adjustment and have in all probability been settled by this time, so as to permit the work to proceed.

Aside from these four places, all cities in the list show the balance to be substantial in their favor. Ottawa's gain of 202 per cent., the biggest increase per cent. tabulated fof the month, places her in the premier position. Calgary lays claim to second honor by an advance of 188 per cent., while Berlin ascends to the third highest rung with an increase of 150 per cent., an amount which amply attests to the rapid manner in which this industrious city is progressing.

Toronto, however, bears the palm for the largest volume of business, permits having been issued for new buildings, aggregating in cost $1,325,132; although Winnipeg is a close contender in this respect, with a total for the month of $1,133,850. The increase noted in each place is 4 per cent. and 85 per cent. respectively, and, in view of the high percentages attained in the preceding month, the showing made in either case is more than satisfactory. Information from Winnipeg states that the architects are extremely busy at the present time, and that a number of big projects will be shortly launched, so as to get the mason work done before zero weather is at hand.

In British Columbia, Vancouver noted an increase of 56 per cent., which more than offsets her loss in the preceding month; while Victoria recorded another gain by an advance of 6 per cent. Other Western gains are reflected in the comparative figures of Brandon and Regina, both of which surpassed last year's total for the month, by an increase of 38 per cent. and 9 per cent. in order named.

Throughout Ontario, all cities, with the exception of Stratford, made substantial headway. In addition to the advances made in Ottawa, Toronto and Berlin, as previously mentioned, other gains noted are: London 68; Brantford 35; and Peterboro 21 per cent. St. Thomas, Windsor and Port Arthur, while not submitting comparative figures, show in their relative amounts for the month—$193,400; $85,085 and $26,000—and especially so in the two first cases, figures which seemingly indicate that none of these places have suffered a reversal.

In the East, Sydney again registers an advance, her gain for the month being 37 per cent.; and Montreal, whose figures came to hand too late to be included in the accompanying table, noted an increase of 7 per cent. This is Sydney's fourth consecutive gain, while Montreal has exceeded the corresponding figures of 1908 for each and every month this year.

Practically all the cities included in the list report

	Permits for August, 1909.	Permits for August, 1908.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.	$20,000	$8,000	150.00	.....
Brandon, Man.	29,200	21,145	38.09	.....
Brantford, Ont.	26,295	19,430	35.33	.....
Calgary, Alta.	242,175	83,810	188.95	.....
Edmonton, Alta.	99,707	103,352	.....	3.52
Fort William, Ont.	168,935	176,725	.....	4.40
Halifax, N.S.	25,117	132,773	.....	81.07
London, Ont.	64,137	38,000	68.78	.....
Ottawa, Ont.	317,200	105,000	202.09	.....
Peterboro', Ont.	42,590	35,195	21.01	.....
Port Arthur, Ont.	26,600	.....	.....	.....
Regina, Sask.	168,224	153,112	9.86	.....
St. Thomas, Ont.	193,400	.....	.....	.....
Stratford, Ont.	2,125	19,700	.....	89.21
Sydney, N.S.	18,900	13,800	37.31	.....
Toronto, Ont.	1,325,132	1,274,185	3.99	.....
Vancouver, B.C.	841,020	538,930	56.05	.....
Victoria, B.C.	141,040	132,770	6.22	.....
Windsor, Ont.	85,085	.....	.....	.....
Winnipeg, Man.	1,133,850	602,000	88.34	.....
	4,665,697	3,457,927	34.92	.....

that the amount of work on hand is such as to tax to the utmost the capacities of both the architects and contractors, and that there is no signs of a let up for some time to come; the general opinion being that in the next two months a far greater number of buildings will be undertaken than at any corresponding period in the past.

Architectural Exhibit at C.N.E.

THE EXHIBIT of architectural drawings, held in connection with the Canadian National Exhibition, demonstrated two things. First, that the public is interested in drawings of this character, and, second, that there is a need for an annual exhibit of this kind. There was no section in the Liberal Art Building which proved a greater attraction or elicited more favorable comment, and much credit is due to the Committee of the Ontario Association of Architects, under whose direction the exhibit was held, for the very excellent arrangement of the display in general and the admirable manner in which the drawings were hung. There was no time during the entire two weeks but what a large crowd was present, and no place in the building where the vast concourse lingered with greater interest than in the space generously alloted by the Board of Management for this purpose.

The drawings in the main consisted of well rendered colored work, and pen and pencil sketches, although a liberal sprinkling of splendid photographic reproductions was also in evidence. A most gratifying feature was the large number of exhibits made and the representative character of the work displayed. The entire wall space available was well occupied and the subjects shown embraced practically every branch of building design. Possibly the only disappointment in this connection was the fact that the affair was a trifle too local in character, the preponderance of renderings and photographs being exhibited by Toronto architects, although several Montreal and Ottawa firms, and a small number of architects in various parts of Ontario, also displayed their work. It would have been better had the representation been more general. This drawback, however, cannot in any way be ascribed to the lack of effort on the part of those in charge, but to the lack of initiative enterprise, and the delinquent attitude on the part of a large number of architects themselves, who hesitate to put a shoulder to the wheel until the machinery is in motion.

All in all, the exhibit was highly gratifying and the committee and those who exhibited and lent their co-operation, are to be congratulated upon its success. In view of the interest manifested by the public, there is no valid reason why it should not be repeated, and become an annual affair. It is to be sincerely hoped that the Exhibition Board will make it a permanent feature, and also that next year the architectural fraternity in every section of the Dominion, will be represented. An event of this kind gives the general public the greatest opportunity to view work of this class, and it can become the means of inculcating in the mind of thousands of people, a broader appreciation of the principles of good architecture and a greater desire for the application of these principles in their immediate surroundings.

Affiliation and Architectural Education.

TWO SUBJECTS that will in all probability form the basis for wide discussion at the second general assembly of the Royal Architectural Institute of Canada, to be held at Toronto, October 4, 5 and 6, will be the questions of affiliation and architectural education. Both evidently will have a vital bearing on the future bf the architectural interests of Canada; and yet, if we are to judge from the experiences of other countries, the first is absolutely necessary, if the high standard desired in the other is to be successfully attained. While some of the provincial associations have, in a limited way, established a system of education, it is quite obvious that far greater and more satisfactory results could be obtained in this direction, if the various architectural bodies would unite and direct their undivided effort through some agency having a national scope.

In speaking of the advantages of co-operation as found in England, and deprecating the lack of this desirable condition in their own country, the committee on education of the American Institute of Architects, in their last annual report says: "Were the institute possessed of a junior body, bearing to it the relation maintained by the English Architectural Assbciation to the R.I.B.A., and acting as the concrete educaticnal agency that stands between the office and the School of Architecture, taking over very largely the educational responsibilities of the institute, but subject to the advice and supervision of its Education Committee, then, in all probability, actual results would be more rapidly forthcoming than is now the case. For this reason, and without prejudicing the question from any other standpoint, the committee expresses the hope that way may be found for the union of the Institute and the League in one powerful and co-operative organization."

Continuing, the reports adds "that the pressing need of education to-day is not curtailment but extension. . . . the general broadening of the curriculum until it comes to lay more stress on the humanities and the other arts allied to architecture. . . . Until the end of time every prospective artist in any department of the Fine Arts must go to school, for the whole period of his life, to the monuments of past civilizations in Greece and Rome, Italy, France, Spain, Germany and England, but it is no longer necessary,, and if unnecessary then most unfitting, that we should be compelled to depend for our crowning education on the charity or the friendliness of another contemporary people. Every nation develops its own type of civilization, solves its own diverse problems after its own native fashion. American civilization is other than that of France, or Italy, or England, and art, which is the flowering of civilization, as well as its touchstone, must vary accordingly, however at one it may be at root with the art of all men at all times."

The latter remarks have an interest in that they indirectly point out a condition with which the architectural fraternity in Canada is confronted. We also have an individuality that differs from other countries, and therefore must develop an architecture that is compatible with our social ideas, tastes, customs and climate. Like America, we can benefit from supplemental studies and observations abroad, but it should not be necessary for us to be dependent on other countries for our higher educational advantages. What is needed more than anything else, is an enlargement of the departments of architecture already existing at McGill and Toronto Universities; the establishing of two or three additional schools; and the developing of an atelier system which will enable the younger draftsman to drill himself more thoroughly in the principles of design, and to come in closer touch and sympathy with the older architects and his fellow students. This, it seems, can only be brought about in one way, and that is by the affiliation of the various architecutral bodies in the Dominion. Perhaps, if this is effected, Government aid and co-operation might eventually be obtained; but until the architects stand as a unit in their endeavors towards a higher professional plane, their ideals at the best will be slow of attainment.

Where the Law Fails.

THERE IS A LATIN PHRASE to the effect that "necessity knows no law," which might be altered to read "there is no necessity for law." While this might sound somewhat anarchistic, it nevertheless has its application, especially where the law utterly fails to serve its purpose. As a case in question, we refer to

the city of Westmount, P.Q., where a firm of contractors, after a series of unnecessary delays, and a rather protracted hearing, were found guilty of employing dishonest methods in the execution of their work, and punished by a fine of ten dollars. Two charges were laid against the contractors, one that they were using inferior concrete in the construction of the foundations for several houses, and the second, that a portion of the foundations did not rest upon a solid footing. These charges were preferred by the City Engineer, who summoned that contractors into court, after they had persisted in ignoring the notice served upon them, that their work was being carried out in violation to the building by-laws and that certain changes must be made. The bulk of evidence introduced, fully corroborated the charges of the City Engineer. It was proven conclusively that not only were a portion of the foundation walls built upon an unstable footing, and not placed upon piles or carried down to a solid base as prescribed by the regulations, but that the material used was anything but concrete, the aggregates being unclean and mixed with earth and debris.

In view of this testimony, and the further fact that the defendants at first also disregarded the court's order to appear for trial, it seems that a fine of such meagre proportions renders the purpose of the law ridiculous and its existence of absolutely no statutory import. We believe, as with others, that "justice should be tempered with mercy" and that the "object of the law is not one of revenge"; but an over-weening leniency, such as this, kicks the very props from under what might be regarded as even a pretense at vindication, and completely emasculates the dignity and force of any legislative enactment. A law which admits of so small a fine, even as the minimum, in a case of this kind, cannot be respected as a wholesome measure or a benefit to the interest of good government. Dishonesty of this nature should not be dealt with as a misdemeanor; it is a more serious offense, and a crime which should exact a more severe punishment.

As it is, in the event of disintegration or the collapse of the walls, or the settling of the foundation—any of which, according to the evidence, is quite possible—the misfortune will be attributed directly to the fact that concrete was employed; and the technical press devoted to other building interests, will eagerly grasp the opportunity to give a garbled version of *another concrete failure*.

If a law is to be of any avail to mankind, it must protect society from tricky and fraudulent methods of this kind, and aid and encourage honest workmanship and legitimate enterprise in all fields of human endeavor. It is ridiculous to have building by-laws and regulations, if such measures are not supported and upheld by the courts.

The Parliament Building Fire.

THE FIRE WHICH DESTROYED the west wing of the Parliament Building at Toronto recently again points out in a forcible manner the results of misdirected economy in building construction. Aside from the heavy damage to the building itself, the Government of Ontario has suffered an immeasurable loss in the way of valuable documents and records which can never be replaced, and which to-day would still be unharmed had fireproof methods been employed at the time the structure was erected. When the building was put up under the direction of a former administration, the low cost of its construction was made the instrument of political capital. It was compared to other structures, and referred to as an evidence of administrative economy, and as the exterior gave no evidence of its internal weakness, it was not until the party in power had been retired from office that the many existing structural defects in the building were discovered.

In an editorial comment upon the matter, one of the Toronto morning papers said: "An examination of the building made within recent years has revealed the cause of the cheapness. The exterior is of stone, and looks reasonably well. But the interior is flimsy. While the division walls in all large buildings are of brick, such is not the case with all the walls in the Parliament Buildings. While the joists in the public buildings that were said to be too expensive are of steel, and while the floors and the staircases in great buildings are usually of stone or marble or concrete, the joists and the floors and the stairs in the Ontario buildings are of wood. The building was so cheaply erected that the great lobby, while safe enough, betrays elasticity when crowded. The iron supports to the floors are thin and hollow. When raising the great central roof, one would have thought that a steel framework would have been employed. But the entire interior is wood. The architect, who was an expert, was clearly required to make everything of the cheapest, and to give as much gingerbread for as small an amount of money as possible. He did the best he could, and it is understood that after he had made his plans, further cheapening expedients were adopted. Since the present Government has been in office it has been exceedingly anxious about the condition of the buildings, and has had them examined with a view to improving them. But it has found that reconstruction is about the only remedy that is available. It has, however, expended some $25,000 in making the electric system safe, and has decided that the addition at the rear of the present structure shall be fireproof. The fire endangered the entire block, and it is a wonder that any part of it was saved. In a building of the fireproof type the damage done would have been little or nothing. The lesson of the fire is that economy can be carried too far. It is a direct loss when a building is put up cheaply, and it is not right to run to economical extremes where the structure is to contain valuable documents and is to serve the public for many years. The Toronto City Hall, as has been alleged, cost twice what was paid for the buildings. But it is only necessary to make a rough examination of the two structures to be convinced that the more expensive building was really the cheapest."

MR. JUSTICE WARRINGTON in the case of Robertson v. Willmott says THE JOURNAL OF THE SOCIETY OF ARCHITECTS, London, has given a decision which is of interest to architects. Under a deed of partnership, dated November 7th, 1906, the plaintiff and defendant entered into partnership as architects and surveyors. There was a clause in the deed which enabled either party under certain circumstances to determine the partnership upon notice, but it was provided that if the dissolution took place within five years the defendant should not practise an an architect and surveyor within certain defined limits. The defendant within five years determined the partnership, and became assistant to an architect practising within the defined limits. The Court held that he was carrying on the profession of an architect in breach of the agreement, and granted an injunction. There appears adds the BUILDER, to be a distinction between carrying on a business and carrying on a profession as far as such covenants are concerned. A man may not be carrying on a business unless he is concerned in the profit or loss, but a professional man is exerting his profession whether he is using his professional skill for another at a fixed salary or whether he is practising on his own account.

Front view, Residence of Mrs. W. P. R. Street, Toronto, showing brick garden wall and general detail of facade. W. A. Langton, Architect.

Rear view, Residence of Mrs. W. P. R. Street, Toronto, showing back porch and service wing projection. W. A. Langton, Architect.

RESIDENCE OF MRS. W. P. R. STREET.—A Noteworthy Addition to Toronto's Domestic Architecture.—Situated on a Double Fronted Lot and Built with Consideration to Site and Aspect.—Features of Design and Plan.

THE PLAN OF THIS HOUSE follows the scheme of a service wing projecting from the north-east corner. This, which is perhaps the best model for a south fronting house of sufficient size, is peculiarly suitable for this house because of the double fronted lot on which it is built.

The lot is 145 ft. from front to front, with a 15 ft. boulevard in addition on each street. The sidewalks are in both streets on the other side of the road. The building conditions require all houses to front on the south street, Mackenzie Avenue. Other houses in the row are set back about 30 ft. from Mackenzie Ave. This house is set back 53 ft., for the purpose of getting more garden space on the south side, and of clearing the other houses at the back so as to get more light and air. This brings the kitchen to the 30 ft. line on the north street, Dale Ave., and provides a cheerful outlook for that part of the house.

Residence of Mrs. W. P. R. Street, 10 Mackenzie Ave., Toronto, as seen from inside the garden wall. W. A. Langton, Architect.

There are one or two other peculiarities which are worth noting as original features. There was no building on the lot to the east when the house was planned, and no outlook could be depended upon in that direction. It was necessary, therefore, to light the dining room from the south. Thus the principle difficulty of the plan was to keep the front quiet, with the two largest rooms and an entrance, and a verandah room not connected with the entrance, all crowding to the front to get on the sunny side of the house. To simplify this crowding, the sunroom and porch were combined in a projecting mass, leaving the main wall to take the character of its composition from the open order of the windows in the upper story, under which the drawing room and dining room windows are placed.

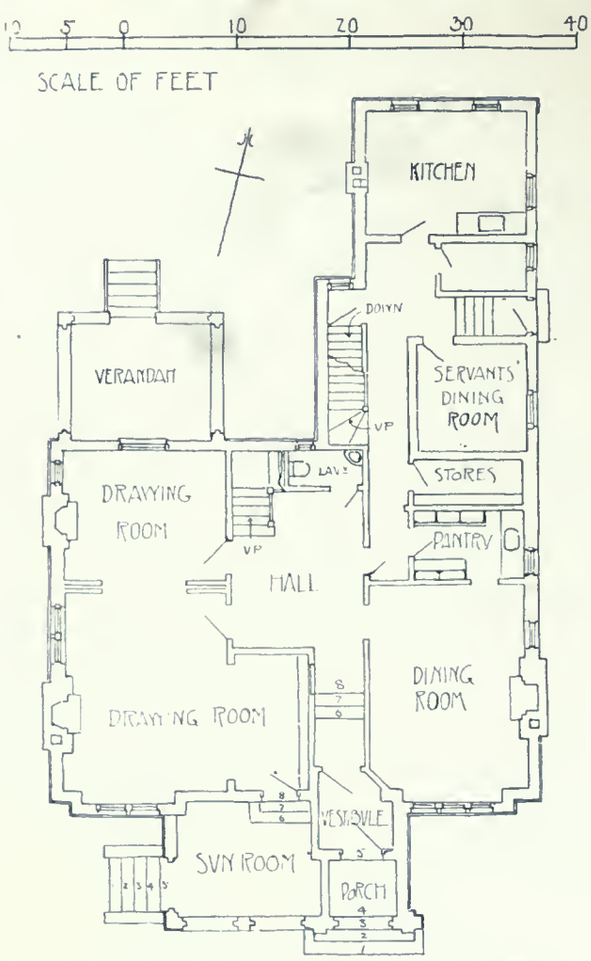
The porch projection serves also the purpose of seating the building on the ground. This is desirable for the Toronto type of residence, isolated in its own grounds. In this respect, they are like country houses; but in respect of having people walking past, only 30 feet away, and carriages driving past at a distance not much greater, the ground floor windows are too much under observation, if the house squats low on the ground like the true country house. The floors of a city house, even in Toronto, must be high, if the residents are not to feel overlooked. Yet there is no doubt that close connection with the ground is more beautiful for a house which stands apart.

In this house the ground floor is 4 ft. above the ground, and the window sills are 6 ft. 6 in. But the sunroom, especially in its summer character of verandah (without the sash which appear in the view), is pleasanter near the ground; and the porch may be even lower. There is some distance to be gone, in getting from the porch to the hall, which is lighted from the other side of the house; and to have some of the steps inside gives a motive and apparent reason for the necessary passages. The porch floor is only 2 ft. above the ground, and the spread of the steps helps the feeling of being well down on the ground.

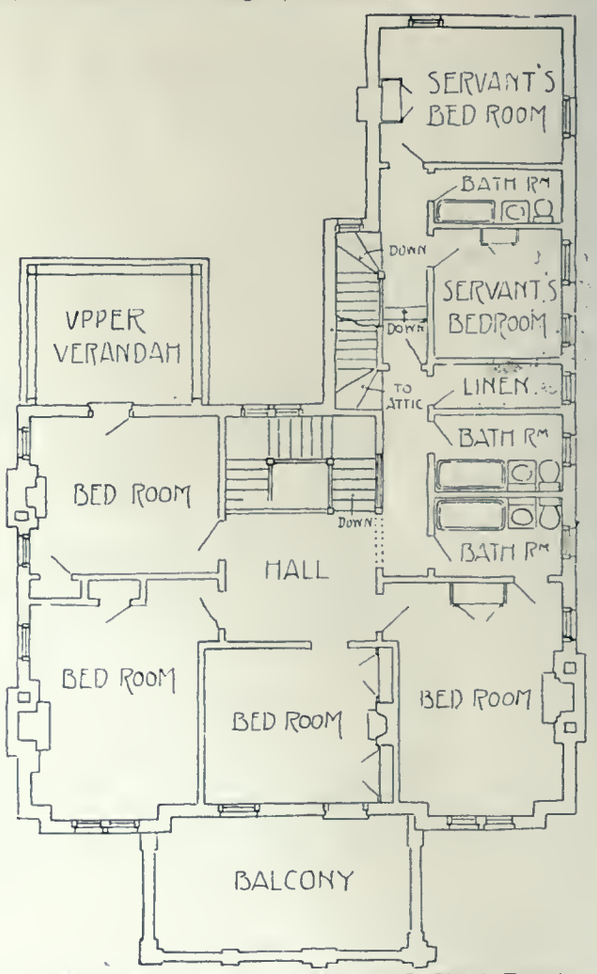
Unfortunately the designer, in his zeal for a secluded garden, has run the brick garden wall so high that the steps, which are an important feature of the front, are not seen, unless the gate is open.

The plan in general has no unusual character, except on minor points dictated by special requirements. All

Entrance Hall, Residence of Mrs. W. P. R. Street, Toronto. W. A. Langton, Architect.



Ground floor plan, Residence of Mrs. W. P. R. Street, Toronto. W. A. Langton, Architect.



First floor plan, Residence of Mrs. W. P. R. Street, Toronto. W. A. Langton, Architect.

rooms on either the ground or first floor are grouped around a centrally situated hallway. The double drawing room, connected by sliding doors occupies the entire portion of the floor to the left of entrance; the front rooms connecting directly with the sun-room at the front,

Front elevation, Residence of Mrs. W. P. R. Street, Toronto. W. A. Langton, Architect.

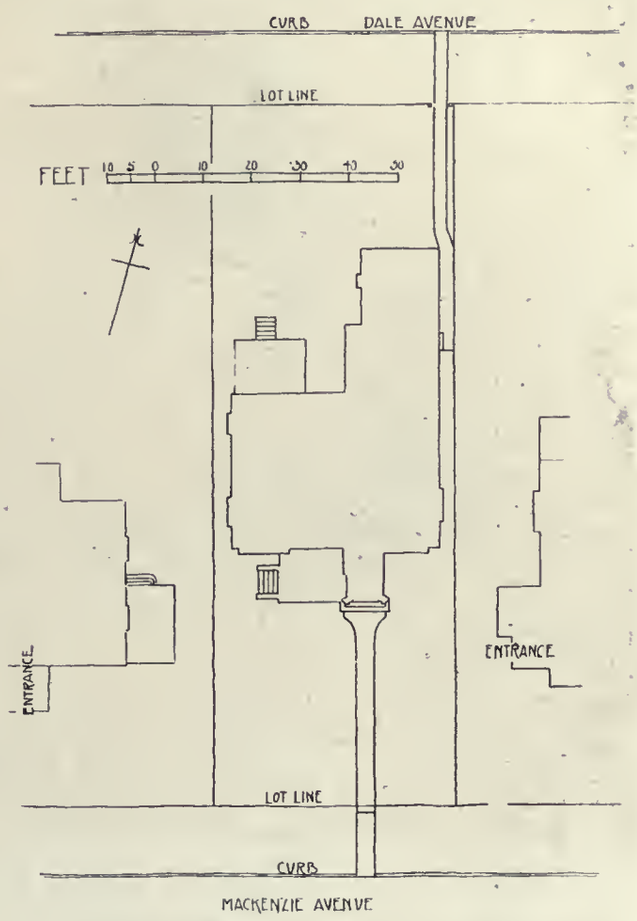
while the rear room opens into the verandah at the back.

The service section is confined entirely to the east of the hall, the dining room being at the front and separated from the kitchen at the rear, by a pantry and the servants' dining room.

All the living rooms and the bed-rooms with the exception of those of the servants have open fire-places. The attic floor is used for storage only.

The bricks are John Price's red brick; the cut stone is Bedford lime-stone, and the slates are the never-fading green from Vermont quarries. The soffit of the cornice is plastered with cement plaster on metal lath.

A STEP WORTHY OF EMULATION on the part of many Canadian municipalities has just been taken in Washington, D.C., where during the past holiday months all schools buildings which are not non-combustible in their construction, have been equipped with fireproof stairways. Eighteen structures in all were improved in this respect and the school building system in general brought up to a higher plane of protective efficiency.



Ground plan, Residence of Mrs. W. P. R. Street, Toronto.

Such a step in many cities and towns in the Dominion, is not only necessary but imperative, and school boards should not await the repetition of the sad experiences of the past to impress this urgent need more vividly upon them. It is a case in which the "ounce of prevention" theory certainly holds good.

West elevation, Residence of Mrs. W. P. R. Street, Toronto. W. A. Langton, Architect.

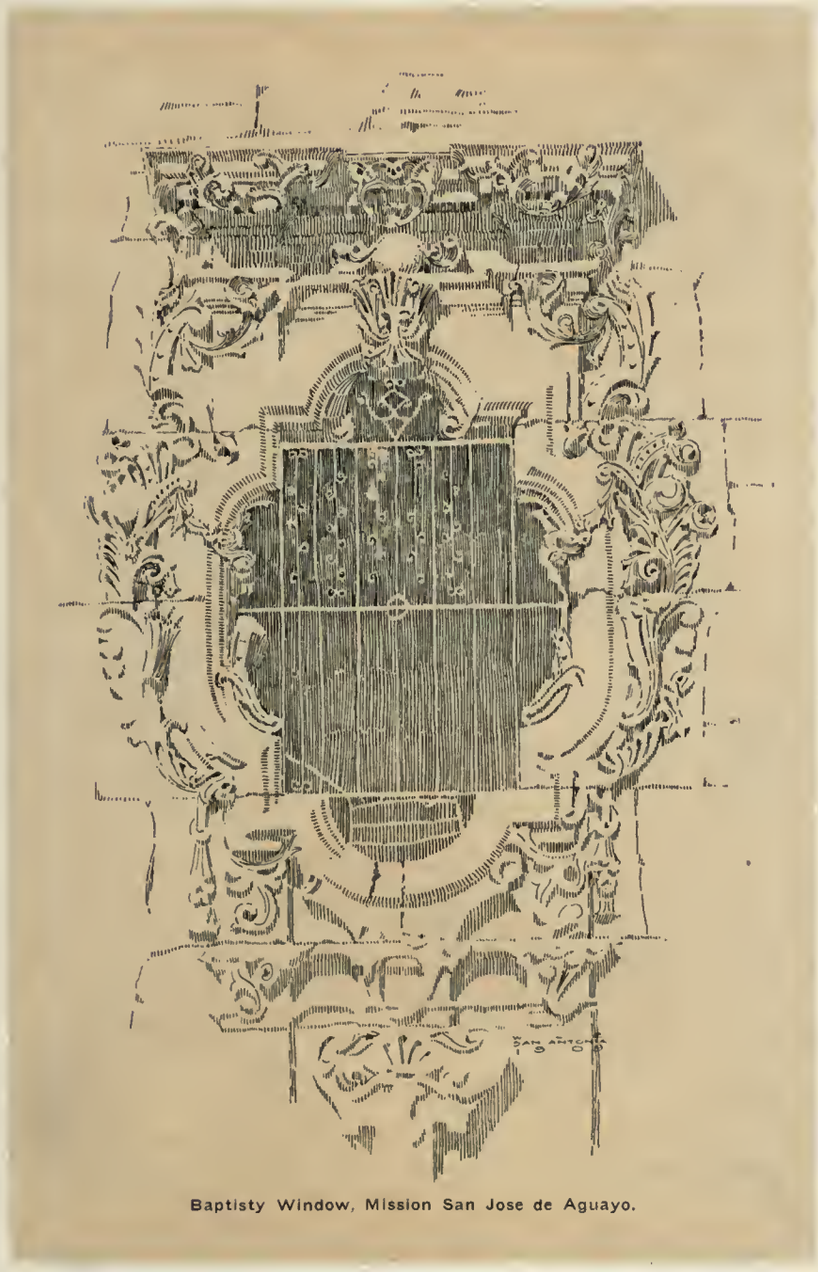
Mission San Jose de Aguayo. Founded 1718—Completed 1731.

Mission of Nuestra Senera de la Concepcion Puressina de Acuna, built 1731.

THE MISSIONS OF SAN ANTONIO.—Worthy Examples of Pioneer Architecture Which Time is Rapidly Laying in Ruins.—Most Notable Group in America—Their Plan and Construction.—Built by Franciscan Friars in Early Part of Eighteenth Century.

Written and Illustrated by W. L SOMERVILLE.

ONE OF THE MOST PICTURESQUE and historical cities in the United States, as well as the oldest with maybe the exception of St. Augustine, Florida, is San Antonio, Texas. The stirring events that have been centred around it may be suggested by the fact that it has been under the flags of five different nations since it was first granted a charter by the king of Spain in 1733. It was eighteen years before this, however, that the Spaniards under Don Domingo Ramon with orders from the Viceroy of Mexico established a "presidio" or fort called San Antonio de Valero on the bank of the San Pedro creek, which runs through the present site of the city. About three years later, in 1718, the first mission was built under its protection by certain Alcantarine Franciscans of the College of Queretaro who called it by the same name. It was the church of this mission, afterwards rebuilt on its present site in 1744, about a quarter of a mile from where it was originally erected, called the church of the Alamo, that was the scene of one of the most terrific battles ever fought by men. Here, Crockett, Bowie Travis and a handful of brave Texans fought for the liberty of their country against an army of seven thousand Mexicans under General Santa Anna. This building still stands in the centre of the city as a monument to the heroes who were massacred within its walls.



Baptisty Window, Mission San Jose de Aguayo.

Four other missions were also established by these industrious friars under the protection of the presidio. The first of these to be erected was Mission San Jose, situated about five miles south of the fort on the west bank of the San Antonio river. On the completion of this building in 1731 work was started on the other three missions, Mission of Nuestra Senora de la Concepcion Puressina de Acuna, or Mission Concepcion de Acuna as it is more commonly known, Mission San Juan de Capistrano and Mission San Francisco de la Espada. These missions were all erected on the banks of the San Antonio river south of the present site of the city, Mission Concepcion de Acuna being between Mission San Jose and the presidio, the other two being south of this mission about three miles apart in the order named.

These quaint old Franciscan missions, beautiful in their architecture because of the honest simplicity of their design, the excellence of their workmanship and the thoroughness and soundness of their construction are a subject of interest to every student of architecture who has had the opportunity to see them. The style was naturally that of the Spanish Renaissance of the early part of the eighteenth century showing strong characteristics of the Moorish influence then prevalent in the south of Spain. Of course the purpose for which these buildings were erected, the necessity of making them not only a place of worship but also a fortress, school and a place in which to reside presented a problem the solution of which in the national style of architecture required that it should be greatly modified. One might almost say it was a style in embryo which has not since been developed. In these buildings we do not find the elaborate ornament nor the exquisite iron work which were features of the Renaissance in Spain. The absence of these features are no doubt accounted for by the lack of skilled workmen. The stone carving is restricted to the occasional decoration of a portal, window or baptismal font. There are, however, traces of rich, brightly colored fresco work on sheltered portions of the fascade. The colors and pat-

terns of a decidedly Moorish origin are still distinguishable.

The Mission San Jose de Aguayo, the first of the latter group of four to be erected, was dedicated to St. Joseph, the husband of the Virgin Mary, and was founded the year that Marquis San Miguel de Aguayo became the governor of Texas, 1718-1720, hence the name San Jose de Aguayo.

The church of the Mission or main building included beside the church a small chapel and the monastical quarters. The walls, which were built of large sandstone blocks quarried not far from the site of the building, are from two to six feet thick, being necessarily heavy on account of the immense weight of the stone vaulted roofs which they have to support. The exterior of the walls were plastered with a natural cement found in the vicinity, which has a cream white color and hardens with age. This was elaborately frescoed in bright colors which may have been used not only as an architectural effect but also to gain the admiration of the Indians who were fond of a display of color.

The most notable features of this mission are the richly carved portal on the main facade and the chapel window. This carving has been cruelly mutilated by thoughtless relic hunters who have chipped the ornament till it is impossible to see even the outline in places. Whole figures have been removed and others made headless.

Although the main facade may be criticised because of its style which is tainted with some Rococo innovations it can be seen even by the casual observer that the sculptor of this ornament was not of ordinary ability. The lines are free and graceful, the drapery and features of the saints and cherubs beautifully executed and the composition of the whole showing the talent of the designer and sculptor. Bishop Neraz thinks the figures to be the Virgin Mary, San Jose, San Benedictine, San Augustine and San Francisco.

The chapel window is considered by many to be a finer piece of work than the main facade. It is very similar in detail, the same mouldings and the ornament being used that occur on the portal to the church.

We have no idea of the interior of the church except that which can be surmised from the other missions of a similar type, the north wall having collapsed a number of years ago, carrying with it the stone vaulted roof. On the south side is a small room which was used as a chapel or baptistry. It is exceptionally well preserved and is still used by some Mexican families living in the neighborhood. It was roofed in the same manner as the church, having three small domes. This seems to have been a favorite mode of construction and is found in all the missions. The baptismal font is simply carved, the pilasters and domes having plain, coarse plaster moldings and the rest of the interior being severally plain.

Mission San Francisco de la Espada, built 1731.

One of the crude but skilful pieces of construction so noticeable about these buildings, is the spiral staircase to the second story of the tower, located in the angle between the tower and the church wall. It is in ruins now, the walls around it having crumbled away, but some of the steps have been preserved. These were made out of logs roughly dressed with an axe into a shape resembling a panel of a wooden fan. The end toward the centre being part of a circle and the tread of a V shape. They were placed one upon an other, the outer end being built into the wall.

Back of the church, forming part of the same building, were built the living quarters for the friars, with a

two storey cloister having a double series of semi-circular arches. This portion of the building which had fallen into a very dilapidated condition, was rebuilt by some Benedictine fathers from St. Vincent's Abbey in the Pittsburg Diocese, Pennsylvania, in 1859, with the intention of using it for scholastic purposes. It was they who built the atrocious pointed arches to some of the windows and the inside row of arches to the cloister; and it is well that they abandoned the mission before they completed their "improvements."

At the completion of this building in 1731, the foundation was laid for the Mission Nuestra Senora de la Concepcion Purissima de Acuna, which was named in commemoration of one of the most important of church feast-days, the Immaculate Conception of the Virgin. This mission is much the best preserved, which perhaps can be accounted for by the fact that being nearer to the city, it probably was the last to be abandoned. Architecturally, it is of little interest except for the fact that it gives us a better idea of the interior of these buildings, the roofs of the others being in ruins. The main facade is very simple. Two massive towers, having plain Roman arches opening in the upper story, rise at each side. The roofs are pyramidical, with small stones at each corner of the base of the same shape. The top of the side walls of the church, and the circular wall of the central dome are serriated in a primitive manner, giving one the impression that the builder had a Moorish prototype in mind, but also that he had a bad memory. The walls were frescoed, but with decidedly less refinement in the designs and colors than those found at Mission San Jose.

This mission, like all the others, faces west. The plan is in the form of a cross, with the towers forming two wings at the foot, the monastical portion being built south from the south wing. The interior of the church is very simple, the stone vaulted ceiling, series of arches and central dome being devoid of ornament. In each arm of the cross are altar places, and at the west end of the church over the entrance is the choir loft.

The erection of the Mission San Juan de Capistrano, named after Santa Geovanni de Capistrano, a friar of the Franciscan Order, born in the little town of Capistrano, in Abruzzi, Italy, 1386, and Mission San Francisco de la Espada, was started the same year as Mission Conception, 1731. These two missions were similar in design, being very unpretentious, but yet picturesque in their present ruinous condition.

Church of Alamo, Mission San Antonio de Valero, built 1744.

At the Mission San Francisco, an interesting architectural feature is the entrance door to the church, which is unmistakeably a Moorish, shouldered, horse-shoe arch. It is the only one of this type found in any of the San Antonio missions.

The Mission of the Alamo or San Antonio de Valero, the church of which is standing to-day, was the last to be erected. It was originally situated on what is now

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THE ARCHITECT UNKNOWN.—Masters of Design Whose Praises are Unspoken or Unsung.—Public Ignorant as to Creators in the Most Important of All Art.—A Plea for a More Deserved Recognition.—Architects' Names Should be Perpetuated in School Text Books.

By F. W. FITZPATRICK

OUR SCHOOL CHILDREN are thoroughly familiar with the names of the heroes and near-heroes of our wars and conquests; youths and maidens, in college and university, can prattle interestingly about the heroes of Greek and Roman history; men further advanced in erudite paths can charm us with the depth of their knowledge, even anent the intellectual Brâhman, the chivalrous Rajput, the wild Bhil, or the naked Gond. The average man is surprisingly well read upon most subjects. He still remembers the heroes he was brought up on, even to the Spartan and the Gaul; is familiar with the name, too, of the great discoverers and historians; does not balk at those of famed musicians, astronomers, and *some* artists, and has the names of the celebrated authors of fiction right at the tip of his tongue.

But most wonderfully ignorant is he—our average man—of the names of those men who have contributed most to his and to his ancestors' comfort, education, and refinement—yes, to his civilization—the architects. Even among our erudite friends above mentioned, few—amazingly few in proportion to those versed in any other one art or science—dabble in architecture or know or care much about the men who are "charged with presiding over the structures that shelter man, his animals and the products of the soil; who build up those immense cities, their splendid monuments to our progress, those thousands of manufacturing plants, housing the prodigious industries of our times—men who have written and are writing history in ineffaceable characters of steel and stone."

Is it not surprising that so little is known of those men, and that so little importance is attached to their works in a silence to which we owe such marvellous creations; that is so useful, of absolute necessity to all our undertakings, and that absorbs so many millions in money and keeps such armies of men employed? Is it that familiarity with the results breeds an indifference to the causes? Then, too, is it not strange that the lesser arts outrank in popular esteem the mother art from which they sprang, and that whenever an architect also excelled in any other art he is invariably known and remembered for his works in that line rather than for the greater works he executed as an architect? Michel Angelo Buonarroti is far oftener mentioned as a sculptor or painter than as an architect, though his works in the latter capacity far outshone any of his efforts in the former. So with Bramante and Brunelleschi, and so with Ligorio, who, though a master in our art, is known to posterity merely as an antiquarian. Geber, the designer of the Giralda tower, little dreamed that he would be forgotten as an architect and remembered only as the inventor of a process that facilitated his calculations—for it was he who invented Algebra. So also is Lionardo de Vinci as often remembered, and far more gratefully, as the inventor of the lock-canal system, even now in use, than a great architect or painter.

Though it would be a most fascinating digression we are not now concerned, in this rambling plaint, with any speculation as to the authors of those ancient structures in the primeval cities of Phoenicia, China, Chaldea, and Egypt, where architecture, as an art, may be said to have had its birth; nor may we trace down, even briefly, the early history of that art, nor how, through the testimony it offers us, we can trace our ascent back through Britain, France, Italy and Greece to the Druids, and our relationship, through the latter, to the ancient peoples of Syria, Persia, Arabia, and that Sanskrit-speaking race that entered India across the upper Indus and settled in the Punjab, during the Kali Yug epoch, at least five thousand years ago. In this brief passing we can give merely a passing glance at the names of a few from among the hundreds of architects of past and present times whose works well merit the placing of their names upon the "tablets of the Immortals," among those of the heroes to whom we and future generations should burn incense.

We read much of Pericles, and how, under his wise management of public affairs, the Parthenon—Greece's most perfect example of architecture—was erected in 428 B.C. Ictinus, of Athens, was its architect, assisted by Callicrates. Phidias did the statuary and decorations only (although he is generally credited with the entire design) and won immortal fame. That pile is, even today a model for us, a standard of perfect proportions. How many readers who know *all* about Phidias, Pericles, and the Parthenon ever heard of Ictinus? The temple of Apollo Epicurius, on Mount Cotylus in Arcadia, is another beautiful example of that master's skill. Archias of Corinth, who flourished in the fifth century B.C., is also a name to conjure with, as is that of Cleomenes of Athens, who planned the city of Alexandria in Egypt, and Isotratus who added so much to that city. We ought fondly to remember the name of Calimachus, if for nothing else, at least on account of the pretty fable connecting his name with the origin of the Corinthian capital. Then should we also inscribe upon our tablets the names of Hermodorus of Salmis, who designed the temple of Jupiter Stator, in the Forum at Rome, and of Cyrus, who, just before the Christian era, was Cicero's friend and architect. Who has greater right to fame than Vitruvius Pollio of Fano, one of the greatest writers on our art, an authority still in use, the Blackstone of architecture? Then, in the same century—the first after Christ—Vespasian and his son Titus astonished Rome with the Coliseum, that vast amphitheatre (seating over 80,000 people and built in less than three years) that we know so well and have seen pictured so often even if we have not seen its ruins. I venture to assert that not one out of a hundred thousand people—no, nor one out of a million—ever heard the architect's name. The matter is apparently so very insignificant that some historians merely surmize that Rabirius was the man, while others vaguely hint at the name of Mustius.

Volumes have been devoted to abusing the fawning friends and advisers of the sensuous, albeit great, Nero. Their names and those of his freedmen and principal slaves are well-known, but—perhaps luckily for the profession—we never read the names of Celer nor of Severus, his architects and chums—men who, when he and his court grew sluggish in devising new deviltries, were called on and always produced some rare and exciting diversion. They "induced him to build" (how familiar that expression sounds) his famous "golden house," and led him into other wild extravagances that contributed much to his final downfall.

Of far different timber was the sage Antonius, better known as a senator of ancient Rome than as *merely* an architect, although he was prouder of his design for the Baths of Aesculapius, and they were remembered longer

far than any of his brilliant achievements in the political field.

Metrodorus of Persia, who built much in India and in Constantinople, deserve mention and remembrance as being the first Christian architect.

One of the first acts of Justinian upon ascending the throne of the East, in 527 A.D., was to invite Anthemius, the architect, to Constantinople. He was a Lydian, a man of genius. He designed the Church of St. Sophia for his emperor. While the temple of Minerva and the Pantheon were domed structures and antedated this church, yet it is the first example of an aerial cupola ever built, a noble pile, still standing and the wonder of every visitor. St. Mark's at Venice, built by Ausciles the Greek, in the ninth century, and hundreds of other buildings down to our own days, had their cupolas patterned after this ancient model.

Architects have ever been known as men of exemplary lives—there being rare exceptions, of course—but few, however they may have merited it, have ever been "sainted." The Catholic Church has conferred the honor of canonization upon but three of the profession, and that for no architectural reasons; all three—St. Germain, St. Avitus and St. Agricola—who lived in the sixth century, being bishops of great sees in France. There have been other bishops, fifty or more, and archibishops, abbots, priests, and monks galore in our ranks, or, rather men of both ecclesiastical and architectural attainments. It is not surprising, however, for, from the eighth century all through the middle or "dark" ages, all learning, letters, and arts were confined to the clergy of Europe; the laity being "confined" mostly in each other's castle-dungeons or to cutting each other's throats. York Cathedral was completed by three succeeding bishops, Egbert, Albert and Eaubald. Old St. Paul's was designed in 1033 by Mauritius, Bishop of London; and Rochester Castle and the old White Tower of London were designed by Bishop Gundulf of Rochester.

The thirteenth century saw, if not the birth, at least the springing into prominence of the semi-religious orders of Masonry, that exercised a most wonderful influence over the art of building; even the name "architect" being lost for a time. "Master-mason," "Supervisor," or "Surveyor" were the titles of those under whom great public works were erected, so that in the more powerful states of Europe the church practically controlled both building and architects for a period of nearly five hundred years.

Why should Romualdus of France be forgotten—he, who in the ninth century built the great cathedral of Rheims, the first example of Gothic architecture? Or Buschetto, who in 1016 gave us the Duomo of Pisa, the first example of the ecclesiastical style of art that made the Lombards famous in their time?

Dioti Salvi, who designed the Baptistery of Pisa, and the German Wilhelm, who built the leaning tower of that city, both merit some recognition, and surely so do Pietro Perez and Erwin von Steinbach, who gave us, respectively, the grand old cathedrals of Toledo and of Strassburg. Brunelleschi, born in 1377, acquired fame as a sculptor and as an engineer, but the noble monument he left to his skill as an architect—the dome of Santa Maria del Fiore—should alone suffice to cause his name to be inscribed among the elect.

Bramante Lazzari, who first designed St. Peter's at Rome; Rafaelle d'Urbino, the St. Gallos, and Perruzzi, who later carried on the work, surely merit some recognition, although Michel Angelo de Buonarroti changed much and nearly completed that great building. Then, too, Jacapo della Porta, Domenico Fontana, Ligorio, and Carlo Maderno contributed to the completion of St. Peter's, finishing it just one hundred years after Bramante's first design was made. Credit is due then, if for nothing else, for carrying out Michel Angelo's designs with so few changes.

What versatility, what splendid talents, were possessed by those old masters of the Roman school founded by Bramante, and how many there were of them in that sixteenth century, so redundant of great men and great events in the world's history. Michel Angelo—the "grand old man of Rome," the dignified and haughty, before whom even the Grand Duke Cosmo, the tyrant of Florence, stood uncovered, whom popes and rulers courted—stood prominently alone as an architect. Had he not won fame so, his "Moses" was sufficient to insure him honor as one of the greatest sculptors. Had fame still been lacking, his paintings in the Sistine Chapel would make him rank with Titian as a painter. Still, more, he was a poet whose works, had they not been overshadowed by his towering mastery of other arts, would have placed his name among the greatest of his time. Raphael, the dreamer, the beloved, the idol of Italy, enriched that century with his marvelous works, and Leonardo da Vinci was the miracle of that age of miracles. Think of the endowments of that one man. An architect, chemist, engineer, musician, painter, poet, philosopher, inventor, and discoverer, and *excelling* in each and every attainment. His writings show him to have anticipated by the force of his own intellect some of the greatest discoveries made since his time by Galileo, Keppler, and Castelli, the system of Copernicus, and the theories of recent geologists. Barozzi da Vignola, the designer of the Farnese Palace at Caprarola, was one of the last of that school, and that palace is to-day used more than any other by our students and disciples as a standard of Italian architecture.

Who has not read of the Tuileries, the Luxembourg, and the Louvre in Paris, and how few ever know or care that Philibert de Lorne, Jacques de Brosse, and Claude Perrault were their designers?

With us of the English race Inigo Jones and Sir Christopher Wren ought to be household names. The first designed Whitehall, Lincoln's Inn, and Covent Garden; the latter—besides being the architect of St. Paul's Cathedral and erecting the largest palace and most stupendous hospital in all England—found time to plan the rebuilding of the city of London after the great fire of 1666, and to design pretty nearly every church in the new city. Old England has contributed many other men "whose works live on among us though their names be forgotten." Sir William Chambers, the Pugins, Joseph Gwilt, Ferguson, George Edmund Street, and Sir Gilbert Scott, merit a better fate than the oblivion into which every architect knows he will ultimately be thrust.

One reads of a great battle in ancient or modern history, and the names of the generals who led the contending forces will immediately present themselves to the memory: a quotation from a well-known poem instinctively recalls the author; the recollection of a great speech brings to mind the orator; and the name of the artist is always associated with or appended to a painting. Yet, however great, however beautiful, a building may be, and however much we may admire and appreciate it, how few of us ever care a rap who *its* author is? We all know and admire the Grand Opera at Paris and have seen it pictured, at least, time and again, but who ever associates it with or thinks of Charles Garnier?

The United States, young as it is, is replete with noble monuments that we visit and cherish and are proud of, but whose authors are to us unknown—mere insignificant incidents. Even the little children in the public schools, living thousands of miles from Washington, know the Capitol building. It is held up to them as one of the great buildings of the world. Its history is familiar to them; how its great dome and its wings were added in later years, and so forth; but never heard of, or even a hint being given to a child by parent, teacher, or text-book that Hallet first designed it, or that

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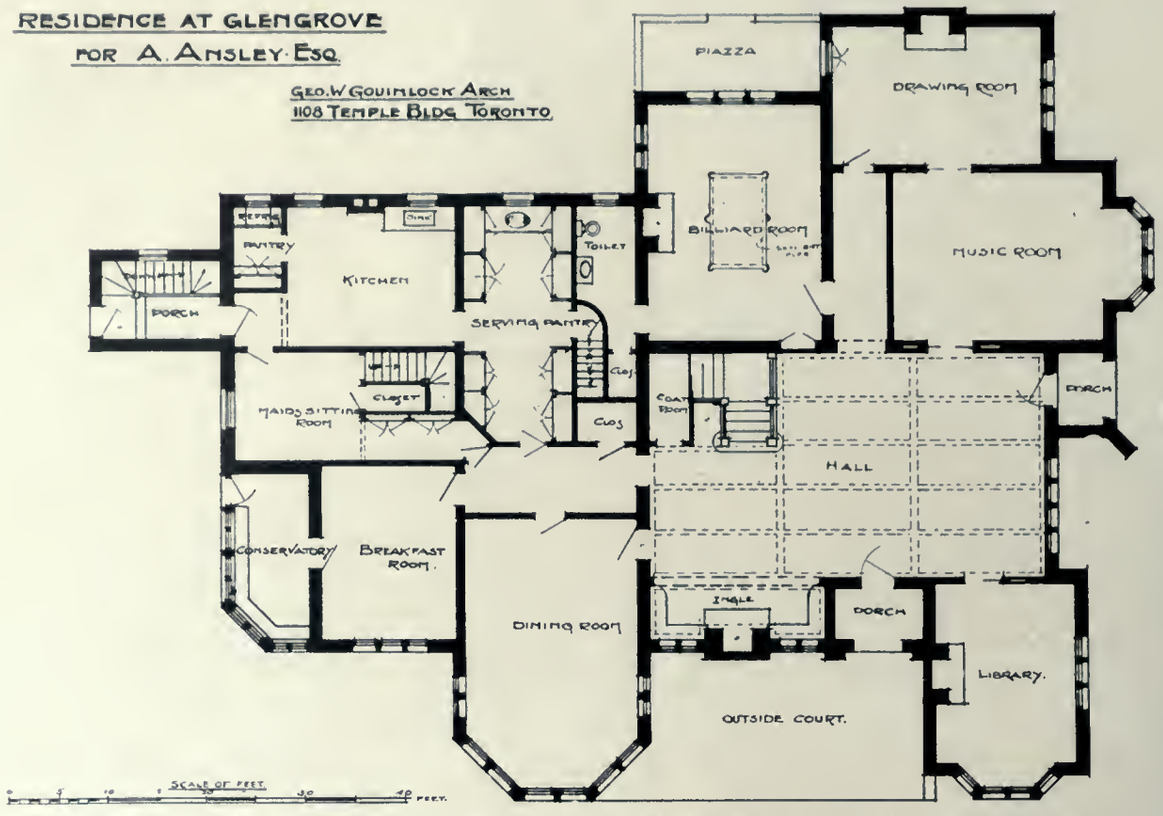
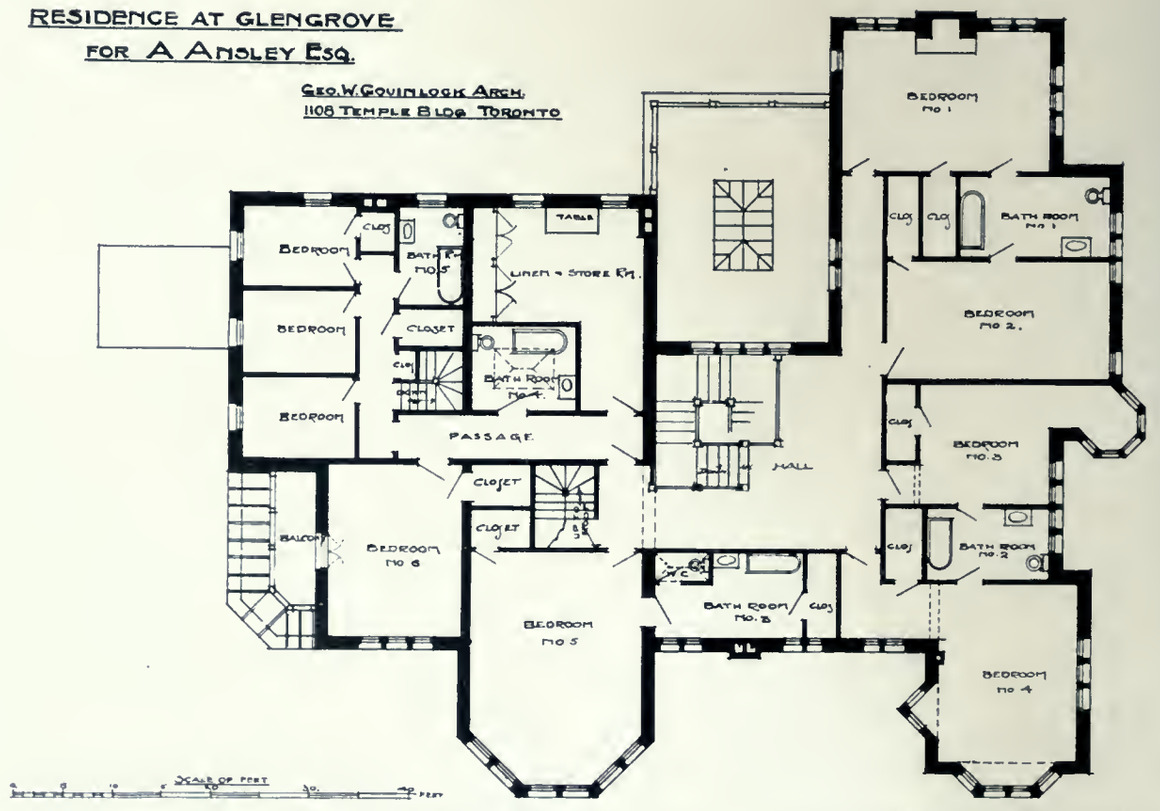


Ground floor plan showing the large reception hall, with beamed ceiling and large ingle-nook. Note the perfect division between the living and services portions of the house, and yet the direct and convenient accessibility from one part of the floor to the other.



First floor plan, showing the arrangement of the various rooms and built-in wardrobes. The location of the bathrooms is noteworthy, as it gives each of the main sleeping chambers the immediate advantage of this desirable feature.

Residence of Mr. A. Ansley at "Glengrove," an estate in Eglinton, a suburb of Toronto. Geo. W. Gouinlock, Architect.

RESIDENTIAL STRUCTURE IN "TUDOR" DESIGN.—Situated on an Estate of Forty Acres.—External Walls Built of Artificial Stones.—Plan Effects Perfect Division Between Living and Service Portions.—Location of Bathrooms a Feature.

IT MAY HAVE BEEN THE SITE which suggested the architectural treatment, but whether or not this was an influencing factor, nothing more appropriate than the "Tudor" could have been selected as the style. In order to more fully appreciate the fitness of the design, one must picture in the mind's eye a manor-house of this period, with its towers and battlements, situated on an eminence, and overlooking an estate of forty acres generously endowed with trees and verdure, and possessed of exceptionally splendid natural advantages. At the back the house stands but a short distance from the brow of a deep ravine, which passes it on the north; while from the south, through rows of pines, a macadamized driveway leads up from the public road to the entrance porch.

The house is the home of Mr. A. Ansley, at "Glenwood," an estate in Eglinton, a suburb of Toronto, on the north, and both in design and plan is an interesting adaptation in recent domestic work. The exterior of the house is characterized by plain lines and surfacing, the directness of the walls being broken only by the towers or projecting bays, which, together with the battlement and treatment of the windows and entrances, serves to give the exterior its decorative detail and individuality of character. These bays are placed on either side of the main entrance, the one to the left being octagonal in shape and rising a full story above the balance of the structure, while a third bay projects from the music room at the east of the house.

From the main entrance, one passes into a spacious hall, having a large fireplace with two windows and comfortable wall seats, in a recess at the left of the doorway. The woodwork is of Flemish oak, the ceiling beamed and the walls dadoed to the height of 7 ft. 6 in. Under the open staircase is a conveniently situated coat room, while at the side are four windows, together with a doorway to a small porch, overlooking the east lawn.

The arrangement of the various rooms, is noteworthy, the plan effecting a perfect division between the living and service portions of the house, without in any way interfering with the directness or convenience of access from one part of the floor to the other.

Across the hall from the entrance, is the music room, which in turn opens into the drawing room at the rear, having a large open fireplace. These rooms are trimmed with white wood finished in ivory enamel, and can be closed off from each other by means of sliding doors. Additional access to the drawing room is obtained through a passage, which also gives entrance to the billiard room, at the right of the music room. The billiard room is provided with an open hearth and a private lavatory, and at the rear overlooks the porch, which opens from the side of the drawing room. The library is at the front of the house, having a most desirable location in the bay at

right of porch, and being well apart from the other rooms.

To the left of the hall is the dining room, finished in mahogany, the half of which takes up the entire floor space in the main bay projection. Adjoining it and having a separate entrance from the passage, is the breakfast room with a door leading into a flower conservatory. Back of these rooms are the maids' sitting room, back staircase, kitchen and servery—the latter being admirably equipped with built-in features, and forming a convenient intermediary between the kitchen and dining room.

Upstairs the rooms are of a good size and well arranged, each being provided with a large individual clothes-closet and finished in ivory enamelled white wood. The servants rooms and a large linen and storage room are located immediately over the culinary department and are well apart from the other section of the floor. A noteworthy feature of the plan is the bathrooms, which are so located as to adjoin all main sleeping chambers.

The house was designed and erected under the supervision of Architect Geo. W. Gouinlock. The outside walls are of artificial stone, furnished by the Art Stone Company, Toronto; the block being of the hollow type and tooled faced.

A CURIOUS HOUSE.

A PLAIN, PLASTERED STONE HOUSE about 50 yards from the ancient city hall of Nuremberg, Germany, has nothing to distinguish it from the other old houses of the neighborhood except that it is built of lithographic stone, worth from 6 to 21 cents a pound. So lithographers who go to Nuremberg wander from the worn tourist trails to see the wonder. The house was built about 1680, nearly one hundred years before Alois Senefelder, the dicoverer of lithography, was born. Andreas Lichtenstein, who built it, took the stone easiest to get, and secured it for the trouble of carrying it away. Now the material in the building is worth about $4,000. The present Andreas Litchenstein, a descendant of the man who built the house, has said "Nein" about once a month for the last twenty years to speculators who want to buy his home and tear it down for the stone. It is his home and was that of his forefathers and he refuses to part with it. So lithographers, with thoughts of rising prices, look and sigh. Lithographic stone is found in commercial quantities only in Bavaria. The largest quarries are near Nuremberg.

THE MISSION OF SAN ANTONIO.—Continued from Page 47.

known as the Military Palaza, but was abandoned and reconstructed on its present site in 1744.

It is thought by some authorities that the Alamo was similar in design to that of Mission Conception, having a tower on either side. This is altogether likely as the plan of both churches are the same, and the thickness of the walls around the small rooms on either side of the entrance indicate that the walls were built to a greater height.

The entrance was a good example of late Renaissance, but is so badly chipped that little of its original beauty remains.

After the siege of the Alamo in 1836 by the Mexicans under Santa Anna, the building was left in a state of complete ruin. The debris not being cleared away till about thirteen years later, when U. S. troops took possession. It was impracticable to restore it completely, so the walls were simply built to an even height, with the exception of the front, which was carried a little higher. A wooden roof was added, and it was otherwise made inhabitable.

The missions of San Antonio are the most important groups in America, and form part of the chain which were built by the Franciscans on their Christianizing march extending through Northern Mexico, Southern California, and East from the Rio Grande through Texas to the Mississippi. Although of such historical importance, but little is known of them except through tradition and what is found in documents belonging to the church.

Time is rapidly doing its destructive work, and it will not be many years before the worthy examples of pioneer architecture in America will have entirely disappeared.

The author is indebted to "San Antonio de Bexar," by Wm. Corner, for a great deal of the historical data.

THE ARCHITECT UNKNOWN.—Continued from Page 49.

Hadfield, Hoban, Latrobe, Bulfinch, Walter and Clark added to it and completed it; or, that the Treasury Building—the Parthenon—the most chaste and beautiful design ever executed in the country, is the work of Robert Mills, Walter, Young and Rogers; that Thomas Jefferson designed Virginia's capitol at Richmond; or that R. M. Upjohn designed Connecticut's handsome capitol at Hartford; or that Fuller designed the Parliament Buildings at Ottawa.

The fame of Trinity Church at Boston is spread far and near, and who has not seen in his own town a replica—a copy in a minor chord—of the magnificent court-house at Pittsburg? Another ten years, and how many Bostonians even will remember that H. H. Richardson designed both?

There are men among us who have performed feats of daring as our steel and brick structures, the like of which have never even been attempted in other lands, may well be called. We admire those huge many-storied buildings of New York and Chicago, of Toronto and Montreal; they impress us by their size, beauty, and (in spite of their height) their grace; but it would be altogether uncalled for and out of place for anyone to inquire who designed them. And but a while ago the world was surprised with an aggregation of buildings of greater magnitude, of nobler design, and of greater impressiveness than had ever been grouped together on the globe. The World's Fair buildings at Chicago mark an epoch in the history of architecture, a great revival of classic art, yet, unlike other buildings, we have not even their ruins to contemplate. They can be to us but a beautiful dream. Surely we cannot afford to relegate to absolute oblivion the names of the men who by that work contributed so much to our own education and pleasure, and made us, as a people, better known and respected by the other peoples of the earth than we had ever been or could ever expect to be by any other agencies. I would not inscribe those names upon mere tablets of marble or of bronze, nor would I erect a great monument to their memory, but I *would* make them known and loved by a far surer way; I would inscribe them in our school text-books, that our children and their children's children might grow accustomed to the now unwonted sight of the names of our great architects enrolled among those of our leaders, our warriors, our jurists and our poets.

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 Toronto, Sept., 1909 No. 11

Current Topics

THE LONGEST BRIDGE IN THE WORLD crosses the Yellow Sea near Sangang, China. Its name is the Lion Bridge, and its length is 5¼ miles. The deck which is 70 feet above the water, is supported by 300 huge arches, and the structure is enclosed in a network of iron.

* * *

CANADIAN MANUFACTURERS, writes Trade Commission H. R. Poussette in a recent report from Durban, South Africa, who are interested in the supply of railway materials and equipment, should have their names placed on the lists of the Agents General for the Transvaal, Natal, Orange River Colony, Cape Colony, and also of the British South Africa Company.

* * *

ONE OF THE LARGEST STONES ever quarried was produced from a granite ledge in the State of Maine, and was intended to serve as one of the columns to support the dome of the Episcopal Cathedral of St. John the Divine in New York. For one reason or the other, however, it was never removed from the quarry. The stone was 64 feet in length, 8½ feet thick and 7 feet wide, its height being 310 tons.

* * *

MEMBERS OF THE R.I.A.C. should not overlook the fact that the second general assembly is to be held at Toronto, October 5, 6 and 7, when many subjects of importance to the profession will come up for discussion and consideration. The greater the attendance the better, and the more support and co-operation manifest, the greater the success of the Institute. It is only through a national organization of this kind that anything tending towards the uplifting of the profession in general, can be definitely accomplished.

OCTOBER THE FIRST is the date set for the laying of the corner stone on the new Parliament Buildings in Edmonton. The ceremony will be performed by His Excellency Earl Grey, who will then be returning from his trip to the Yukon.

* * *

COBALT'S BUILDING REPORT, for the week of August 22-28 leaves no doubt as to the manner of progress which is being made in reconstructing the burned district. During that period forty-five permits were issued for buildings aggregating in value over $100,000, a record never before equalled. The structures will be of a more substantial and permanent type than the ones which they are to replace, one permit calling for a three-story building of solid concrete construction.

* * *

THE BOARD OF EDUCATION, Edmonton, Alta., has appointed Mr. G. E. Turner, a local man, to the newly created office of Commissioner of Public School Buildings, at a salary of $2,000 a year. Mr. Turner severs his connection with the Provincial Architectural Department to accept this new position and he is exceptionally well equipped for the duties of the office. His work will consist of the planning and supervision of all new school buildings and additions, and the superintending of all necessary repair work to existing structures.

* * *

AMONG THE IMPORTANT STRUCTURES under way and in contemplation at Chicago (Ill.), are several depots which in magnitude and appointments will give that city one of the most complete series of terminal stations in the world. These include a $25,000,000 structure which the Pennsylvannia Railroad in conjunction with the Chicago Alton; the Chicago, Milwaukee and St. Paul, and Chicago Burlington and Quincy, will erect to replace the present Union Station. The new building will be erected according to the "City Beautiful" idea and will be located along side the $20,000,000 terminal which the Chicago and Northwestern Railroad is building at the present time. Another and more costly station is a $30,000,000 terminal at State and Twelfth Streets, which the directors of the Chicago and Western Indiana Railroad has now under consideration. This terminal will replace the Polk Street Station, which is used by the Wabash, the Erie, the Atchison, Topeka and Sante Fe, the Monon, the Grand Trunk and other railroads.

* * *

STONES OUGHT ALWAYS TO BE TESTED by tapping them over, either with a hard pebble or a light hammer, in order to ascertain if they have any vents or sandholes, whose presence is detected by a dull sound, which is unmistakable when it has once been heard in contrast with the metallic ring of a smart blow on sound stone. This applies to stones of almost all descriptions, though it may be noted that softly-compacted sandstones or oolitic limestones will sometimes emit a dull ring. This does not indicate local faults, but a general weak structure, and should always be taken as an indication that the stone in question should be viewed with suspicion. If it be placed in water, it will in all probability be found to absorb a large amount, owing to its loose and spongy character; it is probably liable to disintegration, and to the penetration of moisture. There are other easily-applied tests for stones, such as immersion of small, freshly-cut chippings in a glass of water, in which they should be left for half an hour, and then vigorously stirred, when, if they are loosely compacted or contain any appreciable amount of clayey substance, the water will turn muddy. It is not a test, however, which is often employed, and practical men are more inclined to rely upon a thorough inspection by tapping than anything else.

WATER PIPES OF TERRA COTTA were used in Crete forty centuries ago. Those supplying drinking water consisted of a series of subconial tubes socketed into each other with collars and "stop ridges," so constructed as to give the water a shooting motion, thus preventing accumulation of sediment.

* * *

ONE OF THE MOST SACRED SHRINES in India, which has been for centuries the goal of pilgrimages from all parts of that land, is the great temple of Rameswara, sacred to Rama, situated on an island close to the mainland, in the channel between South India and Ceylon. Its most striking features, says the SLATE TRADE GAZETTE of Hull, Eng., is the wonderful corridors which adorn it. The south corridor is 700 ft. in length, and it is the longest in the world, except that in the Vatican. The most attractive of all the Chalukyan (a dynasty ruling from about 400 A.D.) shrines is the great temple of Siva at Halebid, about twenty miles from Belun, delightfully situated on a terrace near the shores of a lake. It was left unfinished in the year 1270 A.D., the towers never having been added. It is one of the most remarkable monuments in India. One of the pavilions in front contains a huge image of the Bull of Siva. In the interior are some remarkable black stone pillars, which look as if they had been turned in a lathe. This temple is unmatched in the variety of its details and the exuberance of fancy shown in its ornamentation. There is, perhaps, no other temple in the world on the outside carving of which such a marvellous amount of labor has been spent. It gives some idea of the enormous amount of sculpture with which this temple is covered when it is mentioned that the lowest band of the frieze alone contains a procession of about 2,000 elephants, no two of which resembles each other.

* * *

ONE OF THE FEATURES of the building situation so far this year, has been the absence of strife between employer and employee. True, Winnipeg is experiencing some difficulty with the carpenters but the indications are that the near future will see everything amicably settled. On the whole, everybody is apparently getting his share of the world's goods, and is satisfied to leave well enough alone. That a condition of this kind obtain, is greatly to be desired, as it means greater advancement and prosperity for all concerned. In commenting upon the situation in general the LABOR GAZETTE for August says: Reports with regard to building continued to indicate the projection of new work in all lines of construction upon a larger scale than at the corresponding period of last year. Important gains are shown in most of the large cities and towns in the estimated cost of improvements for which permits have been taken out. The trades have been exceptionally free from labor troubles, and at the close of the month indications were for continued activity until the end of the season. The following table shows the extent of building during the first six months of the present year, as compared with the corresponding period of 1908, in nine of the principal cities of the Dominion:

City.	Six months.	Six months.
Toronto	$5,013,245	$8,829,375
Montreal	1,500,000	4,283,910
Winnipeg	2,238,250	5,462,450
Vancouver	3,354,050	3,410,195
Ottawa	875,225	2,607,665
Halifax	362,770	374,900
Regina	156,183	362,645
Calgary	409,090	949,110
Edmonton	1,792,810	1,092,220

SPANNING 274 FEET and over 300 feet high, a natural bridge, said to be the largest known, has been discovered by members of the Utah Archæological Society, which has returned from an expedition along the Colorado River in Northern Arizona and Southern Utah. The bridge is located four miles north of the Arizona line in the State of Utah, six miles east of the Colorado River. On its top were found imbedded several fossils of remarkable size, indicating the presence in earlier times of giant animal life.

* * *

WHEN IS A SITE NOT A SITE is the question recently brought before an English justice, and the decision is one that must be of interest to a great many persons and communities, says the ARCHITECTURAL RECORD. The late proprietor of the Birmingham Daily Post, John Feeney, bequeathed to the corporation of his city £50,000 for the erection of a new picture gallery "on a site provided by the Corporation." Splendid municipal buildings were projected on Edmund Street, and the question arose whether, if the basement, ground floor and part of the first floor were used for offices, the balance of the structure—or so much of it as might be needed—might not be used for the gallery under the terms of this bequest. The court decided that Mr. Feeney's purpose was to restrict his legacy to the cost of construction as distinguished from site, and therefore that the word site should be interpreted in this connection as applying to a superficial area, which may include no land or ground as properly understood. With reference to the future at least such an interpretation may well hold. If accepted, any testator who so desires can easily insert henceforth the words "separate structure" to indicate his wish for a distinct building; and if he is not particular that the structure should be used for the purpose designated and nothing else, such interpretation may facilitate the execution of his purpose.

* * *

AN IDEA OF THE MAGNITUDE of the gigantic chimney recently completed at Great Falls, Montana, may be gained from the fact that if the stack could be laid on the ground it would form a tunnel through which three railroad tracks of standard gauge could be laid, side by side. The heaviest types of Mogul engines, each one coupled to 11 freight cars could stand on the tracks without projecting from the tunnel ends, while at the base end there would be room for a platform on each side of the tracks, seven feet in width. The bricks alone used in its construction would make a six-foot sidewalk, over two and a half miles in length. With them, and the concrete used for the foundation, a dozen eight-roomed houses could be built; and the lumber used for the erecting scaffold would be sufficient to finish them complete. Inside the top of that chimney, as it now stands, a circular table could be set up, with seating capacity for one hundred and twenty-five persons, and with ample room in the centre for an adequate force of waiters. There are but four buildings on earth which exceed this great shaft in height—the Eiffel Tower, 1,000 feet high; the Metropolitan Life Insurance Company's building in New York, 657 feet; the Singer Company's building, also in New York, 612 feet, and the Washington Monument, 555 feet high. The enormous capacity of the chimney is perhaps best understood from the fact that the 2,000,000 cubic feet of gas it discharges from the smelters every minute, if of the illuminating variety, would be more than sufficient to light the entire city of Greater New York, without calling upon the aid of electricity. The height of the stack, which was previously described in these columns is 506 feet. The nearest approach in size to it being a 454 foot chimney at Glasgow, Scotland.

Town residence recently erected at the corner of Cote des Neige Road and Pine Avenue, Montreal. Saxe and Archibald, Architects.

A TOWN-HOUSE OF UNIQUE PLAN.—Built on an Irregular and Sloping Site.—Interior Characterized by Semi-Circular and Oval-Shaped Rooms.---General Arrangement Compact and Odd Corners Advantageously Utilized.

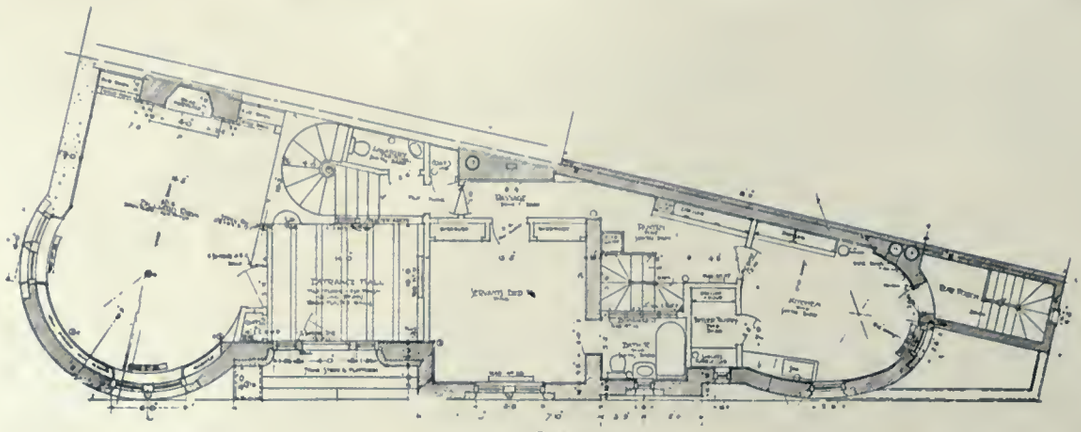
RATHER AN UNUSUAL and attractive residence of the town-house type, has recently been completed in Montreal, at the corner of Cote des Neiges road and Pine avenue. The main interest in the house centres in the fact that it shows an admirable solution of a problem infrequently met with, that of fitting an irregular and sloping site with a residential building having an architectural feeling in both its exterior and interior lines. The ground on which the house is situated has a fall of sixteen feet in its length, tapering at the lower extreme, and is of such a limited area that the entire lot had to be built upon.

The exterior, which exhibits in its treatment a leaning towards the Tudor, is carried out in brick with wide mortar joints, the door and window trimmings being of Roman stone. At the top the walls are finished with a parapet of simple design, while at the corner where the streets intersect they meet in a slight semi-circular projection, a feature which admits of an interior which is unique and interesting in plan.

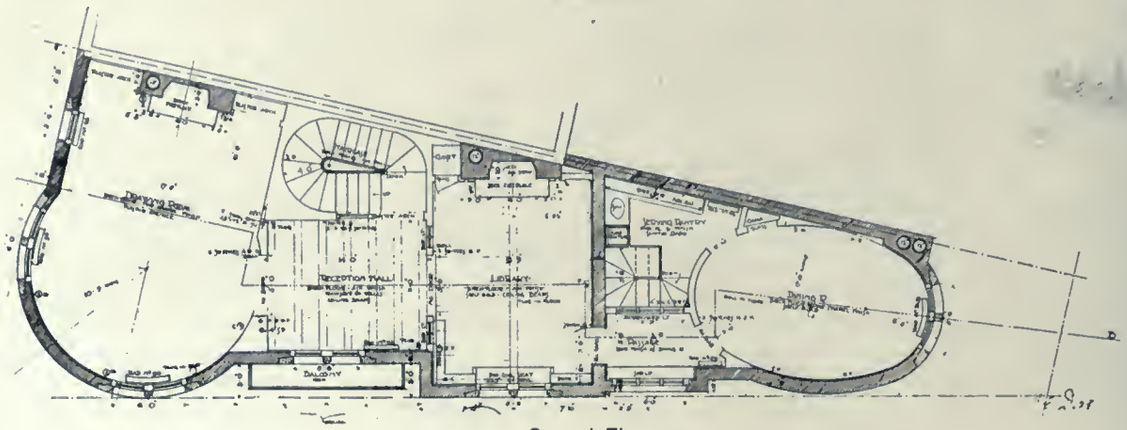
From the entrance, which is centrally located on the basement floor, one passes into a large hall, finished in ash and with beamed ceiling and rough plastered walls. The floor is of tile, and at the back is an open staircase which rises at this point up to the top floor. To the left is the billiard room, a semi-circular, semi-square shaped room of spacious dimensions, having a large brick fireplace and lighted, owing to its location, from high placed windows.

The plan of this floor, as with the other floors, effects a number of economies in the utilization of odd corners which in a less carefully considered house of this type would result in an excess of waste space. A lavatory and coat room, both having tiled floors, find a convenient place in the area back of the staircase. To the right of this is a passage having a servant's bedroom opening off at the front, and leading to a semi-oval shaped kitchen at the end. Between these two rooms the space is taken up by the butler's pantry, dumb waiter and staircase, all compactly arranged—the staircase and dumb waiter connecting with the dining room above and also with the sub-basement, containing servants' sitting room, laundry, furnace room and storage compartments.

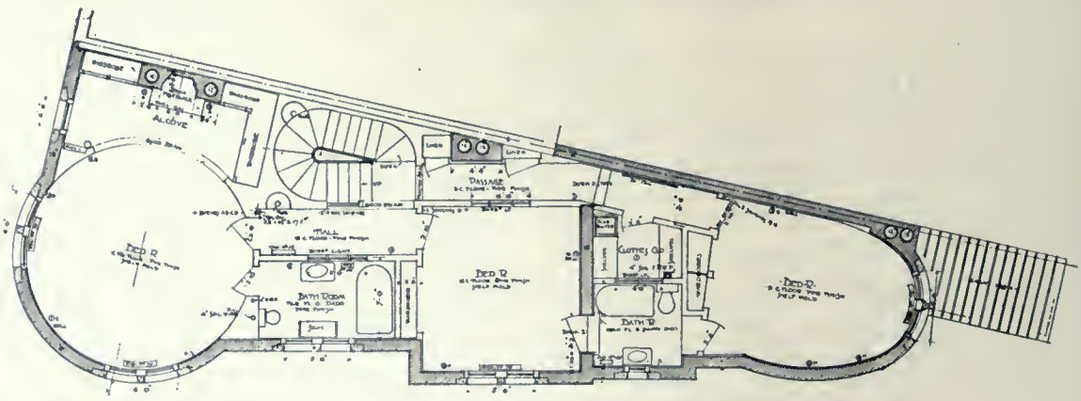
On the ground floor the reception hall is similar in size and finish to the entrance hall over which it is placed, save that the walls are carried up with a panelled wainscot. The drawing room and the library, both having large open fireplaces, occupy relative positions to the billiard hall and servants' bedroom on the floor below; the former being identical in contour, and the latter taking up the entire space from wall to wall. A passage from the library, at the front, gives access to the dining room, which is oval in plan and has an adjoining service pantry in space back of passage. Both the drawing room and din-



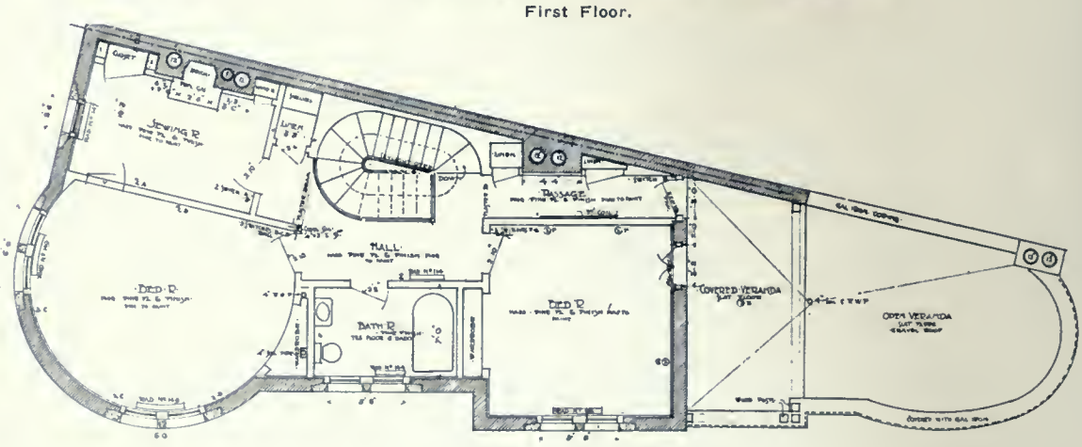
Basement.



Ground Floor.



First Floor.



Attic Floor.

Floor plans of residence, cor. Cote Des Neige Road and Pine Ave., Montreal, showing the arrangement of the rooms and the solution of a rather unusual problem. Saxe and Archibald, Architects.

ing room are finished in white enamelled pine, while the woodwork in the library, which has a built-in window seat with bookcase on either side, is carried out in ash.

The first floor contains three bedrooms with adjoining bathroom facilities, and is amply provided with wardrobe and linen accommodations. The plan in arrangement and in the design of the end rooms partakes of the character of the other floors, as does also that of the second or attic floor, which has two bedrooms, sewing room, and bathroom. A splendid feature of the attic floor is a covered roof verandah opening off the floor at the narrow end of the house, and affording a view of the entire city.

The building was designed by and erected under the supervision of Architects Saxe & Archibald, of Montreal.

FIREPROOF FACTORY BUILDINGS FOR THE COUNTRY.

NOTWITHSTANDING THE PROGRESS which is being made at the present day in fire resisting construction, the fireproof factory building in localities without fire fighting facilities is still something of a rarity. Mill construction has the preference, and wooden factories are often erected to house valuable equipment and manufactured products and the materials from which they are made. In populous centres the fireproof industrial building is gaining in favor. The risk of conflagration is greater than in a small town, but, on the other hand, there is usually adequate protection, both in the way of apparatus and water supply. The insurance rate is less in the city, from which it may be deduced that the risk is greater in the country and the need of fireproof buildings correspondingly important. Probably there is insufficient general knowledge of the rapid strides that have been made in the development of the several elements entering into fireproof construction by which its cost has been lessened. As compared with the slow burning type, the cost to-day is only about 10 per cent. more for a building in which the hazard of fire may be considered negligible under ordinary circumstances, especially in neighborhoods where there is no risk from outside. In exceptional cases, where the contents are of an especially inflammable nature, the argument may not hold, but such instances include few machine shops or factories in the metal industries. While the initial investment is somewhat greater, against this is the offset of a decreased insurance rate, which materially reduces the additional annual interest on the investment. In a recent case a canning factory located on Cape Cod, outside of a zone of fire protection, was built on fireproof principles and equipped with a complete sprinkler system, and the result was a decrease in the insurance rate from $2.25 to 75 cents. In mill construction where oil is freely used in manufacturing, as is the case in many metal industries, the risk of serious fire increases with the passage of time, the saturated woodwork becoming more and more inflammable with the drying influence of age.—CARPENTRY & BUILDING.

Front elevation, town residence, corner of Cote des Neige Road and Pine Avenue, Montreal. Saxe and Archibald, Architects.

SOUTH AMERICAN COUNTRIES are fast recognizing the need and importance of better sanitation, and several of the governments are investing large sums in providing modern water supply, drainage and sewerage systems. In order that nothing may interfere with present or contemplated improvements of this nature, the Venezuelian Government has issued a decree placing such articles as sanitary water-closets, urinals, inodourous sewer traps and kindred devices on the free-list. Canadian dealers in these lines, who are looking for outside business may do well to investigate this market.

FIELD-MADE CONCRETE.*—Essentials to be Considered in the Selection, Preparation and Application of the Materials Used.—Good Workmanship and Rigid Superintendence of Vital Importance.—Failures and Unsatisfactory Work Unexcusable.

By WALTER J. FRANCIS, C.E.

THE OLD COLLEGE SONG in referring to certain high dignitaries says "There are some of them good, and some of them not." This saying certainly applies to concrete structures. And just here I would not wish to be understood as saying that no other type of construction is unsatisfactory. We must recognize that every system of construction has its place. There are places where no one would dream of using anything but wood. Other conditions might demand stone or brick, while still others could best be carried out in concrete. A judicious builder will find that at many times combinations of the various systems will produce the best and most economical results. As a financially disinterested engineer one must seek to know the virtues of every type of construction and to apply each one in the place where it is best suited. Concrete construction and its latest development, reinforced concrete, has in a very few years proven its claim to a place amongst the highest class of permanent and fireproof construction. It has passed through all the stages of development inevitable in every system destined to survive and in its short life has passed through those changes with amazing rapidity. A few decades ago concrete was considered only good enough to be put out of sight in foundations, or into utilitarian structures usually cheap and nasty. Rapid development caused its most ardent friends to try to use it for everything, an effort which resulted in finding what it is not adapted for and in placing it where it stands to-day and where it apparently quite properly belongs. But we are learning, and I take it that while one of the objects of this Association is to advance the use of cement throughout Canada it is no less its duty to see that it is not improperly used. To the mind of the writer two important advances are necessary before concrete can be successfully used for purposes for which it has been tried with varying success within the past few years in the architectural field. One of these is the development of lines of architectural design to suit the material, and the other is the production of a cement which will give a pleasing color effect.

Concrete as we understand the term to-day refers to a combination of Portland cement, sand, stone and water. As a system of construction it is comparatively new and many of our engineers who have not yet passed the prime of life recall the time when Portland cement was first introduced. Its introduction meant the passing of the older hydraulic limes and natural cements and the entrance of a new and scientific method of construction. The structures which for centuries had been built of masonry were to be replaced by a material differing in every point for the constructor. The old standard methods of building meant the adding of element to element already prepared off the site of the building, each bearing in itself some definite relation to the building, whether wood, brick or stone. Concrete meant the application of the atom, so to speak, the employment of the particle of cement, the grain of sand and the bit of broken stone, all of which were delivered to the building in the crude form without having passed the hand of any artificer. It is perhaps to be wondered at that more failures and unsatisfactory examples of the new construction have not occurred, for even to-day we hear of structures of wood, brick and stone failing the requirements of the builder notwithstanding the fact that these types are as old as the hills themselves. Even steel with its inherent and tremendous strength handled by the bright minds of the engineering world does not always accomplish the aim of the designer. The great weakness of human nature is to remember the evil and forget the good. One chafes at missing a street car, not recalling that he has successfully boarded the preceding twenty cars he desired. Because Quebec bridge fell or a load of hay went through a fifty-foot steel span over a township creek the whole system of steel bridges is not to be condemned. If someone has erred in prematurely removing the forms in a concrete building surely that is not the fault of the concrete building. In case a brick wall capable of sustaining great loads when properly braced is loaded before the bracing is placed and as a consequence falls it cannot be said that brick construction is to be condemned. It is to be deplored that bad news travels faster than good. Let a trifling accident happen in a building and immediately the news is flashed far and wide but no reference is made to the thousands of structures that are being safely erected throughout the land.

Wherever concrete has failed the writer believes that in many cases the failures have been the result of overzealousness on the part of its friends. Concrete construction just like every other construction requires a reasonable amount of care. The cry of cheap labor for concrete has been overdone. It is true that cheap labor can be used and should be used in the making of concrete, but it must be recognized that even the employment of cheap labor has a limit. Wood is probably more easy of manipulation than any other construction material but no one would think of erecting even the simplest wooden structure without a certain number of carpenters. Bricklayers require considerable training before they can lay bricks passably well. Stonemasons and steelworkers require long training in their trades. Concrete construction does not need the same proportion of skilled labor as some of the other systems but for satisfactory work it certainly requires the employment of men who understand something about what they are doing.

Of the highest types of permanent construction at the present time both for engineering and architectural purposes concrete is one. For many purposes its economy in cost renders it superior to any other form of construction. Its almost universal application in the construction of culvert and bridge abutments, in foundations of all kinds, in sewers and conduits, and for architectural purposes is ample proof of its general excellence and durability as judged by the best builders of the day. Good honest concrete need make no apology for its appearance wherever it is properly used. That there are some unsatisfactory examples cannot be denied. Even, although the art is a new one, it is the firm conviction of the writer that in the majority of cases these unsatisfactory examples are absolutely inexcusable. It is in the interest of the art and in the interest of every member of this Association that these matters should be frankly and carefully discussed.

The question may be asked, in what sense can concrete structure be unsatisfactory? The answer is from design, quality, surface finish, or color, or a combination of all these points.

ARCHITECTURAL FEATURES AN ADVANTAGE.

In the eye of the architect and artist the engineer's design is probably classed amongst the crudest of all things here below, and while it is not conceded that the productions of the architect are always "things of beauty and a joy forever," still it cannot be denied that many

* Paper read at Toronto before first annual convention of the Canadian Cement and Concrete Association.

of our engineering structures are an offence to the eye. The most utilitarian bridge abutment can by the introduction of a base course, a coping and a pilaster or two, be made a structure which is pleasing in its effect and which in the end may be more economical to build. It is a well known fact that very large planes show up the little inaccuracies of workmanship very glaringly, and the effort to get a perfect plane is very costly. The introduction of the pilaster or a break of some sort obviates this difficulty entirely, gives the builder a reasonable chance to make satisfactory lines and saves him expense in endeavoring to get unreasonable accuracy.

Another element seems to be creeping into design in the present day which is not calculated to be to the advantage of the structure. It is the effort of designers to save material by the introduction of counterforts and angles of all kinds in order to save concrete. To obtain the best results the builder should be given a fair chance with his form work and in the end it will be found more economical not to use unduly thin walls. Labor costs must be considered along with material costs.

But of greatest interest to the engineer is the element of quality of the concrete. This matter of quality may effect the strength or the water-tightness, or both, and in many instances either of these defects may be serious. The defect in quality may be the result of inferior materials, improper formulae, imperfect manipulation or all combined.

First, let us consider the mixture. When a doctor writes a prescription there is always one unwritten element in that prescription for which he depends upon the dispenser. That element is common sense, sound judgment, experience, or call it what you will. Without it a satisfactory medicine will not be produced. The same reasoning applies no less to the formulae for concrete. The best materials that were ever made can be put together in such a way as to form an absolutely useless building material, while with nature judgment a competent builder can with materials of a lower quality make a passably good concrete.

Many specifications do not define clearly what the concrete is to be composed of. They do not say whether the cement is to be measured by the packed barrel or by the loose measure. They do not say possibly what shall constitute "sand," although at the same time they may give a fairly clear definition of what the stone is to be like.

STANDARD COMMERCIAL UNIT NEEDED.

One of the great difficulties with which the careful builder has to contend at the present time is the commercial unit of cement. A "barrel" of cement may mean almost anything. The barrels themselves vary in size, and if with this variation you combine the fact that cement in being packed may be made to shrink over 25 per cent., it will be readily appreciated that some definite understanding should be arrived at. The writer sincerely hopes that at no distant day the commercial unit of cement will be the pound or the even hundredweight. There seems to be no good reason why bags containing one hundred pounds of cement should not be the commercial package. For all practical purposes one hundred pounds of cement can be considered as one cubic foot, and if such a package were in common use a very easy comparison could be made between various mixtures at any time. As it is, it is almost impossible to compare the mixtures of any two jobs or to tell just how much cement has been used. As we find things to-day for practical purposes a bag is a bag, or a barrel is a barrel, no matter what the actual size or weight may be. This is further complicated by the fact that some measuring devices are in use which measures the cement loose. The adoption of the hundred pound bag would not increase the labor of handling and would not make the package too heavy to handle. The farmer and the miller handle regularly 120-pound bags of wheat. The adoption of the hundred weight unit would also facilitate accounting.

The cement on every important job should be carefully and regularly tested. Do not use it without tests. Of all the standard tests the writer considers the boiling or constancy of volume test to be by far the most important to the field man. This test is designed more particularly to develop those qualities which tend to destroy the strength and durability of the cement. Failure is revealed by cracking, checking, swelling, or disintegration, or all of the phenomena. The constancy volume test should be made every time. Practically all the standard brands will always pass the tensile and fineness tests, but the writer has known many of them to fail at times in the boiling test. Failure to pass the boiling test may mean that it is only necessary, if nothing better can be done, to pile the cement with plenty of air space so that the free lime present may have an opportunity to air slake. This may take six weeks, but even at that it may be the only remedy. The writer has been forced at times to deal with thousands of barrels of cement in this way, cement which had passed all the other tests quite satisfactorily. Where possible, of course, such cement should be removed from the work and replaced by satisfactory material. The writer does not for a moment wish to belittle the standard tests: he only wishes to point out the advantage of one of the speediest and easiest of the tests on cement, and at the same time for construction purposes one of the most important. The boiling test is described in the latest Canadian Government Specification as follows: To test the soundness of cement, at least two pats of neat cement mixed for five minutes with 20 per cent. water by weight, shall be made on glass, each pat about three inches in diameter and one half inch thick at the centre, tapering thence to a thin edge. It should be well trowelled to work out air bubbles and surplus moisture. The pats are to be kept under a wet cloth until finally set, when one is to be placed in fresh water for 28 days. The second pat will be placed on the rack in a Faija hot bath tank over the vapor of water heated to 170 degrees Fahrenheit, and allowed to remain there from three to four hours, after which it will be placed in hot water at a temperature of 170 degrees Fahrenheit, there it will remain for the balance of the 24 hours and then allowed to cool. In some cases it will be found desirable to raise the temperature of the water to the boiling point. Neither samples should show distortion or cracks.

It is not necessary here to refer to such matters as the ordinary care required in storing the cement and keeping it properly dry.

GRADING OF MATERIALS.

The next question in the quality of materials is that of the sand. The old idea of having sand uniform in grain and absolutely sharp and clean is now being somewhat departed from. The sand must be practically clean and contain say not more than three or four per cent. of loam. That it must be sharp is not necessary. The grading of the size of the particles, however, is of the greatest importance, and the ideal concrete may be said to be made of materials graded all the way from the particles of cement to the coarsest aggregate. In the writer's judgment it is quite immaterial whether crushed stone or gravel is used, but it is material to have a dense mass, and the best and most economical way of obtaining this density is to have graded material. Before starting any work of importance determine with great care by any of the standard methods the proportion of voids in the sand and the proportion of voids in the gravel or broken stone, and be sure that the combination of the materials selected is such that the mass will be without voids. The ideal concrete is obtained when the cement fills all the voids in the sand and the resultant mortar fills all the voids in the aggregate. Keep in mind that

the strongest concrete is obtained with the greatest proportion of coarse material that can be used. A surplus of sand is detrimental to making a strong concrete. After the proportions are determined from the tests make a number of samples of concrete to the adopted formula so as to check up the result. This is of very great importance both for economical and constructional reasons. Break the samples and examine the fracture closely. In his practice the writer likes to consider as "sand" all the material up to about one-eighth of an inch in size, and he has succeeded in some instances in making a very strong and dense concrete with a formula which might be stated as one of cement, two and a half of sand and eight of gravel. It is very rarely, however, that this can be done as very few pits furnish such an even grading. In using pit run the voids must be determined regularly.

The references that have been made to the grading of the gravel as an aggregate also apply to the grading of broken stone. One uniform size of stone is not advisable or desirable for the resultant concrete will not be so economical as with graded sizes.

Let me repeat—make some more samples of concrete and examine the fracture.

DRY AND WET MIXTURES.

In considering the quality of concrete the mixing is of vital importance. In the best works to-day the comparatively wet mixture is used and the day of dry concrete is past. With dry mixtures perfect water-tightness is very difficult to obtain and imperfect mixing is more likely to result than when more water is used. On general principles batch mixers are to be preferred. It is a well known fact that a lean mix may be increased in strength very materially by continued manipulation in the machine, and it is also well known that a rich mix insufficiently turned may result in a poor concrete. Wet concrete also insures density. It is practically impossible to make the workman ram a dry concrete and obtain a density equal to that resulting from a wet mixture. A wet mixture also facilitates the placing of "plums" or boulders in the mass. A wet concrete can safely be filled with clean boulders until no more can be forced into it, and this is the only way in which boulders can be perfectly embedded. So long as the stones can be forced into the wet mass the writer can see no object whatever in naming fixed distances to be required between the boulders or between the boulders and the face of the walls. Work the concrete after it is placed in the moulds. If you will use a dry mix, pound it. Then pound it some more. And when the men object to do more pounding make them ram it. If you have a wet mix work it, agitate it, get all the air and water bubbles out.

To cleanliness high virtues have been ascribed. A builder cannot make a good job in concrete without cleanliness. Chips, dirt, and disintegrated concrete dust will not make concrete although we regret to find that at many times it has helped to swell the yardage. The greatest cause of the difficulty in bonding new concrete to old is dirt. Keep a hose handy with plenty of water pressure and do not hesitate to use it freely for cleaning purposes.

And here a word about temperature and weather conditions. Mass concrete can be safely carried on at zero weather. Care is required as well as additional money. The concrete must be kept from freezing until after it has acquired its initial set and considerable hardness. It should not thaw out and freeze at intervals during the process of hardening. A blazing sun on a hot summer day may be quite as detrimental to concrete as the frost of winter. It is very desirable and at times quite necessary to have a supply of water on hand to prevent drying out and to assist the concrete to mature.

Wet concrete also enables the builder to produce a face better than that which can be obtained from any other method, a face better in durability as well as in appearance. The custom of using a faced mortar seems to be a needless expense and even a deteriment; and expense since it does not obtain any better result nor even as good a result as that got by the wet mass, and since it adds difficulties in the way of having to use a mortar instead of an aggregate, and since it also adds cost in placing and keeping the mixtures separate; and a detriment since we are placing together two bodies having a different co-efficient of expansion, two masses having essentially different structures. Pure mortar under variations of temperature does not act in the same way as mass concrete and it is not surprising to find that when bonded together they will not act in unison under ordinary climatic conditions. In a concrete wall built with face mortar the mortar is exposed to all the variations of temperature. It acts as a protector to the coarser mass behind it, which therefore, does not receive the same temperature shocks. It is not surprising then to find that cracks develop in the mortar. The writer is aware of many cases where face mortar, so good as to be crystalline in structure, has developed hair cracks at about eight foot squares all over its surface, the cracks extending through the mortar face to the body of the concrete behind.

FINISH AND COLOR.

The most satisfactory concrete finish that can be obtained for exposed surfaces, is when the formwork has been so well put up and the concrete so well placed that no patching is required after the forms are removed. The slight variations in color and texture of such a perfect surface give it a character which cannot be obtained in any other way. The use of the plasterer's trowel and the various washes should be discouraged on all heavy engineering structures. These means give a hasty, unworkmanlike and characterless tone to the structure at the start and also give a surface which does not improve with age. The natural finish on the other hand rather improves with time.

An attempt has been made to improve the surface of concrete structures by imitating stonework. On general principles imitations should certainly be avoided. Concrete has enough virtues to require no apologies for its appearance. In the oldest structures of stone the idea was to hide the weakest parts, the joints. Appreciating the difficulty of this, designers later adopted them as a feature. Attempts to make concrete look like stone by making marks to imitate joints is inexcusable. Good honest concrete need not stand as an imitation.

Concrete surfaces are also unsatisfactory at times on account of color. In some instances this is immaterial, but in others it should be considered. The color of the surface may be the result of the cement itself, of the sand used, or even the staining by the wooden forms. It is usually not difficult to get a cement that is a good color. Ordinary pine planking for the formwork will not stain unduly, and a little care in selection from the pit may obviate the difficulty arising from the sand. The question of color, however, is one which more particularly concerns architectural constructions.

While concrete may be considered a modern method of construction the combination of the use of steel and concrete is very recent. It is less than half a century since the first genuine reinforced concrete was made and for a considerable period its use was confined to the manufacture of such unpretentious articles as flower pots and tubs. The first instance of the use of the combined material which we know in this country as reinforced concrete was about thirty years ago when in New York State, Mr. Ward erected a small house using rods in the lower sides of his beams much as we use them to-day. The French and the Germans at about the same time

began to develop the new system and its growth has been so rapid that it has probably outstripped all the new arts of modern times. From the building of a rowboat in 1856 to that of a sixteen-storey sky scraper in 1903 is a tremendous stride, and to-day the system of reinforced concrete is worthy to be considered with the highest types of permanent and fireproof architectural construction. The reinforced concrete engineer is invading even the domain of his brother who works with steel, and we find railway bridges and viaducts being constructed in various places. For railway bridge superstructure time alone can prove the suitability of reinforced concrete. That cracks may be developed by the variations from trains or locomotives there may be good reason to think, in which case the steel would be exposed to those elements which will seriously deteriorate it. The suitability of reinforced concrete for architectural purposes, however, is past the experimental stage. Certain well defined designs are now recognized as good practice. Formulae have been developed which enable the engineer to design in reinforced concrete as rationally as he can do so in structural steel.

Well designed reinforced concrete buildings possess certain virtues in a very marked degree. Some of these qualities assert themselves quite forcibly,—fire resistance, absence of vibration, increasing strength with age, rigidity, sound proofness and economy are very marked. In many cases reinforced concrete demands consideration side by side with structural steel skeletons, but there are cases where reinforced concrete cannot for practical purposes be considered, as for instance the construction of a building during the winter season.

It is not our purpose here to enter into a discussion of design with which the standard authors deal so fully, but rather to refer briefly to some points which must be carefully watched in the field after the outside man has received his designs from the office.

In the present state of the art these designs will probably not call for any concrete to be exposed in the exterior of the building, in any building at least where architectural effect is aimed at. The building will probably be composed of a reinforced concrete skeleton with an exterior of brick or stone.

Some reinforced concrete buildings having concrete exteriors have proven unsatisfactory from the fact that up to the present no distinctive design has been developed to suit the material and until the architects succeed in developing suitable lines the use of concrete for exteriors is not recommended.

As well as lines, the element of color enters strongly into the architectural objection. Portland cement and ordinary sand do not give a pleasing color effect, but it is probably only a matter of time before a cement will be put on the market which will get away from this difficulty.

SUPERINTENDENCE OF WORK.

The building superintendent requires to take care of all the points that have been mentioned in connection with the field work of ordinary concrete and he has in addition to carefully watch the placing of his reinforcing. He must appreciate the fact that he has placed in his hands the crudest kinds of building material, with respect to which he is the chief workman and master builder. He has no shop work to fall back upon and blame for errors. He has been given the details of a highly scientific structure and he is responsible for carrying them out. The steel must be properly and accurately fabricated and correctly placed and held in the moulds. The columns must be of the proper size and perfectly plumb avoiding eccentric stresses. In short the concrete building superintendent must realize that he combines in himself the shop superintendent and the foreman erector.

The necessity for a wet mix required by his brother superintendent working in the heavier classes of concrete is still greater for the buildings. Without a wet mixture he cannot properly fill the forms. The building members are comparatively small and filled with reinforcing steel. Mechanical pounding is out of the question. Use the mixture wet and work all around the forms and the steel. In columns use long rods or gas pipes for manipulating or puddling the concrete.

Again, without a wet mixture the steel cannot be properly and thoroughly embedded. Unless you can flush up the wet mortar of the concrete against the surface of the steel adhesion cannot be secured. The writer recalls an instance of the demolition of a portion of a concrete structure in which a very rich but dry mixture was used, and in many parts there was no adhesion.

This brings up the subject of the adhesion of concrete and steel. In the mind of the layman this property is a very vague and doubtful one. In reality it is a very positive and definite quality. Let any doubter go to a mixing machine that has not been thoroughly flushed out with water on stopping operations and after it has stood a few days, and give him a hammer or a chisel and let him try to clean that concrete off the bright smooth steel interior. There will be no further doubt on the question of adhesion. And then let him remember that the interior of that machine is very smooth compared with the surface of the rods usually embedded. There is absolutely no doubt about the adhesion of concrete to plain steel. Set up the requisite amount of agitation in the concrete by puddling it and it will adhere to the steel. The manipulation is necessary and if it is not done no amount of mechanical bond will save the structure.

As far as the writer's observation has extended practically all the accidents in reinforced concrete buildings have resulted from the premature removal of the formwork. Give the concrete time to set up and there will be no trouble from this cause. The time necessary can only be judged by experience. Ten days in some cases is as good as three weeks in others. A bridgeman will not remove his falsework until the riveting is safely completed. A builder will retain the bracing until the building is complete in itself. No greater amount of good judgment is required for concrete.

Something has been said about cleanliness in concreting on heavy work. Let it be said again. Keep the work clean. Chips and shavings and snow are not good reinforcing materials. If the superintendent is good he will be clean, and if he is not clean he won't be happy if he thinks at all.

And don't put up light building work in reinforced concrete during freezing weather. If you are compelled to do so be careful. It can be done but it means money and eternal vigilance.

Don't let a blazing sun shine on your new concrete when the thermometer stands at 80. Give the cement a chance.

Throughout the discussion the element of cost has been carefully avoided in order that it might be emphasized at the end. The cost is sometimes an unsatisfactory element—why? Because, after all ordinary and economical methods have been used, there remains the desire to get something in concrete that would never be thought of for other types, a polish finish. An owner may demand his concrete beams and columns to be mathematically true, but he would not dream of exposing in his halls or factory it may be the corresponding members if the building were of steel. He would be satisfied possibly with the rough unevenesses of a brick wall with its dust catching surfaces, but in concrete he wants it like a billiard table. Do not attempt to get mathematical planes in concrete building work. If a perfectly smooth surface is demanded use common plaster. In this way

(*Concluded on Page 74*).

View of rotunda, new Public Library, West Toronto, looking towards the entrance, and showing detail of ceiling and walls. Ellis and Connery, Architects.

View looking through rotunda and toward men's reading room, new Public Library, West Toronto. Ellis and Connery, Architects.

New Public Library, West Toronto. Ellis and Connery, Architects.

WEST TORONTO'S NEW PUBLIC LIBRARY.—A Practically Planned and Substantially Built Structure.—Provides Ideal Accommodation for Both Public and Staff.—Interior Arranged so as to Bring All Rooms Under Immediate Supervision of Librarian. ∴ ∴

THE PUBLIC LIBRARY, in that it supplies an economic and educational want, has of necessity become a component part of our system of municipal organization. There are few, if any, of even the smaller towns and villages, which cannot boast of certain advantages in this respect. It provides an abundance of good reading for those who find time to indulge themselves that way. The student uses it to supplement his class studies; the scientist for additional research; the journalist and litterateur, its works of reference; and the poor man finds within it the newspapers and current periodicals which his meagre income will not permit him to buy. In short, the public library is a storehouse of lore with books for the naturalist, volumes for the artisan; works on history, art and industry; tales of romances, masterpieces of literature and innumerable other subjects which one and all are privileged to consult and enjoy.

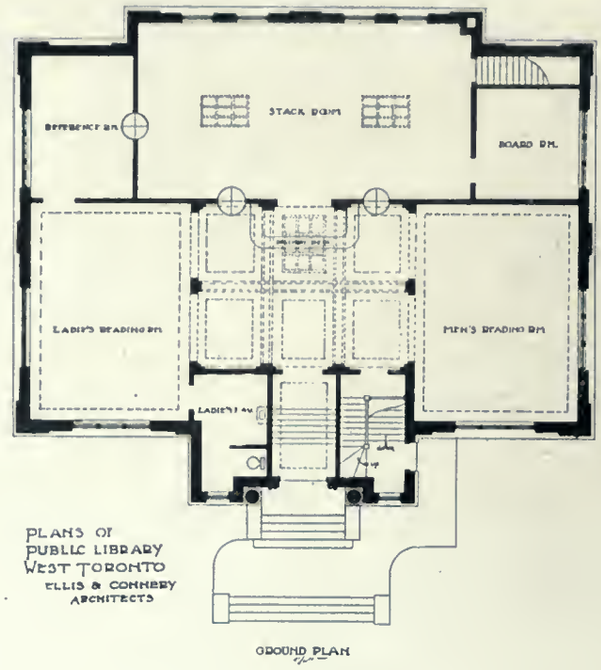
At the present time, a large number of the smaller municipalities are concerned with the matter of providing housing accommodations that will adequately meet the requirements which such an institution necessitates, having either through their own resources or through the aid of philanthropists reached that point where they are in a position to erect a building to be used exclusively for library purposes. The problem, therefore, with which these places are dealing, is the problem of design and plan, and how to secure the greatest return for their investment, viz., a building having dignity and character in plan and elevation, arranged so as to bring the various rooms immediate under the supervision of the librarian and his assistants, and providing the maximum degree of accommodation with the minimum cost of up-keep.

While the amount usually available is not sufficient to provide an absolutely fireproof structure, the building, owing to the character and value of its contents, must be safe and substantially constructed, with the hazard of fire reduced to the lowest point compatible with the sum invested. In addition to the library proper, the plan should provide for a lecture room, as the lyceum feature is coming to be more fully recognized as an important adjunct to the library system; and as for lavatories and similar conveniences, these should be located so as to effect the greatest economy in plan, and equipped with a view of obtaining the highest degree of sanitary efficiency.

One of the more recently completed buildings of this character is the new public library at West Toronto. It is a square, practically planned building, one story and basement in height, and designed with a modern classic feeling. The walls are of red pressed brick laid up with black mortar points, the floor system of concrete, and the entrance cornice and window trimming are executed in Ohio sand stone. A low parapet and simply designed belt course helps materially in giving the building a pleasing breadth of character; while the entrance, having easy ascending steps and embellished with columns of the Corinthian order on either side, assists in imparting to the whole the feeling of dignity which such a building should possess.

The interior plan of the building effects the greatest economy in the utilization of space and provides an ideal

arrangement in every respect. Inside the entrance is the vestibule which in turn opens into a large rotunda trimmed and furnished in quarter-sawed white oak having a polished surface. The walls are finished in a brown

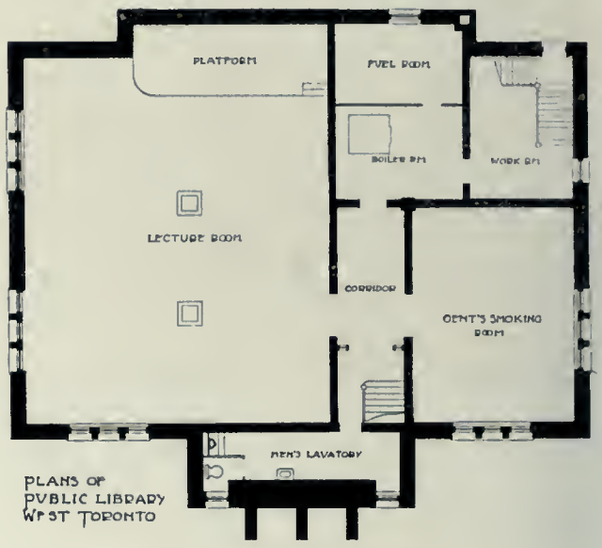


Ground Floor Plan.

toned stucco; the pilasters, capitals and cornice in white keen cement; and the ceiling crossed with enriched white plastered beams forming deep recessed panels, the centre one of which providing a skylight over the delivery desk

To the left and right of the rotunda are the ladies' and men's reading rooms, the former having direct lavatory accommodation, and a doorway leading to the reference room situated at its rear. Both of these have large windows, to insure plenty of light and adjustable electric pendants over the tables. Immediately back of desk is a stock room of spacious dimensions, having the board room to its right, together with a staircase leading to the work room in the basement. The delivery desk, being placed opposite the entrance, enables the librarian or the clerks to have a commanding view of both reading room and to exercise complete supervision over the entire floor. The floors throughout have hardwood surfaces, and the rooms in general are similar to the rotunda in finish and appointment.

Access to the basement is obtained either from the outside or the rotunda, the stairway being conveniently situated in the space between the vestibule and men's reading room. This floor contains a large lecture room occupying one half of the floor space, a smoking room, men's lavatory, boiler and fuel compartments and work room.

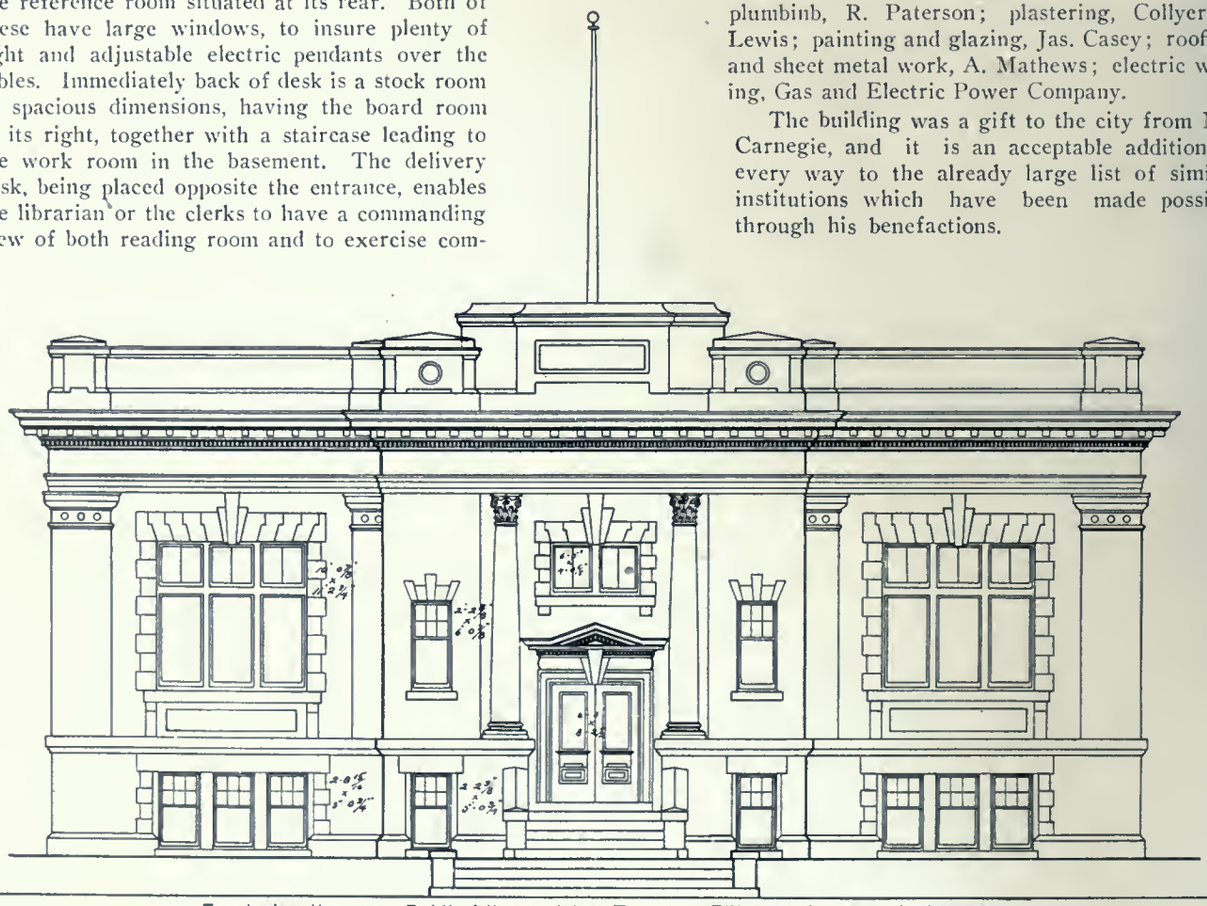


Basement Plan.

The lecture room is separated from the other rooms by a corridor, and the lavatory is placed in the space underneath the main entrance.

The architects of the building were Messrs. Ellis & Connery, and the various branches of the work were executed by the following firms: Masonry, Teagle & Son; carpenter work, Smith & McElroy; heating and plumbinb, R. Paterson; plastering, Collyer & Lewis; painting and glazing, Jas. Casey; roofing and sheet metal work, A. Mathews; electric wiring, Gas and Electric Power Company.

The building was a gift to the city from Mr. Carnegie, and it is an acceptable addition in every way to the already large list of similar institutions which have been made possible through his benefactions.



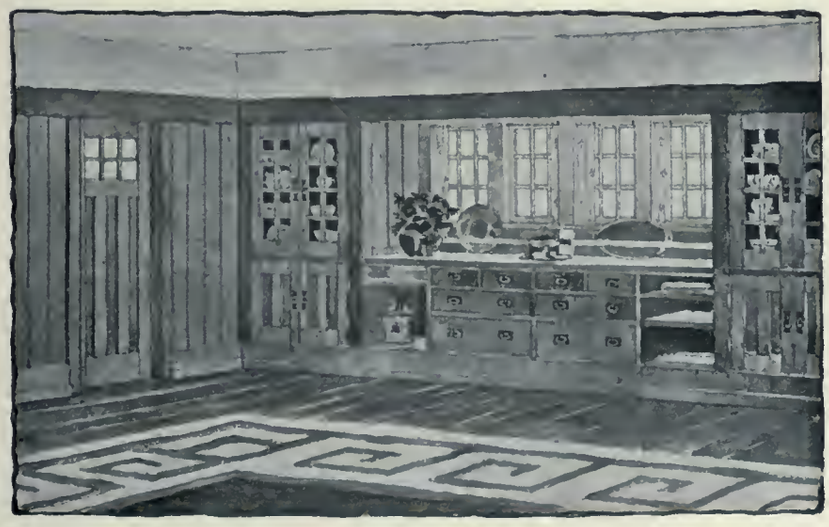
Front elevation, new Public Library, West Toronto. Ellis and Connery, Architects.

Design No. 1—A country house especially adapted to a site which is slightly elevated and the immediate grounds somewhat open. It is built entirely of wood on a foundation of field stone. The lower story, and part of the second is covered with eight-inch weather boarding 7/8 of an inch thick; the shingles are of the rived kind and the vertical gable boards V-jointed. The three belt courses, stained a darker tone than the rest of the walls, materially assist to give the house its low, bungalow like appearance.

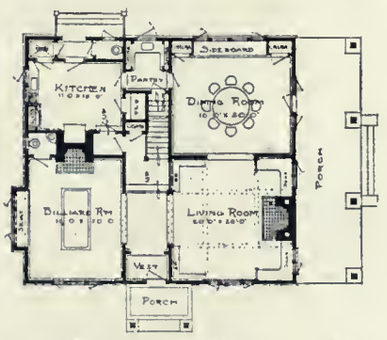
COUNTRY HOUSES AND COTTAGES.—Small and Moderate Sized Dwellings Which Express a "Ruskin" Truthfulness in Construction and Combine Interest, Beauty and Comfort in Design and Plan.—Built-in Features an Integral Part of Scheme. ∴ ∴

NO TIME IN THE PAST has the need for the highest and best efforts in domestic design been more urgent or imperative than it is to-day. Within the next twenty years, Canada will pass through an era of "house building" such as has never been experienced before, or in all probability will ever be experienced again. It will possibly be the greatest period of development in this respect. The press of even the secondary towns now boast of residential growth of from 200 to 500 houses annually, and, while it must be admitted that great progress is being made, a casual glance shows that in the main, it is a case of much "building," but little "architecture." This, however, is not to be taken as a reflection on the architects. What they have done needs no apology; and what they are doing, they are doing well. Their efforts are easily distinguishable from the products of the speculative builder. A condition is simply pointed out; one that demands attention and needs remedying; one that needs the interest of the architect as a stimulus, for the time is now at hand for the "planting of the seed," if a domestic architecture is to be developed that is worthy of the name.

The great need is for economical, small and moderate sized houses that have the interest, beauty and comfort which every home should possess;



Section of dining room, Design No. 1, showing the large built-in sideboard with china closets an either side, and the high panelled wainscotting.



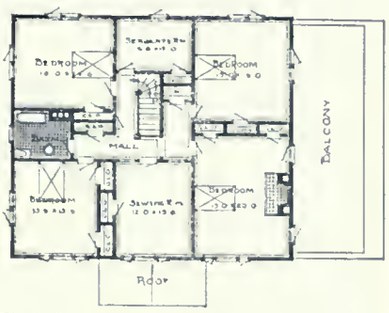
Ground floor plan of Design No. 1, showing the location of the fireplaces and the positions of the built-in features.

houses such as will carry out the Ruskin idea—denoting truth and simplicity in their lines and construction, and designed to secure the greatest interest and harmony in proportions, structural features, sense of space in interior arrangement, and blending of colors in walls, woodwork and furnishings. The disinclination of many architects to give time and study to the design of small

Design No. 2—A country house built with field stone. Note the ruggedness of its lines and the structural efficiency of walls. The design could be as effectively worked out in brick, concrete or terra cotta, and would be beautiful in weathered cedar or with half-timbered construction.

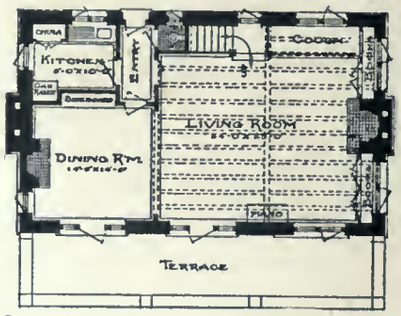
houses, regarding them as being less remunerative in proportion to the effort expended, than other classes of buildings, is indeed deplorable. This attitude, in many instances, has led the prospective owner to become a victim of the speculative builder, and is responsible in a large measure for the many architecturally distorted buildings, which, in both their lines and construction, reveal nothing more than a vagueness of character at the best.

Possibly the best idea as to what is required more than anything else is to be found in the type of building known as the "craftsman" house. There is at least truthfulness in its lines, and a sturdiness of character and simplicity of detail to recommend it. Such a type of house admits of unlimited possibilities in interior decorative work. Built-in bookcase, shelves and similar features become a very part of it, and as for economy and permanency it has a



First floor plan of Design No. 1, showing the well proportioned rooms and economically arranged closet space.

value that is hard to equal. England has done much in the development of this character of house, although the same may not be known as such, and yet the leading members of the profession there have come to realize that the best traditions in domestic design must be jealously guarded and preserved, if the simple charm and sincerity of the past is to be perpetuated. They, too, have begun to witness the desecration of architectural principles by speculative builders, and in order to check this unfortunate tendency, a number of prominent architects are not only interesting themselves in the design of small houses, but are devoting a large portion of their time in lecturing on the "art in building" and the relationship of the various "crafts" to domestic structures.

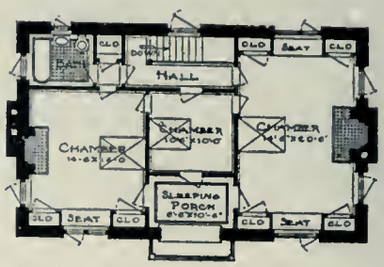


Ground floor plan of Design No. 2, showing the large living room and the compactly arranged kitchen.

In view of this fact, we are reproducing herewith a number of designs from the CRAFTSMAN, which we believe in design, plan and construction will prove to be of interest.

DESIGN NO. 1.

Design No. 1 is a large house especially adapted to a country site, and is seen at its best when built on a slight elevation and on grounds which afford a somewhat open space at its immediate site. The house is built entirely of wood, on a foundation of field stone. Everywhere is



First floor plan, Design No. 2, a feature of which is the sleeping porch, projecting slightly beyond the outside wall.

open construction with both purlins and rafters exposed. Cypress is the material used in the exterior of the house, being employed in various forms, but equally as good results could possibly be obtained from other species of wood. The weather-boarding and shingles are thick and broad so that the angle of their projection upon each other is deep enough to cast a shadow, and thus, even at a distance, the walls retain the rugged character of their construction.

The roof is of low pitch with a projection of four feet at the eaves. The lower story and part of the second is covered with eight-inch weather-boarding, seven-eighths of an inch thick. This surface is varied by two belt courses of four-inch boards, laid flat, and stained a darker color than the rest of the house. Between the upper belt course and the

Living room in Design No. 2. The chimney-piece is built of the same material as the outside wall, thus bringing the exterior into close harmony with the interior of the house. The fireplace is hooded with hammered copper, and the bookcase and couch are all built-in.

eaves, rived shingles are used. In the gable, narrow V-jointed boards

Rear view, Design No. 3, showing the roof lines and treatment of windows. The pergola having concrete posts, opens off the entrance of the porch, where the family dinner can be served during the summer months.

are laid vertically, with a flat band matching the belt courses in color, forming the finish between the vertical boards and the shingles, and running around the house at the line of the eaves. The effect of these three parallel courses of a darker color is to take away from the height of the house and give it a low, bungalow-like look in spite of its three stories.

The windows all over the house are much the same, each one protected by a hood; the large windows are made with a stationary panel, on either side of which a single casement opens outward. The smaller windows have a casement placed beside a stationary panel of the same size. When the window is open it

Design No. 3. A cottage suitable for town, village or suburban environments. The walls are of a soft, light grey plaster. The plain wood cornice under the eaves is stained a deep reddish brown, the tone fading into a dull grey-green in the windows, and merging into a light grey near the ground.

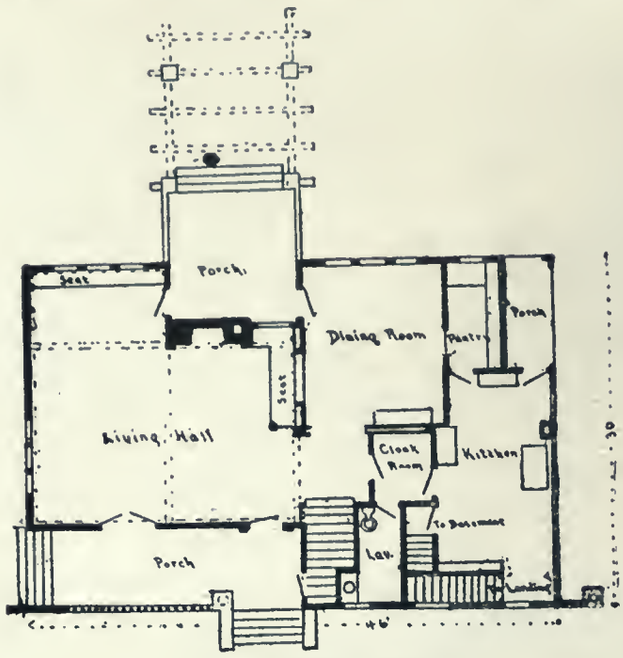
View of living room, Design No. 3, with its fireplace and cozy seat, topped with book shelves. The walls are done in soft grey-green and the ceiling in light tan, the two tones with the silver grey of woodwork producing an effect of quiet neutrality.

gives the effect of a double casement with one half closed. This arrangement is an economy in screening, as only half of the window needs to be covered. Since the casement opens outward, the screens may be fitted inside the window frame and thus, protected from rain and dampness, last four times as long. By the use of a casement adjuster, it is possible to open the window and keep it open at any distance desired without raising the screen.

The entrance door is paneled, with a group of square lights at the top, and opens upon a small porch built of stone, with stone posts at either side of the steps. Large wooden pillars stand upon these posts and support the roof which protects the porch. Instead of a parapet, two wooden seats are built along the sides. As it is always more advantageous to make a porch practically an outdoor room of the house, and not a public entrance, the large living porch is at the side of the house and opens with French doors from the dining room. This has a low parapet of stone with the same arrangement of post bearing the pillars that support the roof; the floor is of cement. Flower-boxes run from post to post, outlining the parapet.

From the entrance door one enters through a small vestibule into a hall, the end of which is raised by two steps to form a dais-like landing from which the stairs go up to the second story. The area of this landing is calculated for the greatest amount of use. A coat closet fills the space under the stairs and at the side a door leads into a small entry that connects with the kitchen. This gives the maid a direct passage to the front door and also does away with a second flight of stairs because the main stairs may be reached so easily from the kitchen without passing by or through any of the other rooms in the house. A second door placed between the kitchen and the entry does away with any possibility of the odor of cooking penetrating into the hall and the adjoining rooms. The lower hall is practically an open passage with the billiard room and the living room on either side of it. The

ceiling of the living room shows four of the great beams in the house. There is a fireplace with a deep inglenook on either side built below



Ground floor plan of Design No. 3.

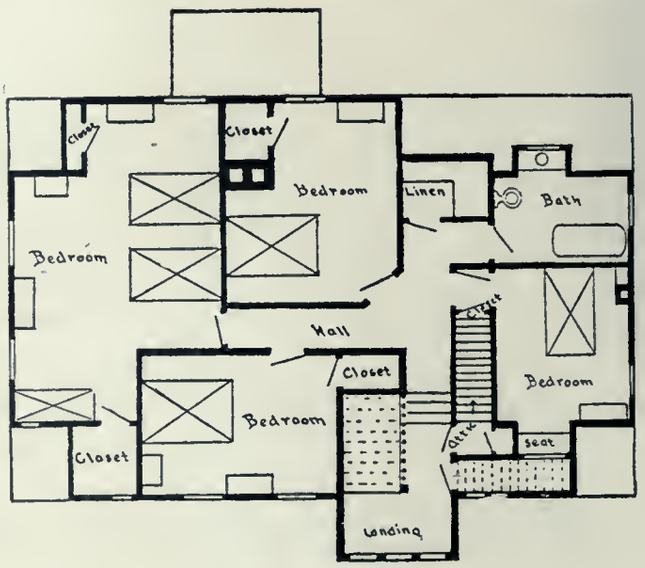
the windows which look out upon the porch. The dining room is separated from the living room by a narrow partition of spindles. A corner of this room is shown in the interior view. One of the interesting features of this room is the commodious built-in side-board, at either end of which is a china closet with cupboards below. This sideboard is planned to meet every need of serving in the dining room, as well as to afford places for keeping the dining room utensils. The room is wainscoted to the plate rail with V-jointed boards. A swing door, handsomely paneled and set with glass at the top to admit light, leads to the pantry. The billiard room has a big bay window with a seat below and a conveniently placed toilet closet. The arrangements of the kitchen are complete and well placed; there are big closets and also a cold closet containing the icebox, which may be filled from the outside of the house. The second story shows four bedrooms and a room for the servants, a sewing room and a bath. French doors open upon the roof of the side porch which, if desired, may be finished with a railing and used as a balcony.

DESIGN NO. 2.

Design No. 2 is also a structure which is strictly of the country-house type, and it is intended to be built where field stone is plentiful, as the degree to which this material is available is a big factor in influencing the cost. If the stone has to be quarried, the expense is relatively increased, and the cost will amount to quite a different sum. This fact, however, is no drawback to the use of the design, which in a simple and direct manner adequately meets the needs of home life in the country. It could be as effectively worked out in brick, or concrete, or terra cotta, and would be beautiful in weathered cedar or with a half-timber construction. The house illustrated is, however, of stone, with heavy lintels of hewn white oak. The roof is covered with a composition roofing, which comes in strips, thirty-six inches wide, and is, in this case, dark red in color, but also may be had in green and slate colors. At the junctures of these strips, over each rafter, a batten of chemically treated cypress is placed. This makes a very effective roofing and the exposed rafters and purlins, aside from the economy in repairs and actual durability that open construction always carries with it, add to the appearance of ruggedness and do much to emphasize the solid, permanent character of the architecture. Casement windows are used throughout the house, sometimes placed beside a stationary panel of the same size and sometimes with a fixed panel between two single casements. French doors lead from the dining room and the living room out upon a terrace built with a parapet and posts of stone. The floor is of cement, and cement flower boxes run from post to post. On the second story a sleeping balcony is finished with a beautiful railing supported from the exposed timbers of the house. This porch, and the two casements on either side, form what is really an exaggerated dormer construction broken through the roof. The rear of the building is shown in the illustration.

The house is entered from the front through a hallway in which three doors lead to the living room, dining room and kitchen, respectively. The interior view shows a corner of the living room. The chimneypiece is built of the same material as the outside walls, thus bringing the exterior into closer harmony with the interior of the house; the fireplace is hooded with a sheet of hammered copper for the purpose of radiating the heat from the open fire. Bookcases, with convenient drawers below, are built in beneath the windows on either side of the chimneypiece. The stairs to the second story go up from the living room, and beneath them a closet, containing toilet arrangements, opens into the hall. The ceiling of the living room is very interesting; all the beams of the construction are left exposed. In the chamber above, a foundation floor of chestnut, the finished surface down, rests upon these beams. This floor makes the ceiling of the living room, and another flooring is laid upon this, with a deafening quilt between, for benefit of the chamber above.

The dining room is separated from the living room only by a shallow grille running along the ceiling, and the sideboard is built into the room. The kitchen is connected with the dining room by the entry. Upstairs are a bathroom and two large chambers fitted with closets and window-seats; each chamber contains a fireplace. Indeed, in these rooms, as in the lower story, the house seems furnished and hospitably ready to be occupied before the owner has moved in any of his personal possessions. A smaller chamber is



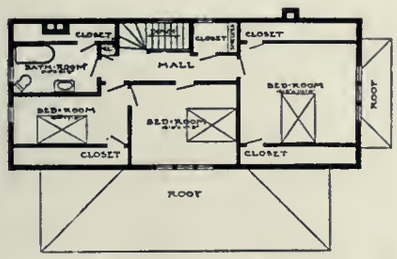
First floor plan of Design No. 3.

connected with the large one on either side of it, and all three open

upon the sleeping balcony, half of which is sheltered by the roof—a welcome arrangement in severe weather,—while the other half is

Design No. 4. A six-room house which provides splendid accommodation for a small family. The walls are of cement plaster over metal lath, the plaster being left in its natural grey color, which contrasts pleasantly with the dull dark red of the roof, the brown stained rafters of the eaves and the white of the doors and windows.

open to the sky. This balcony will be a delightful sitting place both in the daytime and in the evening, and a cool and refreshing scene for bedtime rendezvous. The interior arrangements of this house throughout



First floor plan of Design No. 4.

are noticeably calculated to foster comfort and convenience.

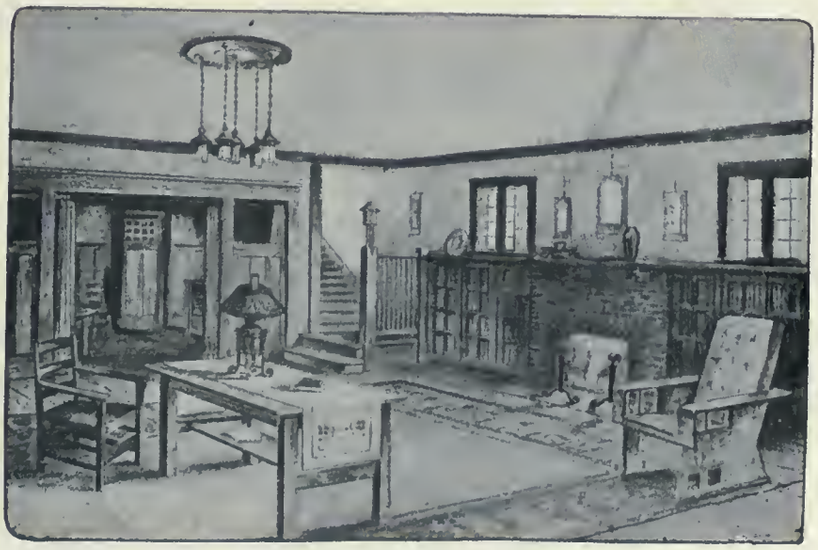
DESIGN NO. 3.

Design No. 3 is a cottage suitable for town, village or suburban environments. The first sight of its ample roof awakens an interest and a nearer approach reveals no repelling complacency in the broad, low facade and simple ornamentation. The walls are of soft, light gray plaster. The plain wood cornice under the eaves is stained a deep reddish brown, somewhat as Nature would tint it if we gave her time. This tone fades to a dull gray-green in the window and door trim, and loses its green to merge into the light gray of the wall near the ground. This treatment avoids the decided, liney effect which woodwork in solid color gives.

It is quite evident from without that the hanging window accommodates the landing of the stairs, and that it is supported by carrying the floor joists beyond the face of the main wall. Its peak is not allowed to break the long line of the main roof. The sweep of the roof on the opposite side and the extension of the walls make the gateway of the rear garden and the dividing fence a part of the harmonious whole.

The porch is within the area, only the steps projecting. The front door of matched oak planks has more decision of color than in the casing; its green is somewhat deeper and is mellowed attractively with brown.

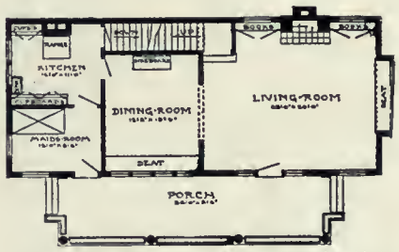
Direct entrance into the living hall, which occupies about half of the house area, gives an effect of spaciousness much to be desired. The



Living room in Design No. 4. The interest in this room centres in the fireplace of red brick, and the bookcases on either side, surmounted by square mullioned windows with the unbroken wall space between, which gives a beautiful balance to the whole.

simple fireplace, with its accessories of seat, bookcases and high window, is the feature of the room, as it should be in every climate where "Winter comes, to rule the varied year." The leaded-glass window between sections of the bookcases gives a glimpse of the dining room. This living hall gains much in attractiveness from the situation of windows on three sides of the room, overlooking the garden; and the seat beneath them offers an ideal resting place.

At the right of the entrance, in an alcove, the main stairs ascend to the landing, rendered pleasing by the three diamond-paned casements of the hanging window. Opposite the staircase, the open door to the dining room reveals a charming vista of the room and of the garden beyond, through the three windows at the end The closed door in the stair alcove (shown in illustration) opens into a cloak room, through which access may be had to the kitchen, an arrangement most convenient to a mis-



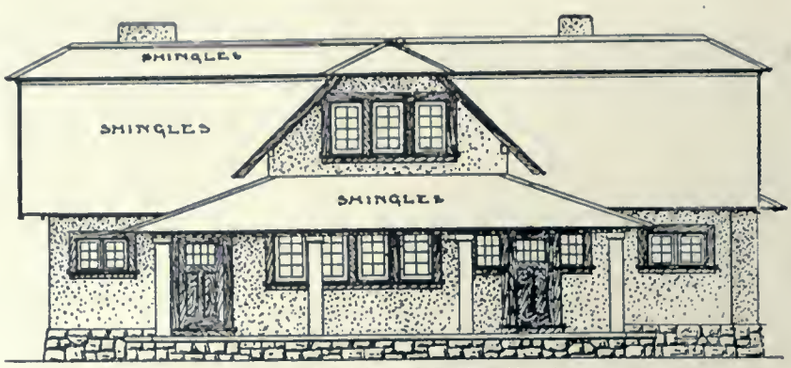
Ground floor plan of Design No. 4. Note the privacy of the maid's room and the connection of kitchen and dining room.

tress without a maid, or to the maid when it is necessary to admit a caller at meal time. And the situation of the lavatory makes an additional one on the first floor unnecessary.

The rear porch lies partially within the area of the house, and, directly accessible from the living hall and dining room, contributes not a little to the charm of each. Protected by screen wire, it is the summer den of the mistress, and, when August days grow oppressive, the family dinner

can be served here in the shade of the vine-roofed pergola.

The columns of the pergola are of concrete, finished with one coat of plaster, the same as the final coat of the building. The soft, light gray is a pleasing contrast to the deep, warm brown of the beams above, and gives an intimate relation to the house. Of like construction are the bases and posts of the balustrade-like fence, but the balusters are wood, four inches square, painted to match base.



Front elevation of Design No. 4.

The living hall and dining-room have paneled wainscoting, and this, with the door and window casings and beam work of ceiling is stained silver-gray. The walls of both rooms are soft gray-green. The ceilings are light tan which show a suggestion of gray. The effect is one of quiet neutrality, into which considerable color in furnishings may be introduced without sense of discord.

The ceiling of the living hall is divided into three panels by one cross and one lengthwise beam, and a short beam separates it from the ceiling of the stair alcove. Half beams fill the cove between ceiling and wall, and these half beams continue around stair landing on a line with their position in living hall. The wall of the landing above this line and the walls of the upper hall are the light tan of the ceilings below.

The woodwork of the second story is silver-gray. The double bedroom at the end of the hall has a soft, yellow-brown wall. The front bedroom is in light terra cotta, while the room directly in evidence at the head of the stairs, carries forward the gray-green of the walls below. The remaining bedroom has the greenish blue tone known as Gobelin blue. In selecting the tint for each room, the effect of the whole has been considered.

Casement windows are used throughout the second story. The outward swinging casement must have been the early conception of what a window should be, and the wonder is that the modern window has departed from this form. No other sort is so simple and so charming in effect, no other so fully meets the requirements of ventilation; with the recent improvements in hardware, facilitating its operation, the casement window should come into more general use.

Diamond-mesh leaded glass has been used freely in this house, with most satisfactory result. The sash including glass is but a trifle more expensive than small-paned glazed sash. Where the view is to be considered, the lead lines are less objectionable than the wood bars, and the glass is much more easily cleaned, but the strongest argument in their favor is that, where not necessary to exclude the light, draperies may be omitted, for a leaded window never looks bare. Indeed, the effect is often better without than with curtains, and their absence is a material saving of time and labor to the housekeeper in cleansing and expense in replenishing the hangings, a consideration to the busy woman.


End elevation of Design No. 4.

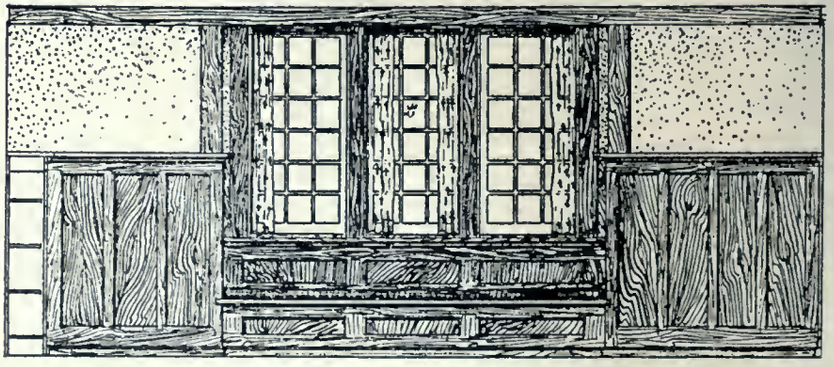
Not least among the conveniences is the ample provision of individual closets and a roomy linen closet from the passage to bathroom. In addition to these, there is an attic, which, though rather low (being about eight feet in the centre), furnishes considerable floor space. The clustered windows in front and rear gables give abundant light, and it can be either used as a playroom, or for storage purposes.

DESIGN NO. 4.

The cottage illustrated in design No. 4 provides a splendid accommodation for a small family, and can be built on either a town or village or a suburban lot. It is a house that is rather unusual in plan. The outside measurements of the cottage are fifty-one feet in width by thirty-two in depth, including the porch in front and the chimney in the rear. The walls, from the rough-stone foundation to the shingled roof, are of Portland cement plaster over metal lath, the plaster left in its natural gray color, which contrasts pleasantly with the dull dark red of the roof, the two harmonizing admirably with the greens and browns of the landscape.

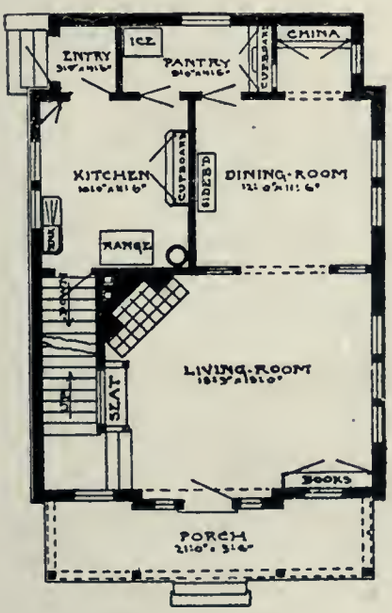
The outside framing of the doors and windows and the rafters of the overhanging eaves are of cypress, stained a light brown, while the porch columns and the mullions of the windows are of pure white. The porch is floored with dark red cement, repeating the color of the room, and instead of a porch railing, long boxes of growing plants guard the edge. Mullioned casement windows are used throughout the house, both because their effect of quaintness is in keeping with the whole character of the cottage, and because they afford excellent ventilation.

The kitchen and maid's room are placed at one end of the house, and are arranged so that they may be completely cut off from the living-rooms. One of the doors leading


Detail of window seat in living room, Design No. 4.

from the entrance porch opens directly into the maid's room, which is meant to be fitted with a couch-bed, so that it is a bedroom only when needed and a pleasant sitting room the rest of the time. In case this arrangement is not considered desirable, it can be changed, with no alteration of the general plan, simply by omitting the door leading to the kitchen and cutting a door between the living room and the little front room, which could then be used for a library, den, sewing room, or study as desired.

Design No. 5. A small house with shingle covered wall. The simplicity of its lines is relieved by the overhanging eaves and rafter, the well balanced porch, grouping of windows and heavy beams which extend around wall. This design will admit, in a limited way, of the substitution of other materials.



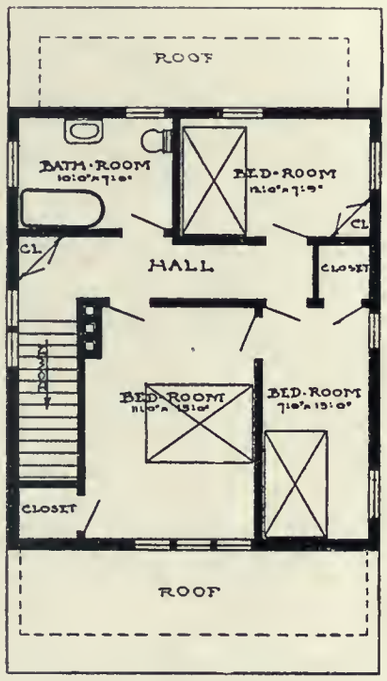
Ground floor plan of Design No. 5.

Aside from the kitchen and maid's room, the whole first floor of the house is given to the living room and dining room. The second floor is divided into a hall, three bedrooms, and a bath. The cellar is large and well lighted by high windows, and contains a laundry, storeroom, toilet, and lavatory, and a place for the furnace and coal bins.

The entrance doors are of oak and made rather broad in proportion to their height, with mullioned lights of antique glass above and two long panels below. Two high mullioned windows of the same antique glass, and made a little broader than they are high, are built into a frame, giving an attractive group of lights. On the same wall is a double casement window, mullioned like the others, but with panes of clear glass. The living room is full of light, as it has nine windows in addition to the borrowed light from the dining room.

The living room and dining room are practically one room, the dividing line between them being little more than suggested by the slight partitions of wood which serve more as a decorative structural feature than as a division between two separate rooms. These wood partitions on each side of the wide opening are merely panels of the five-foot wainscoting that runs around both rooms and terminates in posts that reach to the ceiling beams.

The living room proper is twenty-three feet long by twenty wide, and the accompanying sketch shows it as seen from the window seat. The structural interest of the room centres in the fireplace with its flanking bookcases and in the staircase which completes the group. The fireplace is of red brick, and the bookcases on either side, surmounted by the square, mullioned windows with the unbroken wall-space between, give a



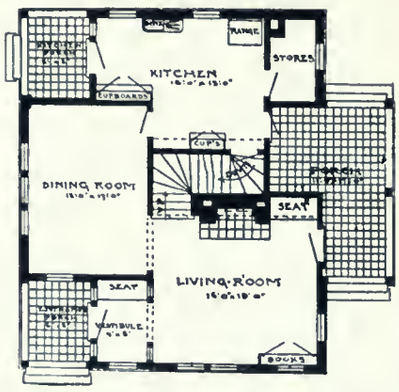
First floor plan of Design No. 5.

Fireplace and stairway in living room of Design No. 5. The fireplace is built of red brick, being thrown diagonally across the corner and carried up to the height of the wainscot, where a stone lintel forms a projecting shelf.

beautiful balance to the whole. The stair-landing in the corner is entirely inconspicuous, and yet it is important to the structural completeness of

Design No. 6. A cottage which will readily adjust itself to any locality where an ample site and a few natural advantages are provided. It is built of concrete brick, being shaped like a cross, which gives opportunity for the maximum allowance of light and air and for large, well-placed rooms.

the room, as the rail is just the height of the bookcase beside it, and is connected with it in construction, while the bookcases in turn establish the line, at the height of five feet, which is carried around the room by the oak wainscoting. A five-inch beam in



Ground floor plan of Design No. 6. Note the roomy arrangement, the convenient porches, and summer kitchen.

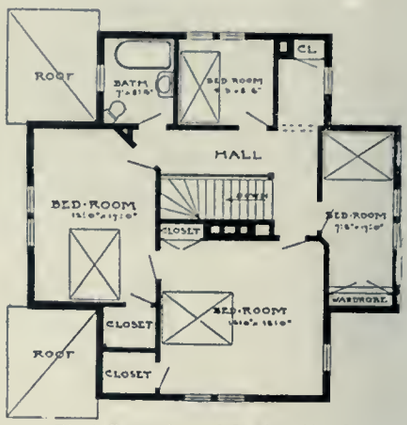
the ceiling angle projects an inch from the side walls and serves as a finish at the top. Looking from the dining-room the window seat comes into view, set into a recess which forms a bay from the outside, and surmounted by a triple casement window, mullioned, with clear glass lights.

The dining-room is twelve and one-half feet wide by nineteen feet and nine inches long, and is lighted by a group of triple casement windows, beneath which a seat extends the entire length of the room. As this room is practically a part of the living-room, it is given the same treatment in structure as well as in color, with the exception of the top of the walls, where the five-inch beam is omitted and the ceiling is dropped to the depth of twelve inches on the side walls, a narrow strip of wood, placed at the height of the cap of the door frame, running around the room with the effect of a small freize. The five-foot oak wainscoting is continued from the living-room around the walls of the dining-room.

The color scheme of both rooms is naturally the same to preserve the effect of space as well as harmony. The oak woodwork is finished in a rich nut-brown; the sand-finished plaster walls in a shade of light golden brown with a tone in it of grayish green, something like the color seen in the skin of a russet apple; and the ceiling in ivory white with a suggestion of green.

DESIGN NO. 5.

Design No. 5 is a small house built entirely of shingles, although its design will admit, in a limited way, of the substitution of other materials. The simplicity of its structural lines is relieved by the overhanging eaves and rafters of the roof, the well-proportioned porch, which is balanced by the extension at the rear, the heavy beams which run entirely around the walls, with a slight turn of the shingles above, and the effective grouping of the windows. The shingles on the walls are laid in double course, the top

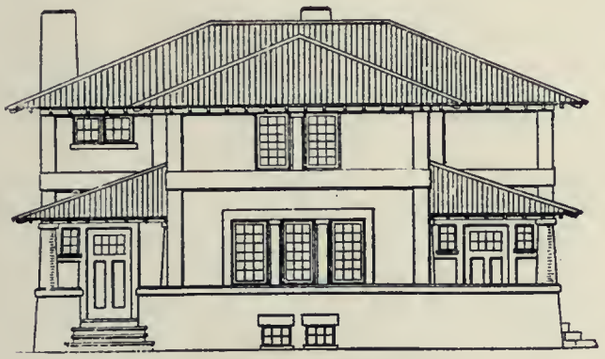


First floor plan of Design No. 6.

ones being well exposed and the under ones showing not much over an inch below. This not only adds to the warmth of the house, but gives an interesting effect of irregularity to the wall-surface.

The house, although of frame construction, is built to stand weather, and its sturdiness in this respect is the direct cause of its wealth of attractive structural features. The roof of the porch projects two and one-half feet, which affords protection even in a driving storm. Also for

Fireplace and nook with high placed bookcase, in living room, Design No. 6. This view shows the room, looking toward the vestibule, dining room and stairway.



Front elevation of Design No. 6.

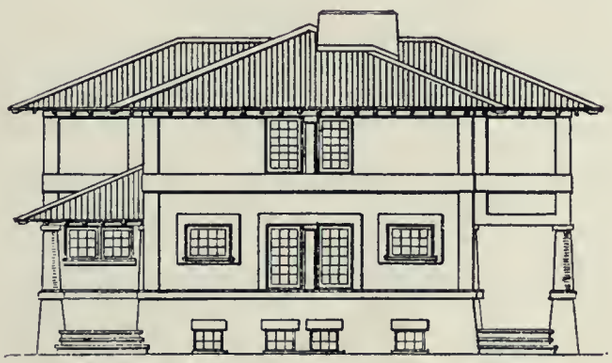
protection, all the exposed windows are capped by little shingled hoods which grow out from the walls, and which, in addition to their usefulness, form one of the most charming features in the whole construction. The eaves of the main roof project over the front for two and one-half feet, and the weight is supported by purlins placed at the peak of the roof and at its connection with each of the side walls. This widely projecting roof gives a most comfortable effect of shelter and homelikeness, an effect which is heightened by the way in which the quaint little casement windows on the second story seem to hide under its wing.

The living-room (shown in accompanying sketch) is entered directly from the porch and has three casement windows in the side wall. The fireplace is thrown diagonally across the corner, with a small built-in seat between it and the landing of the staircase, which turns and runs up back of the seat. The fireplace is built of rough red brick, with a stone lintel placed just at the height of the wainscot, and is built out from the wall three inches, with little projecting brackets to support the shelf. Above this the sand-finished wall recedes to its proper distance, making an unbroken space. The seat beside the fireplace is meant to be built so that the top can be raised and the inside used for a storage place. The back is raised one and one-half feet above the wainscot for protection on the stair, but the line of the wainscot is continued by the dividing strips between the long panels below and the square ones above. An interesting structural feature is the continuation of the same line from the five-foot wainscot of the living-room to the first landing of the stair, where it sinks to a height of three feet and continues up the stair. The front door, with its mullioned windows, is recessed eighteen inches, and the bookcase is built into the wall, affording relief from the continued surface of the wainscot.

The dining-room is twelve feet wide by eleven and one-half feet long, and is amply lighted by a double casement window mullioned into eighteen small lights. These mullioned casements are used throughout the house. The walls of this room show a continuation of the wainscot in the living-room, and the only partition is posts and panels, the latter extending only to the height of the wainscot and leaving an opening above.

The extension at the back of the house is partly utilized for a pantry, with a sink in it for washing dishes, and a shelf and door for convenience in passing them through to the dining-room. The corner space is used as a rear entry-way, and the opposite corner as a recess in the dining-room for a dish closet.

The kitchen is well lighted by a double window, and is amply fitted



Side elevation of Design No. 6.

with cupboards. Except for the entrance through the pantry, it is entirely unconnected with the dining-room. The stairway from the kitchen leads down to the cellar, which extends the whole length of the house and is well lighted by high windows. It contains a large laundry and storeroom, and a chimney which gives opportunity for a heating apparatus to be installed if desired.

The second story is divided into a hall, one large bedroom well lighted by a triple window and having a good-sized closet, two smaller bedrooms, well ventilated and lighted, and supplied with closets and a bath.

The cost of this house is estimated at two thousand dollars without decorations.

DESIGN NO. 6.

Design No. 6 is a structure of the type which will readily adjust itself to any locality where an ample site and a few natural advantages are provided. It is built of concrete or hollow cement block construction, being shaped like a cross, which gives opportunity for the maximum allowance of light and air and for large, well-placed rooms. The side walls are broken into panels by raised bands of concrete that bind the corners, and also run around the entire structure at the connection of the roof and again between the first and second stories. These bands are smooth surfaced, but the walls are made very rough by a simple process of washing off the surface before it is quite hard. The face of the concrete is completely flushed against the form, and when the form is removed, after the material has set, but while it is still friable, the surface is washed with a brush and plenty of water, and well rinsed, so that the film of cement which formed against the mold is removed, and the particles of sand and stone are exposed. The appearance of the surface is largely controlled by the extent of the washing. If this is done at exactly the right time, the washing brush can be so plied as to remove the mortar to a considerable depth between the stones, leaving them in decided relief and producing a rough, coarse texture that is very interesting. Although this process apparently is intended only for the regular concrete construction, it would seem equally practicable to roughen the outside surface of concrete blocks in this way, if it is done as they are made.

The foundation of this house is also of concrete, and is continued upward on a gentle slant to a line at the base of the windows on the first floor,

Interior elevation of living room in Design No. 6. Facing the front of the house.

which gives a continuous horizontal line on a level with the parapets of the porches on either side of the front wing. The roof is covered with Spanish tiles of red terra-cotta, and is broken into an attractive form by the intersection at right angles of the two sections of the roof, one of which is a little smaller than the other. The eaves overhang about two and one-half feet, and are supported by rafters placed twelve inches apart. The same tile is used on the small roofs covering the front porches, and the support to these little porch roofs is furnished by round cement columns that are slightly tapered.

The main entrance porch is at the right of the house, while the kitchen is entered from the porch on the left. The window frames, with the exception of the small windows that are so built as to be included in the framework of the entrance door, are of cement with capped pilasters. The wings on the side elevations are a little larger than those of the front and rear, and the rear porch is recessed and extends the whole width of the wing, being large enough to serve as a very comfortable summer dining-room. This porch is floored with square tiles of red cement, which are especially adapted for outdoor use.

The first floor is arranged with only wood partitions separating the rooms. In the vestibule, which is just sufficiently large to prevent a too abrupt entrance into the living-room, is a box seat, useful for the storing away of various articles. The back of this seat is a continuation of the five-foot wainscot on the walls of the living-room, and opposite to it is space beneath the high windows for a hat and coat rack. Suspended from a five-inch ceiling-beam, between the two supporting columns of the partitions separating the vestibule from the living-room, are two lanterns of opalescent glass, framed in hammered copper, which serve to light the vestibule, and also add to the lighting of the living-room. A grille of slender spindles is run across the entrance from the vestibule, and also across the opening from the living-room into the dining-room.

The fireplace is built out into the room about two and one-half feet. To a height of five feet and to a depth of six inches—which is wide enough to support the ten-inch shelf—it is of red brick. A square post on either side of the chimney breast supports the beam, which runs the entire width of the room, establishing the entrance to the stairway on one side, and making a nook two feet deep on the other, in which a seat is placed. The back of this seat is paneled to the height of six feet from the floor, at which height a bookcase is built across the whole width. This is recessed six inches farther back than the edge of the seat so that it may be within easy reach of anyone standing on the seat, and also because one rising suddenly will be less likely to strike the head than if the bookcase were the full depth. On each of the posts of the mantel breast a copper-framed lantern is hung from a bracket, one to light the seat and the other the entrance to the stair. The stairway, winding as it does around the chimney breast, shows an unusual and very interesting arrangement as to its entrance, and is so placed that it is convenient to both the living-room and the dining-room. A door with a panel of small mullioned lights at the top opens upon the back porch. In all, the living-room is lighted by five windows in addition to the light borrowed from the four windows in the vestibule and from the dining-room. The windows in this cottage are all casement and mullioned. They all open in and are so placed as to be well sheltered from the weather, so that there is no danger of leakage. These windows are especially suited to small and homelike cottages on account of their quaintness and indescribably friendly look, as well as their desirability on practical grounds.

The dining-room is seventeen feet long by twelve feet wide, and is lighted by a triple window on the side wall. Here the wainscot is dropped to a height of three feet, affording a pleasant contrast to the high wainscot of the living-room. The kitchen and pantry are combined in one large room with built-in cupboards and all conveniences. A storeroom with a window connects with the kitchen. The cellar, which is unusually large and lighted by high windows, is entered from the kitchen. It contains a laundry, lavatory and toilet, large storerooms, and place for a heating apparatus and coal-bins.

The second floor is divided into an upper hall, four bedrooms and a bath; two of the bedrooms are large, and two are of medium size. All are excellently lighted, ventilated, and supplied with closets, and all are accessible to the hall and bath.

The cost of this cottage, it is estimated, will be in the neighborhood of $3,500, if located where the materials required are fairly easy to obtain.

POTTERY SECRET OF ANCIENT ROMANS.

As a result of archæological studies pursued during many years, J. Prestel claims to have discovered the essence of the method employed in the manufacture of ancient Roman pottery and its homogeneous glaze. According to Herr Prestel, the secret lies, not in the chemical composition of the paste, but in the treatment applied to it and to the colored glaze. The clay was prepared by ageing, followed by washing, kneading and stamping. Before firing, the ware was exposed to the sun and air, but sheltered from rain, until it appeared quite dry. The frequent changes of temperature and humidity and the alteration of sunlight and darkness which occurred during this slow process of drying insured uniform shrinkage in firing and durability of the finished ware. When a glaze was used it was applied to the moist ware immediately after the latter was shaped, so that the glaze became intimately united with the body of the ware during the slow drying process. Firing then produced a brilliant gloss and imperishable colors.—New York "Scientific American."

THE DISCOVERY OF GLASS.

Pliny gives a well-known account of the discovery of glass by Phœnician sailors who built a fire on the sand with which soda was mixed.

Now, this account is untenable, says The National Jeweler and Optician, and we note that Pliny does not give it other than a story he had heard. On the other hand, it is not to be wondered at that such a story should become current, considering that Egypt was not a timber-producing country, there being no occasion there for furnace fires, or fires other than for the most necessary domestic use; while Phœnicia was heavily timbered, and its people, the great traders of the world at that period, were accustomed to the use of fires and became the glass makers of the world after the Egyptians.

From the copper glaze of the tombs of Beni Hasson to the making of a true glass occupied what to us would be a very long time, that is, about 1,000 years. The mixture of the alkali from the Natron lakes (in the vicinity of Alexandria), with a substance like copper slag, developed into nearly what we know as glass, the first piece being altogether opaque, showing the insufficient heat and insufficient alkali or flux. The decomposition of pieces found is exactly what would happen to glass made this way.

GAS ENGINE PUMPING VS. HIGH DUTY STEAM PUMPS.—By L. G. Read, M.E., A., Mem. C.S.C.E.

IT IS NOW very generally conceded by the engineering fraternity that gas engines have come to stay: indeed, in no branch of applied science has anything like a corresponding advance been made during so short a space of time as in the design and efficiency of the prime mover.

A few years ago the internal combustion engine occupied a small field consisting of small units—doing work of small importance, and was not even considered eligible to take the place of an ordinary non-condensing simple steam engine in driving an ordinary ten-hour-per-day factory load. To-day the ten-hour factory load is among the least of its marvellous accomplishments. To-day there is no kind of duty so sensitive, so irregular, or so large that it does not successfully perform.

In paper mills, textile mills, flour mills, cement mills and central generating stations it has not only proved its own reliability, but has maintained its unchallenged superiority over the best performances of steam engines in points of fuel consumption per b.h.p. hour, and now it has entered the field of pumping—the field in which steam engines have attained their most brilliant results. It enters this important field too, not to compete for honors merely against the direct-acting non-fly-wheel type of steam pump, but against the steam pump's "Champion" unit—the *high duty type.*

With perhaps less than a dozen exceptions, there is not a pumping unit on this continent which is averaging, under ordinary daily working conditions, more than one hundred millions of foot pounds duty per hundred pounds of coal, and it is safe to say that the *average* foot pound duty—among the municipal pumping plants: that is to say, taking the *best* average—will fall far below *seventy-five* millions.

Without going into the reasons—the inherent inefficiencies of a steam plant, whether it be pumping or any other duty, the universally conceded difficulty of maintaining the efficiency of a steam plant under ordinary daily working conditions, etc.—let us compare the showing which a suction gas engine pump is prepared to make, against a high-duty steam pump.

To begin with—it must be remembered that the results obtained with the steam pump under *expert test* and the results shown under *daily working conditions* are vastly different—for the reason that its overall economy depends mainly upon its boiler evaporative efficiency and it is needless to dwell upon the fact that whereas, under expert handling, with all surfaces clean and with proper draft pressure, an evaporation of ten pounds of water per pound of coal may be obtained, this evaporation falls off rapidly under ordinary daily working conditions, and as against which the suction gas engine—having no surfaces to become foul, no varying draft pressure, not depending upon evaporative efficiency, stoking or any of the many other separated elements of the steam plant, maintains its expert results automatically and continuously. And it must be particularly borne in mind that guarantees obtainable on high-duty steam pumps are invariably based upon a given foot pound duty *"per thousand pounds of dry steam"*—without regard to the amount of coal which *may* have to be burned in order to supply the "thousand pounds of dry steam," and that the actual yearly coal economy is 35 to 50 per cent. below the usually advertised results. As against this a guarantee is given on the gas engine based upon a given foot pound duty *per hundred pounds of coal* and covering a period of an entire year's run, thus leaving no doubt as to over-all results or as to its continued economy.

The Hornsby-Stockport gas engine has demonstrated—in many installations in Canada—that, under continuous ordinary daily working conditions, a fuel economy of less than one pound of Pennsylvania anthracite pea coal per b.h.p. hour is obtained; that is to say, it delivers on the engine shaft 33,000 foot pounds x 60 minutes=1,980,000 foot pounds per hour per pound of coal, or 198,000,000 foot pounds per hour 100 *pounds* of coal.

Should this engine, therefore, be direct coupled to a multiple-throw pump with an overall efficiency of say 80 per cent., then the combined efficiency would be 198,000,000 x 80 per cent. or a foot pound duty of 158,400,000 per 100 pounds of coal. Using a clean anthracite pea coal (such as is easily obtainable in the Canadian market) at a cost of say $5.00 per ton and pumping against a head of 100 feet—including suction lift—this gas engine has to its credit the phenomenal economy of 22.5 cents fuel cost per 158,400,000 foot pounds duty—net! or, expressed in terms representing daily working conditions, would pump *one hundred and fifty eight thousand four hundred Imperial gallons per hour, against* 100 *feet head, for a total fuel cost of only 22½ cents*, or 3,800,000 gallons per 24 hours for a total fuel cost of only $5.40—enough water to supply a city of 30,000 population and with 800,000 gallons per day as a margin. 3,800,000 gallons of water per day for a fuel cost of only $5.40 being equal to only $1.42 per million gallons per day!

It is perfectly safe to say that—with two, possibly three—exceptions, there is not a town in the entire Dominion but what its fuel cost for pumping is from three to ten times this cost. And the above figures represent, by no means, the *best* this gas engine can do. They represent an economy which is easily obtainable with small units—say down to 50 b.h.p.

As a matter of fact, in the larger units, say from 250 to 1,000 b.h.p.—a fuel consumption is easily shown of .8 of a pound of coal per b.h.p. hour. Taking, then, the pump efficiency still at 80 per cent., the result would be $\frac{158,400,000}{8\%}$ =198,000,000 foot pounds per 100 lbs. of coal or a fuel cost of only $1.14 per million gallons against 100 feet head.

No steam pumping unit—though it be of the best design, equipped with the most refined auxiliaries, and operated under the most ideal conditions, can approach such results! Furthermore, this gas engine can be attached to a turbine pump—a pump which is the acme of simplicity—by means of the famous Wuest Double Helical Speed Increasing Gear—a gear which, like the gas engine, has recently forced its own merit upon a doubting public—and show results which, under ordinary daily working conditions, are rarely equalled even by the best modern high-duty steam pumps.

Taking one pound of five dollar coal for the gas engine per b.h.p. hour, 97 per cent. efficiency for the gear and a turbine pump efficiency of say 68 per cent., the result (with ample margin of safety) is 33,000 x 60 x 100 x 97 per cent. x 68 per cent=*over* 130,000,000 *foot pounds duty per* 100 *pounds of coal.*

How many high-duty pumping sets—in the United States and Canada combined—will average a daily working result of even one hundred million foot pounds duty per 100 pounds of coal? Not a dozen!

And yet here is a gas engine, with self-contained enclosed gear and turbine pump—with capital cost, space occupied, cost of maintenance, attendance with maximum simplicity, fewness of parts, ease of accessibility—all in its favor—which, almost without attention, will develop 130,000,000 foot pounds per 100 pounds of coal every day in the year, and with the crowning feature of automatic regulation of its own economy—since not a pound of coal *can be* consumed except in direct proportion to the actual horse power required on the engine shaft.

In other words the efficiency of the steam plant depends directly upon boiler evaporative economy, and the

(*Concluded on Page* 82).

UNIQUE METHOD OF CONCRETE WALL CONSTRUCTION.—Invention of Graduate o School of Practical Science.

TO BUILD IN CONCRETE without the use of forms has long been the problem that has presented itself to the constructing engineer and contractor.

Until quite recently no satisfactory method had been devised, though many devices for reducing the cost and labor of erecting forms have been brought on to the market.

Concrete blocks may be said to achieve this result, but the cost of this form of construction is comparatively high and the dry tamp method, necessary to make one machine turn out a large number of blocks, has not been very satisfactory as dry concrete has not the full strength of a wet mixture; and is porous causing the block to soak up moisture in wet weather.

The Wagner system as illustrated in the accompanying cuts is an invention of W. E. Wagner, B.A.Sc., of Toronto, for which patents have just been granted.

This method of construction is entirely new, and, while it presents all the advantages of ordinary concrete work, the cost of erection is considerably less than half.

The large air spaces are of special advantage as an insulator against heat and cold, and the surface, being trowelled wet, is very dense, and this together with the air spaces, prevents any penetration of moisture, making it perfectly safe to white plaster directly on the slabs. In many cases the smooth finish of the slabs is quite sufficient without any extra plaster coat.

The procedure in construction is to make, in a factory or on the building site, a number of slabs reinforced with poultry netting and containing two or more projecting bond wires.

The slabs are made in a multiple bottomless mould, consisting only of side pieces of the same thickness as is required in the slab, and the surface is struck off with a straight edge. It is convenient and economical to build the slabs one on top of the other with a sheet of building paper between, as this minimizes the amount of floor space necessary and keeps the slabs from setting too fast, which might result in hair cracks.

Only a few forms are necessary, as they are built with projecting steel plates set in flush with the bottom of the boards, and these plates rest on the finished slabs, thus supporting the form. The forms are made detachable at the corners so that they can be easily removed from the lower slabs, and put in place on top for another set.

The surface of the slabs can be trowelled or floated off, and will closely resemble marble if faced with a coat of marble dust and white cement. A very attractive wall is made by selecting colored stones for the surface, and washing and scrubbing the slab, before it has set very hard, to remove the mortar from around the stones and cause them to stand out.

Form boards marked D are used to gauge the thickness of the wall and hold the slabs in line until the studs have been poured.

These form boards are made in two pieces, wedge shaped, so as to be easily removed and are clamped by struts D3 and wedges D4, to the finished stud in the course below. The tops are held in place by separating blocks D5 and clamps F.

The horizontal joint is spread with mortar and slabs are set in place against the form boards, and the projecting wires are inter-locked as shown, to hold the slabs rigid; then the space between the form boards is poured with concrete to form a stud, embracing the bond wires and holding the slabs permanently in place.

After the studs are sufficiently set, the form boards are loosened and raised, ready to receive the slabs in the course above.

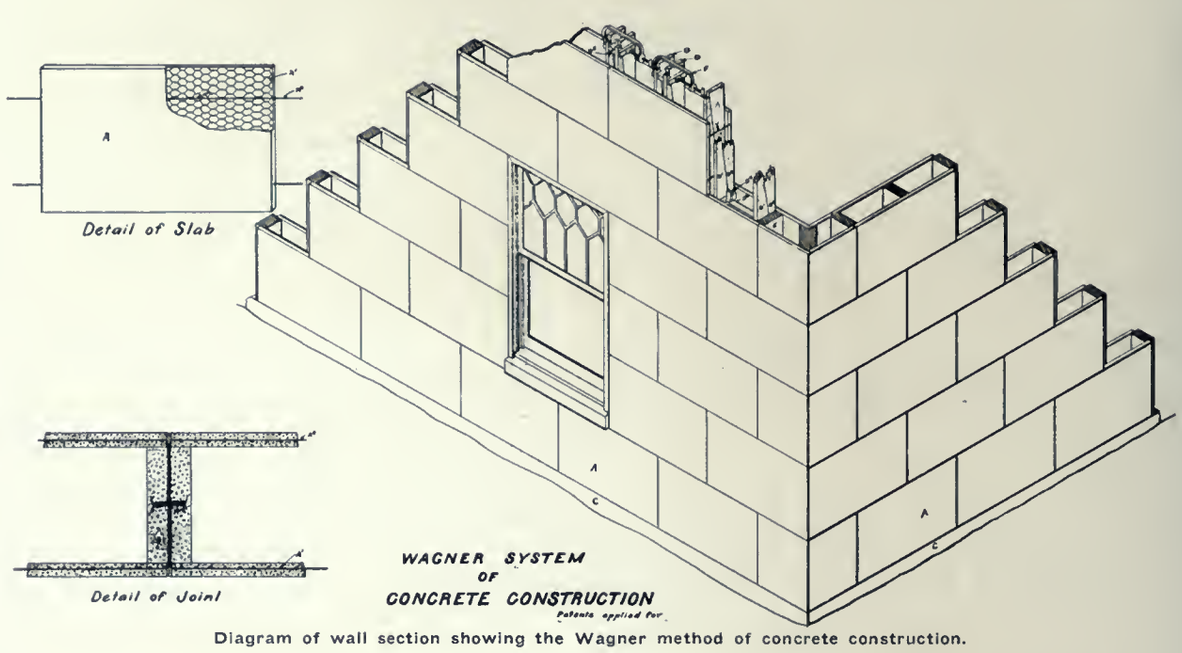


Diagram of wall section showing the Wagner method of concrete construction.

To obtain horizontal bond between the courses, the studs are not jointed at the same level as the slabs, but are made to extend down and catch the top bond wires in the course below.

The slabs are not intended to carry any load; the weight of the joists being transmitted directly to the studs. This is done by reducing the thickness of the wall at each story and thus forming an offset. The top of the studs are joined together level with the offset forming a concrete beam, on which the joists rest. The studs may be any width and the wall any thickness, depending on the load.

The Wagner system is used in the same manner for building solid walls. After the slabs are in place, the greater part of the wall space is filled with concrete, leaving only the space occupied by the form boards, and this space is filled when pouring the course above; thus a solid wall is built with a hard and close grained surface, requiring no finishing work, and without the use of any exterior form work.

MACHINERY AND TRADE

Canadian National Exhibition.

WHILE THE CANADIAN National Exhibition is of invaluable assistance to the Canadian manufacturer in general, affording him an opportunity of displaying to hundreds of thousands of his countrymen the product of his craftsmanship, there is perhaps no branch of trade more directly benefited by this important annual affair than the building material interests. In almost every other line of business the travelling salesman carries samples of the product of his house. The building material salesman cannot do this, and in some instances his prospective customer has never actually seen the wares he offers. Thus the bringing together in one place, of a comprehensive array of materials, affords a distinctive class—architects, contractors and builders—a most excellent opportunity of informing themselves of what may be obtained along these lines from the Canadian manufacturer.

This is a most gratifying condition of affairs, for it is too often supposed by those who have the power to purchase, that in order to obtain materials and equipment in keeping with the structure they may have in view, that it is necessary for them to look beyond the borders of Canada and obtain the product of the foreign manufacturer. This should not be, for the good and simple reason that at this present day, Canadian manufacturing houses can supply materials and equipment for buildings quite in keeping with the most exacting demands of the builder. Why this custom should obtain is the fault, perhaps, of the manufacturer as much as anything else. He has not, as a rule, realized the necessity of educating the purchaser to the nature of the goods he produces. He has been slow to exploit his wares in the market place and demand attention. But a change has been affected by a fuller realization of the tendency of some Canadian buyers to go abroad, and one of the steps, by no means the least, which has been taken with a view to securing to ourselves our own trade, is the growing practice of annually displaying at the National Exhibition, for the inspection and consideration of the Canadian purchaser, the successful achievements of the Canadian artisan. Now that the Exhibition is being so well patronized by the building inter-

Exhibit of the Geo. B. Meadows Toronto Wire, Iron and Brass Works Company, Ltd., at the Canadian National Exhibition.

ests, it would be well if arrangements were made whereby a building would be set apart to contain all exhibits of this character.

Exhibit of Geo. B. Meadows Company.

WITHOUT DOUBT the exhibit of the Geo. B. Meadows Toronto Wire, Iron and Brass Works Co., Limited, in the Process Building, was one of the most excellent on the grounds. The accompanying illustration may give the reader some idea of the character of display made by this firm—but, unfortunately, a photograph does not reproduce the beautifully rich color effect of the bronze, the iron and the brass in their various shades of finish. This firm is to be highly complimented on their enterprise—and it is rumored that the Exhibition Management are inclined to reward their endeavors by some special recognition. The display embraced almost every line of goods manufactured by the Meadows Co., and the range of their products is an extensive one. Almost everything imaginable in the way of highly artistic, ornamental iron had its place, and was very cleverly arranged to meet the eye of the visitor without clashing with the surroundings. A teller's cage had a most business-like appearance, and a sheaf of valuable looking checks rested on the paying board. These were most generously distributed to the firm's thousands of friends and informed the recipient that "Our Old Sand Bank will pay all sorts of Dollars to every Canadian who will invest brains and honest toil in the development of the natural resources of the Dominion," with the very promising prospect that "Dividends for old age are positively assured." These checks created considerable interest, looking very genuine, being printed on official blue paper in handsome and business-like script. And the Geo. B. Meadows Co., in giving these checks, gave value indeed—for the sentiment expressed is good—and it shall never be known to what value some of them will be cashed in the future.

Eaton's Model Furnished Rooms.

DECORATIVE ART as applied to the interior of the home, so as to produce absolute harmony between the architectural scheme and furnishing, was beautifully exemplified at the National Exhibition in the "Model Furnished Rooms" of the T. Eaton Company. This splendid exhibit, which proved an irresistible attraction to the thousands of visitors who thronged the Manufacturers Building, comprised four handsome interiors, each carried out in a distinct decorative style. In each room, the absolute absence of conflict, the minute consideration of detail and the discrimination displayed in the selection of each essential, bore eloquent testimony as to how thoroughly equipped and capable this firm is to serve the architect and owner in carrying out work of this character.

Louis XVI. Dining-room, at the T. Eaton Company Exhibit of "Model Furnished Rooms."

A strikingly rich interior was the Louis XVI. drawing room. The walls of the room were divided off into silk panels and the wood work and ceiling characterized by the decorative features of this "period." In keeping with the whole were the silk rep hangings, the hand embroidered curtain and lambrequin of Brussels lace, and the hand tufted Austrian rug, designed especially for this particular scheme. Adjoining this, was the Flanders Living Room, a quiet and restful interior, equally as carefully considered in its every detail. Here the color scheme was carried out in soft tones of green and brown;

the furniture being in oak upholstered in green damask, and the floor covered with an oriental hand tufted rug. A pleasing feature was a Flemish brick fireplace, affecting in its design, the delightful simplictiy so evident in the decorations and furnishings.

Differing essentially from the others, but none the less interesting, was the dining room carried out according to the decorative style of the Flemish Renaissance. A feature of this interior was a magnificent suite of old oak finished furniture, an exact copy of the set used by William III., Prince of Orange. The walls of the room were done in a delicate blue, being panelled, and set off effectively by a freize of wool tapestry; this tone being further carried out in the curtain of plain tapestry and the Austrian hand tufted floor rug. A pleasingly designed mantel added effectively to the whole, while over the table was a large inverted ceiling dome in colors and enriched by six pendants.

Another most inviting interior was the Bed-Room, with its furniture of inlaid satin wood, designed in the Adam style of the 18th Century. This set consisted of a wardrobe, ladies' dresser, secretary, bed, small table, somno, two chairs and a rocker; and as in the other rooms, the wall hangings, decoration and carpets, were selected so as to produce a perfect harmony in the general scheme.

"Alexandra Ware"

THE EXHIBIT of the Standard Sanitary Company of Port Hope, displayed to advantage, a most complete line of bath tubs, wash stands, bidets, foot baths, shower receptors, manicure tables, and other toilet room necessities. The company are the largest exclusive manufacturers of cast iron porcelain enameled sanitary ware in the British Empire. Included in the display, which took in an entire section in the Process Building, was a full line of the well-known "Alexandra Ware," which, owing to its superior quality, design and finish, is meeting with universal favor among architects and owners throughout the Dominion. "Alexandra Ware," is free from the many defects found in so-called "solid enamelled porcelain ware," made from clay products. It is heavily enamelled both on the exterior and interior and has a "pure air space," instead of a porous clay body. Besides this, it is made in two parts, being more convenient to handle and install, and, as for style, the company has forty-eight exclusive designs fully protected by patent right. In addition to the foregoing lines, the company also manufactures drinking fountains, laundry trays, kitchen sinks, factory sinks and lavatories, and a large variety of similar appliances, designed to meet the requirements of every class of building where the most approved methods of sanitation are desired.

Francis Hyde Company

THE FRANCIS HYDE COMPANY, Montreal, had an extensive exhibit in the Machinery Hall, consisting of foundry supplies and equipments, contractors' materials, fire brick, clays, etc., and full oil furnaces for all shop purposes. The bending of the piston rod on the large engine, used to drive the shafting in Machinery Hall, during the early part of the first week, gave the company a most excellent opportunity to demonstrate the capabilities of the King Portable Heater, one of the attractive features of their display. This mishap promised to place a large number of exhibitors at no little inconvenience, and it was only after the Board of Management had learned that no shop in Toronto was prepared to make the repair in less than two days' time, that the company undertook the work. The rod was then placed over the furnace in question, and subjected to a temperature of 2,200 Fahrenheit, the time required to heat it through and bend it back to shape, occupying but a space of thirty-five minutes. The quick and thorough manner in which this work was performed leaves no doubt as to the practical value of the King Portable Heater, and the important part it is destined to play in the modernly equipped shop and plant. It is capable of generating as high as 4,200 degrees of heat, the fuel used being common crude oil with compressed air.

Hygienic Flooring

THERE HAS RECENTLY been placed on the Canadian market a new chemical composition floor known as the "Hygienic Floor," which comes well recommended. It is the product of the Chemical Floor and Tile Co., 25 Toronto street, Toronto, R. M. Houser manager and treasurer, and already some large contracts have been placed for its installation.

The new 12-story factory building of The T. Eaton Co., Limited, will contain nearly 200,000 square feet of hygienic flooring. It has been installed and successfully tested by this firm in other parts of their Toronto premises, and this magnificent order speaks well for it.

While it is new in Canada, it has been used with marked success in Germany and other European countries. Slight changes were made in the chemical composition to meet the climatic conditions of this country, and it is now claimed by the manufacturers to be a floor of excellent merit, absolutely impervious to fire and water, and of lasting quality.

Field-Made Concrete.--Cont'd from Page 61

the work may be cheapened very much and be made more satisfactory all around.

Let me repeat the formula for concrete—Portland cement, sand, stone, water and brains. And let me say again, mix it thoroughly. When you have mixed it enough give it another turn. After it has been pounded, pound it again. When you have puddled it well, puddle it some more.

Gas Engine Pumping vs. High Duty Steam Pumps.--Continued from Page 75.

boiler economy depends directly upon the intelligence with which every pound of coal is fired.

As against these varying and uncertain elements the gas plant eliminates all consideration of evaporative economy, draft pressure or intelligence of firing—by the substitution of a device through which and by no other means, the consumption of fuel is regulated by the movement of the engine piston itself and, since variation of piston resistance is instantly met by the action of a sensitive governor, it follows that no fuel *can* be converted except in direct proportion to the variation of load.

It would be of great interest—did space permit—to go more fully into plotted data covering direct comparisons with actual results. May it suffice, however, for the moment, to say that very shortly a demonstration gas engine pumping set will be installed in Montreal, consisting of a small (55 h.p.) gas engine with Wuest Double Helical gear and a turbine pump, for the purpose of permanent exhibition—that Canadian engineers may see for themselves, not merely *expert* results; but results obtainable by a continuous 24-hour-per-day performance. This exhibition unit will be equipped with all necessary instruments for pumping under a variety of quantities and heads and any competent engineer will be permitted to make his own tests and satisfy himself as to results.

In a later issue of this journal the writer will deal with the mechanical questions of gears, belt and rope drive of turbine pumps.

'Steelcrete' Expanded Metal System

for fireproofing Steel Frame Construction

is unequalled for efficiency, economy and utility. :: ::

The New Eleven Story Warehouse now being erected in Toronto for the T. Eaton Co. represents another of the many recent victories of

"Steelcrete" Expanded Metal Concrete Reinforcement

The concrete floors and the concrete fireproofing of the columns of this structure are reinforced with "STEELCRETE" EXPANDED METAL.

"Steelcrete" Expanded Metal is adapted to any form of reinforced concrete work. Its use insures a strong and durable result and the facility with which it can be handled reduces all construction costs to a minimum. The continuous mechanical bond afforded in all directions provides for the true type of monolithic structure with every unit of mesh carrying a portion of the load.

It assures an elasticity and tensile strength in concrete construction which admits of graceful lines without weakening arches, enabling it to conform to the requirements of the most elaborate architectural design and exacting engineering practice. It has been the standard — UNIVERSALLY ACKNOWLEDGED — SUPERIOR REINFORCEMENT FOR 15 YEARS.

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EXPANDED METAL AND FIREPROOFING COMPANY, Ltd. FRASER AVENUE TORONTO

Toronto's Shame

IF THE NEXT school building disaster takes place in the city that has, through faulty construction methods and grossly inefficient protection against fire or panic, the most inadequately equipped structures in the shape of public school buildings, Toronto will be aroused with a horror that will never be forgotten, one that may, at last, awake the public, the city fathers, and school officials from their self-satisfied and indifferent attitude toward the proper design, construction and equipment of school buildings in the city of Toronto.

We do not know of a city of its size on the continent that builds three story school buildings of such a cheap, inflammable type of construction, without some character of emergency exits being provided as a protection against the unexpected in case of fire or panic.

Toronto's school buildings are practically all three story structures, of what we might call simply cheap joist construction, and there is not one in the whole city that is equipped with fireproof stairways, fireproof entrances, or fire escapes of any kind whatever. Such a deplorable, yes, almost criminal condition, obtains in no other city of its size on the American continent.

If a private individual applied to the City Hall in Toronto for a permit to erect a structure of like construction, to be used for a similar purpose, with the same lack of protection against fire or panic, it would be refused. Three story apartment buildings must have fireproof entrances, as well as fire escapes. Business buildings and factories, three stories or more, must have fire escapes. Theatres must be provided with exits on every side, with automatic doors, which open out on to an elaborate system of outside iron stairs, which must at all times be kept absolutely free from obstacles of any nature. Such places of amusement must also be of at least semi-fireproof construction. Three story hotel buildings are required to protect their guests to an infinitely greater degree than does the city of Toronto protect its school children.

Why is it necessary to provide such strict measures of protection on all such buildings that are occupied by adults, if it is unnecessary in structures that house from four hundred to a thousand school children? A business man finds it expedient under the present methods of underwriters' inspection, to build his factory, his warehouse, his office building or his store building of at least semi-fireproof construction, but a building constructed of highly inflammable materials, without even the usual fire protection required by the city's building department in private buildings, is sufficient to send his children to school in.

A Lesson Unheeded

After the horrifying Collinwood catastrophe that occurred more than a year ago, the daily papers all over the continent were loud in their demands for better fire protection in school buildings. Cities in every portion of the United States and Canada conducted school building investigations, with the result that there were radical changes effected in hundreds of towns and cities. Even the smaller cities and towns, where public school structures accommodate a comparatively small number of pupils, made marked improvements. Many cities in the United States closed the third floor of their schools until fire escapes of some character were provided. Others closed some of their schools entirely. Toronto did nothing. The daily press was full of talk for a while, but it died down without having accomplished one improvement. The school authorities assured the people that Toronto's schools were safe, there was no cause for alarm, and that, in case of fire, a carefully worked out system of fire drills would effect the safe exit of the children from a burning building. The public, which knows little or nothing about building construction or fire protection, accepted this statement of the school officials, and were satisfied. The daily press does not run a building inspection bureau, and hence editors, through the lack of authentic, unbiased, technical advice on the subject, dropped the matter when the sensational interest in the agitation ceased.

Montreal, as a result of her dearly bought experience in the Hochelaga disaster, was taught a lesson that resulted in convincing her school authorities of the necessity of fire escapes. We hope Toronto is not waiting for a similar catastrophe to cause her authorities to act.

Fire Drills

To say that the fire drill is sufficient protection against fire and panic in three story structures, such as are built in Toronto, is foolish on the face of it. There is not a prominent school official or building inspector on the continent that would be satisfied with such a poor excuse for protection in buildings such as are Toronto schools.

If it is necessary to establish a fire drill to facilitate the quick exit from a building, for protection against fire, would it not seem reasonable that some measure of protection should be adopted against the awful consequences that would result from a fire panic. It is altogether probable that a building could be emptied through a well organized drill before the halls or stairways would be blocked by fire or smoke. But, if, in the event of a quick, threatening fire, the children became over-awed and were seized with hysteria, what provision is made to minimize the loss of life in the panic that would inevitably follow? There are many, not only possible but probable unforeseen situations that might arise that would easily cause a break in the ranks of the little marchers, and create a condition of wild disorder. In such cases, the passages would be blocked, and with the exposed wooden staircases and unprotected narrow hallways, the natural means of exit would soon be cut off, and with no outside stairways, no fire escapes, and no iron chutes, the children in the third floor, in the hallways, and in the stairways would perish as if caught in a flaming trap.

No one will deny the fact that a fire drill is necessary

under any and all conditions, but it is by no means sufficient protection in itself, in a three story building. It is a conceded fact that almost invariably all the fatalities that have occurred in fires in school or public buildings are the result of panic, and not actually of the fire itself. If we require the fire drill for protection against fire, then why should we not make some provision for emergency exit in case of panic? What this outside means of emergency exit should be, it is not my purpose to say. In New York, an inside fireproof stairway is used. It is cut off from the building proper entirely with a fireproof wall, and is covered with wired glass. In other cities outside covered iron stairways are used. In still others, open iron stairs, protected with iron netting, have been adopted. In others, the ordinary iron stairway has been considered sufficient, and in many others, what is known as the spiral slide escapes are used, with the greatest satisfaction. This latter type has been put on thirty-four schools in Chicago, and fifty are in use in Louisville, Kentucky. Winnipeg recently spent $24,000 in equipping its schools with this escape.

But fire escapes are only a means whereby some additional measure of necessary protection is provided on a building that was originally badly designed and cheaply constructed. The ideal school building should at least be of semi-fireproof construction, and should not be more than two stories in height. It should have at least three wide fireproof entrances and stairways, the halls should be straight and broad, and the first floor should be of concrete. In such buildings, fire escapes are, of course, unnecessary.

Schools in the West

I was very much impressed with the superior character of public school buildings being erected in Western Canada. In even the smaller Western towns, the school buildings represent the best type of construction to be found in each town, and I must say that their broad, liberal spirit in this particular, sets to shame many of our communities in the East, and especially Toronto, with the antiquated, fossilized, tight-fisted policy pursued by those who are responsible for the shamefully inferior type of school structures in Toronto.

Winnipeg is especially to be congratulated in the liberal, vigorous and wholesome manner in which they have undertaken to teach and house their school children. After the Collinwood disaster, all three story structures were equipped with spiral slide fire escapes. These escapes are steel tubes connected with the building by long iron balconies. A steel door opens out on these balconies from the tube at the second and third floors. The children come out on the balcony and throw themselves into the tube and slide down a spiral sheet steel slide. The first boy down automatically opens the door at the bottom of the tube with his feet and the others follow at a remarkable speed. Everything works automatically, and it is impossible for an accident of any nature to occur. The children enjoy it immensely, and continually look forward to the fire drill, with the prospect of going down the fire escape.

During the recent visit of the British Association for the Promotion of Science, the Commissioner of School Buildings of Winnipeg, Mr. Mitchell, gave a demonstration of the efficiency of their fire drill and these fire escapes before a delegation, and Dr. Kimmings, Inspector of Schools of London, England, who has 20,000 teachers under him, after having taken a trip down the escape, declared it the most wonderful protective device he had ever seen.

But not only has Winnipeg put Toronto to shame in the matter of providing and equipping her three story schools with efficient and practical escapes, but in the design, construction and equipment, her recent schools, which, although not absolutely fireproof, are of an immeasurably better type of construction than is employed in Toronto.

All schools now under course of construction are built with solid brick walls lined with terra cotta, directly upon which the plaster is applied. The first floor is of reinforced concrete, the entrances are fireproofed with concrete, the halls are from 14 to 18 ft. wide, and metallic ceilings are used throughout. When we take into consideration the very much higher cost of all fireproofing materials in Winnipeg, as compared with the prices at which they may be obtained in Toronto, it seems most extraordinary that a city that claims the honor of being the educational centre of Canada, should be satisfied with such a highly combustible, cheap type of construction, as that adopted in the erection of her public schools.

Toronto Schools Inferior

Not only has Toronto refused to properly equip "blunders in school design," with proper fire protection, but the new school buildings erected, while somewhat larger, with a trifle better plan, are almost as bad in design, construction and equipment as the old ones; buildings of highly inflammable construction with no adequate means of fire protection. Surely a horrible catastrophe will not have to occur before people will awaken to the full realization of the awfulness of the consequences they are courting.

If the actual inferiority of Toronto's school buildings, as compared with those of the type usually considered adequate by authorities in other cities, could be made plain to the citizens whose children attend these schools daily, there would be a flood of criticism and demands for better buildings and better fire protection that all the assurances of the school officials of Toronto could not stem.

I am free to admit that Toronto's school officials are not wholly to blame for this deplorable neglect. They have unquestionably done the best they could with the funds at their disposal. But these officials are to blame in that they have assumed the responsibility for structures in the construction of which insufficient funds have been provided.

It would be ridiculous for an individual to attempt to erect a theatre in which the lawful fire protection was not provided for the safety of his patrons on the grounds that he had not sufficient funds to enable him to do so. The school officials are responsible for the condition of school buildings, and it is their duty to the public to see that they are provided with sufficient funds to properly erect and equip these.

Expert Criticism

This is not the first time that Toronto's school buildings have been adversely criticized. It is a common subject among the local as well as visiting members of the architectural profession. Mr. F. W. Fitzpatrick (executive officer of the International Building Inspectors and Commissioners of Washington, D.C.), who is the greatest authority in the world on building construction as regards fire protection, and is, by the way a Canadian. was dumbfounded at the character and condition of Toronto's schools during a recent visit to that city. He declared that in no particular are Toronto schools up to the usual standard in either design, plan, construction or equipment, and Mr. Fitzpatrick knows whereof he speaks.

If the school board were to submit plans of six representative Toronto school buildings to a committee of any five prominent architects in Toronto or in Canada, or five prominent building inspectors in the United States or Canada, for their opinion as to whether the buildings, as they now stand, with their present equipment, are safe, the unanimous answer would be in the negative. It is time that Toronto received the opinion of unbiased authorities on this important subject. It is most inconsistent to ask men to pass a criticism on their own work.

I.S.M.

Architects and Compulsory Education

THE MOTIVE BEHIND the several appeals made by the Ontario Association of Architects to the Provincial Government for the enactment of some measure that will establish a system of compulsory architectural education, have been misunderstood by many, and misconstrued by a few.

The O.A.A. is composed of men who stand high in their profession, men of integrity, who are among the most respected in commercial and social circles in the province. It is not their desire to monopolize the profession; their aim is not to secure a close corporation; their interest in this vital question is not prompted by the desire to strengthen their organization by forcing every architect in the province to pay dues into their coffers. Individually, there is nothing to be gained in a monetary way by the architect of to-day through the establishment of a legalized form of architectural examination.

The only selfish motive, if it could be so called, that these earnest men can have in this apparently thankless work, is their desire to promote a better class of architecture in the province of Ontario; to raise the standard of the profession and insure the public against the operations of the incompetent, dishonest, so-called architect. They ask that every man who wishes to serve the public as an architect, shall be forced to properly qualify before some competent, unprejudiced board of examiners.

And after all, what more public spirited motive could be conceived of? The very character, style and stability of our building depends solely upon the ability, knowledge and training of their designers. The design and construction of our buildings means much to us as a new country. There is no factor in our development that will so truthfully reflect our culture, tastes and attainments as our architecture. Then why should not a parental government in the interests of the whole people, insist that the men who are to be responsible for our buildings, should be properly trained and properly qualified to assume that great responsibility? This is simply what O.A.A. has been contending for. They have not laid down any arbitrary conditions under which they would have the government proceed. With their knowledge of the requirements and responsibilities of their profession, they ask the government to protect the people against themselves, by forcing the intending architect to prove his worth before he is permitted to assume the title.

The following letter from Mr. G. W. Gouinlock, President of the O.A.A., shows concisely the dire need for some form of compulsory education, and expresses briefly but truthfully the broad minded, unselfish position taken on the subject by the O.A.A.

"The aims and object of the Ontario Association of "Architects are to encourage a higher and better type of "architecture, which should have its effect in an educa-"tional manner.

"We have in Ontario an Act which permits architects "to register through our Association and call themselves "Registered Architects, but the course of study is not "compulsory, and there is nothing to prevent a black-"smith, butcher or other tradesman from calling himself "an architect and hanging out his shingle as such.

"Some years ago, when we first obtained our present "Act, architectural students thought then it would be "necessary to take examinations before they could prac-"tice, the result being that there was then a class of about "thirty attending the School of Practical Science (sub-"sidized by the Government.) I regret to say that since "it was found unnecessary to take a compulsory course "of study and pass examinations, the students have not "done so, and as a result there have been only one or "two architectural students attending the School of "Science these last few years.

"We applied to the Board of Governors of Toronto "University to improve our training, and they referred "us to Dr. Falconer, who expressed his sympathy in our "cause, but said he did not see that they were in a posi-"tion to endow a Chair of Architecture in the University "at present, as they had not sufficient accommodation nor "a professor for that subject. There the matter remains.

"In the provinces of Quebec, and Alberta they have "a course of study and examinations for architects before "they are permitted to practice, and this is bound, in my "opinion, to produce a better type of architecture and "assist in the beautifying of these provinces and in the "education of the public.

"At present we have no national style, and we can "never hope to obtain one so long as the education of the "student is neglected. This we have tried to remedy by "applying to the Government for an amendment to our "Act, so that we might have a compulsory course of study "and that the student should then be properly qualified "and the public feel safer inside of their buildings as "well as pleased with the exterior design.

"It does seem a shame that so little is known or "thought about architecture by the layman, the grandest, "the mother of all arts, and one in which a greater revolu-"tion has lately taken place and in which more progress "has been made, with more stupendous results, than in "any other."

The establishment of a system of examinations that would bring about compulsory education, would not increase the practice of its agitators one whit. Their interest in the question is prompted solely by their pride in their profession and the realization of their responsibilities. The agitation should come from the layman, the man who builds, but, unfortunately, the average man is not sufficiently in touch with the subject to realize its importance, hence the task falls upon the shoulders of the men who do know the real situation.

In the interests of the people of the province of Ontario, as well as the profession of architecture, some plan must be devised whereby an architect must be an *architect,* in deed as in name.

Overcrowding of Churches

ARCHITECTS are so accustomed to being criticized that they are usually loth to criticize. This is unfortunate, insofar as the public, of necessity, depends upon the advice of the architect in all important matters pertaining to building construction or equipment, and, while it may be ill-advised for an individual member of the profession, to put himself on record in the criticism of the condition or equipment of a building or of a condition that obtains in a given structure, it is, nevertheless, the duty of an architectural organization, as a body, to attempt to remedy such evils pertaining to matters of this nature, that militates against the safety and welfare of the public.

In this connection, we are pleased to note that the Toronto Chapter of the O.A.A., in a recent communication to Mayor Oliver, brought to his notice the flagrant violation of the building by-law, by several churches, in allowing their aisles to be obstructed by chairs. The letter reads as follows:

"At a meeting of the Toronto Chapter of the Ontario "Association of Architects held on the 12th inst., I was "instructed to write you in regard to Section 72 of the "Building By-Law, which prohibits any passageway, stair-"way, etc., in any church, theatre or other building used "for public meetings being obstructed by chairs, etc., and "also prohibits people from standing in aisles, stairways. "etc.

"We understand that the enforcement of this By-law "is in the hands of the Police Commissioners, and we "beg to suggest that, inasmuch as this By-law is fre- "quently disregarded, it would be advisable to have form- "al notice printed, containing the provisions of the By- "law, to be put up in some prominent place in all public "places of meeting.

"In making this suggestion, we have special reference "to churches having chairs in aisles, several instances "having come to our notice recently, where churches "have been very overcrowded.

"Those in charge of the church services are not us- "ually as conversant with the By-laws as are the officials "in theatres and other places of amusement, and the "danger in case of panic in church buildings is very "great.

"Trusting this suggestion may meet with your ap- "proval, I remain yours very truly, Wm. F. Sparling. "Hon. Sec. Toronto Chapter O.A.A."

This practice is known to be a common one in Toronto churches, and it should not be tolerated in a church any more than it should in a theatre, and it is to be hoped that Mayor Oliver will take the necessary steps to put a stop to it.

There are a few more abuses of the building laws in Toronto, known well to architects, that they would do well to bring to the notice of His Worship. In such acts as this, the architects are doing the unsuspecting public an inestimable service.

Building Activities in September

CONSIDERING THE POINT to which the season has advanced, and, especially the remarkable series of preceding monthly gains, September, as regards operations in the building line, was a period of unusual activity and development. Comparative figures, as supplied CONSTRUCTION, place the average gain for the month at 49 per cent., and, although five of the twenty cities reporting, showed a falling off, the losses were widely scattered, and detracted but little from the well balanced and highly satisfactory condition which obtained in general. The results in the West, were particularly gratifying, and only one city in that section, is listed among the places in the Dominion which suffered a decline. This decrease fell to the lot of Brandon, which, after a most lively period for some time back, dropped behind her last year's figures for the month, to the extent of 42 per cent. On the other hand, not only was a marked forward movement evident in all parts, but the gains made in almost every instance, were of such huge proportions as to most strikingly reflect the prodigious growth which the entire Western section of the country is at present undergoing.

The largest increase for the month is noted in the case of Calgary, which follows her extraordinary gains of the preceding months by another mighty advance of 377 per cent.; Edmonton is second in this respect, with an increase of 309 per cent., which overwhelmingly wipes out the loss sustained in the month of August: while Victoria again repeats her previous successes, by registering an advance of 160 per cent. the third highest increase tabulated for the month.

Aside from the splendid progress made in these places, other cities which showed substantial headway, were Vancouver and Winnipeg, which augmented their big season's gain by a additional advance of 135 per cent and 60 per cent. respectively. Regina also comes well to the fore by overreaching last year's figures for the month to the extent of 32 per cent.; and Lethbridge, although failing to submit corresponding figures for September 1908, shows by the high total recorded, amounting to $95,000. that this city is pressing onward at a most remarkable pace. Winnipeg issued permits aggregating in value $801,050, as against $481,200 in the corresponding period last year, while Vancouver shot ahead of her 1908 figures for the month, by a margin of $440,025.

Despite the set backs noted in the case of Toronto and Peterboro ,which were 5 per cent. and 18 per cent. in order named, the situation throughout Ontario proved to be highly satisfactory and steadfast. Berlin registered a gain of 150 per cent.; Hamilton 71; London 15: Fort William 10 per cent. and Port Arthur recorded a total for permits issued during the month of $271,000. which amply attests to remarkable expansion which is taking place in this rapidly growing city. This is the first reversal Toronto has experienced in eight months. and Peterboro's decline comes only after a series of uninterrupted gains.

In the east, Montreal has again annexed a gain, this time adding 8 per cent. to her credit. Operations in Montreal this year have been unusually active and an idea as to the progress which has been made may be imagined from the fact that the Metropolis has so far this year carried on building operations involving the expenditure of $6,505,151 as compared to $3,860,078 for the corresponding period in 1908. Halifax, however, was nit hard, suffering a decrease of 85 per cent., which doubled that of any other loss noted for the month. St John also recorded a loss, that of 19 per cent., but Sydney on the other hand loomed up strongly with a gain of 95 per cent., the fifth consecutive increase which this thriving city has recorded.

As yet there seems to be no indication of any decided break. On the contrary the reports from the country at large show that the architects and builders are unusually busy, and while the volume of work is not as heavy as in the spring and summer, there is at least a proportionately great amount in prospect through the Dominion than at any other fall season in the past.

	Building Permits for Sept., 1909	Building Permits for Sept., 1908.	Increase, Per Cent.	Decrease, Per Cent.
Berlin, Ont.	$24,000	$9,60-	150.	.....
Brandon, Man.	53,250	93,300	.....	42.92
Calgary, Alta.	280,737	58,800	377.44	.....
Edmonton, Alta.	505,199	123,425	309.31	.....
Fort William, Ont.	161,935	147,100	10.08	.....
Halifax, N.S.	27,000	180,311	.....	85.02
Hamilton, Ont.	181,950	106,150	71.40	.....
Lethbridge, Alta.	95,000	.....	.....	.....
London, Ont.	54,890	47,500	15.55	.....
Montreal, P.Q.	716,840	662,875	8.14	.....
Peterboro', Ont.	46,485	57,230	.....	18.77
Port Arthur, Ont.	271,900	.....	.....	.....
Regina, Sask.	53,300	40,173	32.67	.....
St. John, N.B.	15,800	19,550	.....	19..
Sydney, N.S.	18,205	9,300	95.75	.....
Toronto, Ont.	1,046,065	1,109,580	... ..	5.72
Vancouver, B.C.	764,530	324,505	135.59	.....
Victoria, B.C.	140,935	53,630	160.92	.....
Windsor, Ont.	17,600	.....	.....	.....
Winnipeg, Man.	801,050	481,20-	66.46	.....
	52,276,671	3,524,229	49.72	.....

A HALIFAX, ENGLAND, INVENTOR named Binns, according to a contemporary, has discovered a process whereby a durable waterproof wall paper can be made at a lower cost of manufacture. The finished product, it is said, bears a close resemblance to tapestry, and the quality is such that the paper, after being applied to the walls, can be washed and cleaned at will without the least danger of damage to the fabric. In the manufacture of the character of wall covering in question, a foundation of paper is employed, to which is secured by glue or size, a surface gauze or open woven fabric composed of cotton, flax or similar yarn, the whole being waterproofed by an oil or like process.

Residence of Wm. F. Sparling, of the architectural firm of Curry & Sparling, Toronto. A noteworthy production in domestic work in which the unique treatment of the clinker brick walls results in a rusticity of character which most strikingly harmonizes with its surroundings.

RESIDENCE OF WM. F. SPARLING, TORONTO.—Novel and Interesting Use of Clinker Bricks in Domestic Design.—Walls Partake of Rustic Character of Surroundings.—Interior, Home-like in Appointments and Carried Out with a Consistency in Decorative Detail.

IT IS THE AIM of all architects, and in fact, any person who strives for individuality in his environments to find new materials and new ways of doing things; and while it seems almost impossible to accomplish anything in this respect, at the same time it is possible to re-arrange the methods for utilizing materials that we have on hand, so as to produce some new and satisfactory effect.

This is admirably demonstrated in the residece of Mr. Wm. F. Sparling, of the architectural firm of Curry & Sparling, Toronto, in which one of the accepted materials of construction is shown in a most novel and interesting expression.

As the location of the site and its surroundings is always a prime factor in carrying out a consistent general scheme, the design in question and the adaptation of the materials employed were strongly governed by this important consideration. In this particular case, the lot was situated on the edge of the woods, and contained from ten to twelve varieties of trees, including butternut, two species of of hickory nut, beech, pine, maple, bass, ironwood, oak, and one or two other indigenous growths. It was at once decided that this setting called for a house of a semi-rustic appearance, as it was "the one chance in a thousand" where it would be possible to find such an unusual condition within a city limit.

The question of material at hand it was decided to use clinker brick, but in a way different to what had hitherto been employed. For the benefit of those who are still unacquainted with clinker bricks, it might be said, that in burning the kiln in making brick, the bricks next to the fire fuse and run out of shape, forming in the shape of clinkers. Formerly the smoothest of these bricks were used for facing the walls and backed up with the rougher brick. In this case, however, the owner decided to try the other extreme and culled out the smooth brick, using only the rough knobs for the outside. The experiment proved to be anything but disappointing; the ruggedness of the walls fitting in perfectly with the surroundings and partaking of the character of the foliage about it. To form a contrast with the rough brick, there is a strip of roughcast plastered on the brick slightly up from the first storey; and this, with a wide overhanging eave, and a good old fashioned cottage roof with a large bell cast, gives a very consistent and pleasing effect.

The brick in the summer, and more especially damp weather, takes on a dark greenish brown shade, and in the winter a tone more on the lighter browns and straws color. In laying the brick, it was endeavored to keep out all brick with yellow cast. The roughcast is in a straw color, and the general woodwork white, except the soffit

Detail of clinker brick walls and stone work, Residence of Architect Wm. F. Sparling, Toronto. Note the general ruggedness and striking rustic effect of the masonry.

Entrance Hall, looking towards reception room and vestibule, residence of Architect Wm. F. Sparling, Toronto.

Living Room, residence of Architect Wm. F. Sparling, Toronto, showing the clinker brick fireplace with its copper hood, and the general character of the home-like appointment. Note the furniture, which was especially made to form a part of the general scheme.

Dining Room, residence of Architect Wm. F. Sparling, Toronto. The wall and color scheme of this interior is similar to that of the living-room, which it adjoins. The panelling is filled with a greenish paper having an oatmeal effect; the woodwork is in black ash and the floor in plain cut oak. Above the plate rail the frieze is done in a rich shade of burnt orange, while the tone of the ceiling tends more to the yellow ochre.

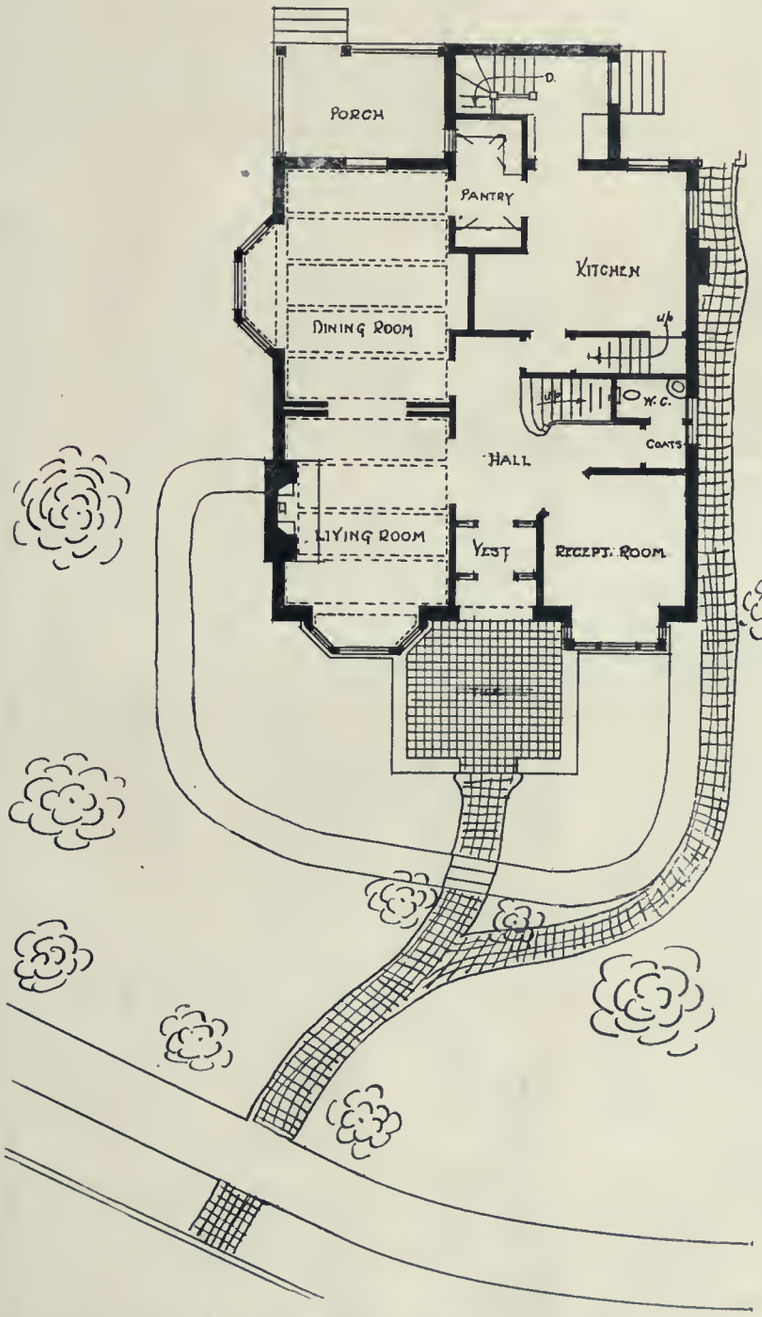
Bed-room, residence of Architect Wm. F. Sparling, Toronto. Note the complete harmony between the wall treatment and furnishings.

Bath-room, residence of Architect Wm. F. Sparling, Toronto. A compact but conveniently arranged and refreshing interior, equipped with the most approved sanitary fixtures and carried out with consistency of decorative detail.

of the caves, which are undressed boards and battens stained green, with a copper colored gutter and down pipe. The walks and piazza are carried out in red tile quarries. This with a mottled green slate roof and the green foliage, gives a finishing touch to the general color scheme. It will be noticed that the verandahs were kept from the front of the house, being placed so as to overlook the woods in the rear, the upper balcony especially, being very large and cosy, and so designed as to readily admit of it being closed in with glass.

In planning the interior, it was kept in mind that the more compact the plans the less would be the work required in housekeeping. The arrangement was therefore governed so as to produce a plan which would not only afford as much comfort as possible to the occupants, but also the greatest degree of convenience in the performance of domestic duties; as after all, this later consideration is something which must always be taken into account in the designing of a successful house.

On coming in the front door one is impressed with the pronounced homelike feeling which prevails and this impression is greatly intensified on entering the living room, for, directly across from the door is a large clinker brick fire-place—with a round copper hood and an opening capable of burning large logs—which beckons most invitingly. The whole room was designed with the sole object of harmony and comfort; and it is surprising how much the success of the whole is contributed to by the color scheme. The woodwork, including plate rail, beams, etc., is of black ash, stained a russett brown, which gives a two tone effect. The dark grain comes out a rich brown and the lighter grain a golden copper shade that is difficult to definitely describe, but which results in a most exquisite effect.



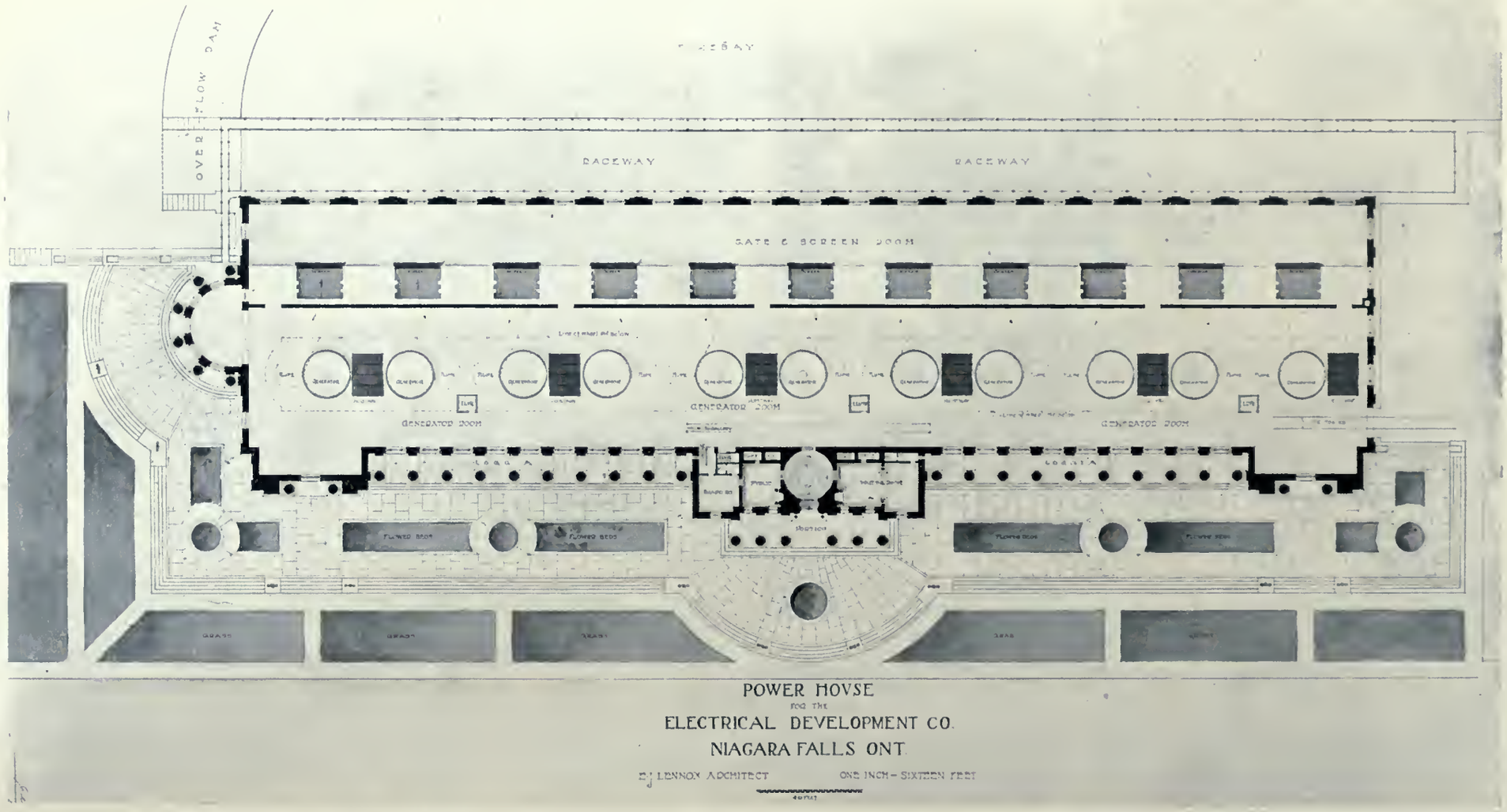
Plan of grounds and first floor, residence of Architect Wm, F. Sparling, Toronto.

Second floor plan, residence of Architect Wm. F. Sparling, Toronto.

The living room and dining room, being adjacent, are panelled and the panels filled with a kind of green paper, which gives an oatmeal effect, or which has an appearance of cork matting. Above the plate rail, the frieze is carried out in a rich shade of burnt orange and the panels between the beams a little lighter shade, more on the yellow ochre. The portieres are velours of a rich russet shade, which harmonize perfectly with the light shade of the woodwork. The curtains are a rich shade of yellow, or light orange. The furniture in these interiors was specially designed to participate in the general scheme of the rooms, and is slightly darker in shade than the general woodwork; while several of the electric fixtures were wrought by hand in black iron, under the supervision of the architect.

The doors are in two long panels with thumb latches instead of the regulation door knobs. The floors throughout indicate that the owner has a preference for plain cut oak, and also in the woodwork a preference for black ash to using quarter cut oak. It is claimed by the owner that quarter cut oak is more adapted to furniture, but that aside from this to obtain the desired effect, plain cut oak or black ash is far more satisfactory as the grain gives an opportunity to put a certain life into the materials when decorating, which the extremely fine texture of the quarter cut oak precludes.

(*Continued on Page* 51).



Plan of power house and grounds, Electrical Development Company, Niagara Falls, Ont., showing Raceway, Screen-room, Generator-room and Offices. The dotted lines indicate the location of the flumes through which the water rushes to the turbines operating the huge generators; the water in turn passing into a large tunnel which empties into the Horseshoe Falls.

Generating Station, plant of the Electrical Development Company, Niagara Falls, Ont. E. J. Lennox, Architect.

ELECTRICAL DEVELOPMENT CO.'S POWER PLANT.—Model Generating Station at Niagara Falls, Ont.—Driven by Huge Turbines and Equipped with 8,000 Kilowatt Units.—Electrical Energy Transmitted Over Eighty Miles to Toronto.

TWO FACTORS OF VITAL IMPORTANCE in the development and operation of industrial utilities, are efficiency and cost, and how to improve the one without increasing the other has been a problem which at all times has engaged the attention of the engineering world. The cost of production of any manufactured commodity, or the cost of service to the community in the way of light, heat and transportation, is strongly governed by the cost of motive power, and anything which tends to lessen the expense of operation, renders an economic service which either directly or indirectly, is of benefit to the public.

While water power for centuries back has been one of the means employed to arrive at this end, the remarkable strides made within the past decade in the exploitation of this natural force, as the basis for generating electrical energy with which to operate our industrial units and public service enterprises, marks one of the most forward steps which has measured the progress of engineering science. Engineers, the world over, are now diligently engaged in harness'ng the great cataracts to be found in commercial and industrial centres, and it would be difficult indeed to consider the vast amount of capital invested, the numerous central generating plants that are springing up, their great equipment, and the miles and miles of transmission lines, without realizing the great development which is taking place in this respect and the economic possibilities which it offers.

As a specific instance of hydro-electrical development, one can perhaps find no example more interesting than the power plant of the Electrical Development Company, situated in Victoria Park at Niagara Falls, Ont. Not alone because it derives its motive power from the great onrush of water at that point—although that, of course, is an important feature—but because when completed, it will be, both architecturally and in equipment, one of the most thoroughly designed and constructed power plants in the world.

The generating station itself is 433 feet long by 100 feet wide, and the entrance is through a large circular rotunda at the centre of the building. The floor of this rotunda is laid with marble tiles in neat pattern, and the walls are finished in exquisite colored marble with enriched cornice, from which rises a domed ceiling having a large cut glass electrolier in the centre. To the right and left are the public and private offices and waiting room, while directly opposite the entrance door is the entrance to the generator room, in which there is space for eleven of the largest generators in the world, capable of generating 25,000 horse power each. These generators are run by water turbines, situated in wheel pit, about 150 feet below the floor of generator room. Each generator is operated by a flume of water, 10 feet in diameter, which empties into a large tunnel, and, in turn, is discharged back under the Horse-shoe Falls. When the plant is running at full capacity, about forty-three million cubic feet of water will pass through the turbines every hour.

Back of the generator room is the screen room, where the water passes through immense metal gratings to prevent ice from getting into turbines. Both the generator room and the screen room run the full length of the building, and have very high ceilings, and each room is equipped with a fifty ton travelling crane for handling of heavy machinery.

The walls of the generator room are lined with glazed brick, with cut stone trimmings, and the switchboard is in the gallery over the entrance, from which point it commands a view of the whole interior.

The exterior of the building has been designed in severe classic, having a large central pavillion and side wings, and the structure is approached by broad steps and terraces, running the full length of the building. The entrance has a lofty colonaded portico, while the side wings have a recessed colonade so that the public may view the machinery in the generator room through large plate glass windows. The exterior facades are built in Indiana limestone, with the exception of the elevation overlooking the Falls, which is of Roman stone, and the whole building throughout is absolutely fireproof. Where plastering is employed, the work throughout is either applied directly to metal lath or terra cotta; the whole of the ground floor offices having enriched classic cornices, and the general waiting room, heavy moulded beams supported by columns and pilasters which give a pleasing effect.

Operation of the plant was first started in the fall of 1906, and at present four 8,000 kilowatt generators have

End view of Power House, Electrical Development Company, Niagara Falls, Ont., showing the onrush of water which is utilized in developing electric power and energy to operate Canadian manufactories and industries. E. J. Lennox, Architect.

Rotunda, looking towards Generator-room, Power House, Electrical Development Company, Niagara Falls, Ont. A rich interior, circular in shape and executed in high-grade marbles. The panels of the wall are in Breche violet with a stile of English veined Italian, the sub-base being Jaune Fleuri and the door trim consisting of Rouge Jasper and Jaune Fleuri. The floor has a field of White Italian inlaid with Red Numidian, the border being composed of Rouge Jasper, Sienne, Verde Antique with Sylvian Green squares. E. J. Lennox, Architect.

View of Generating Room, power plant of the Electrical Development Company, Niagara Falls, Ont., showing four 8,000 kilowatt generators. E. J. Lennox, Architect.

Screen Room, Generating Station, Electrical Development Company's Power Plant, Niagara Falls, Ont., showing the immense steel gratings through which the water passes to the turbines. E. J. Lennox, Architect.

Interior of Transformer Station, power plant of the Electrical Development Company, Niagara Falls, Ont., showing the terra cotta ceiling with its structural steel supporting members. E. J. Lennox, Architect.

View showing Transformer Banks, power plant of Electrical Development Company, Niagara Falls, Ont. E. J. Lennox, Architect.

been installed, although provisions have been made for seven more, which will give the station a total capacity of 125,000 horse power. These generators are the largest at Niagara Falls, and were manufactured by the Canadian General Electric Company. The electro-motive force produced is 12,000 volts, which is stepped up to 60,000 volts at the transformer station, where it is tranmitted to Toronto, over eighty miles away. At Toronto, it is stepped down through transformers to 12,000 volts, and distributed to the various sub-stations throughout the city, where it is again reduced to a lower voltage for the operation of the various machines which these stations house. These sub-stations supply power for the Toronto Street Railway and the Toronto Electric Light Company.

The plant in general is considered to be one of the most modern and thoroughly equipped power plants to be found anywhere. It is absolutely free from ice trouble, and its operation is unaffected by high or low water. This was amply demonstrated last winter when the high ice jam at Niagara harassed a number of plants along the gorge. As a protection against electric storms, the plant is equipped with the most approved lightning apparatus to be procured, and in every way it is designed and constructed to attain the highest efficiency in service with the least possibility of interruption in operation.

Transformer Station, plant of the Electrical Development Company, Niagara Falls, Ont. E. J. Lennox, Architect.

The architect of the plant was Mr. E. J. Lennox, Toronto, and the firms identified with its erection and the installation of machinery were: Brick, cut stone, etc., Larkin, Sangster & Marshall; carpenter work, T. V. Gearing; copper work, etc., A. Matthews; steel work, etc., Canada Foundry Co.; plastering and marble work, Hoidge & Son; painting and glazing, A. M. Browne; generators, Canadian General Electric Co.; turbines, J. P. Morris Company.

RESIDENCE OF WM. F. SPARLING, TORONTO.—Continued from Page 45.

The staircase in the reception hall comes forward just sufficiently to afford an easy ascent, and to screen the kitchen door from the front of the house; and it was thought preferable to utilize the space beneath the stairway for lavatory purposes than to have either a basement stair or a side entrance at this point. Instead, the steps to the outside and the basement have been placed at the rear of the kitchen, and results in a more satisfactory arrangement.

The plan and decorative scheme of the up-stairs shows the same consistency in detail as is found on the floor below. The bath room is tiled and has a marble shower in the corner. Over the basin, having a light on either side, is a medicine cabinet with a mirror in the door for shaving. From a small trap door in the floor, runs a clothes chute to the basement, with a slide in the pantry and a small cabinet beneath the laundry ceiling for the clothes until wash day.

It was a question how to supply wardrobe room to bed room No. 3, without taking space from the bath room, or linen closet. It was found by merely placing a wardrobe in the corner of a room, gives a bad appearance. The problem was met by furring down the ceiling about ten inches in line with the wardrobe, and by running the picture mould beneath. This formed an alcove with the cupboard door opening into same. Also alcove with the wardrobe door opening into the same and also provided a convenient arrangement for an opening to the balcony.

The house itself faces more toward the east, and a pleasing feature has been worked out at the north-east point in the second story window which is slightly set back and placed diagonally across the corner, thus affording an exceptionally splendid view of the park beyond from bedroom No. 2. While this feature itself is not exactly an innovation, it is carried out in somewhat of an unusual manner in that a pier is continued up from the corner of the walls to the roof itself. This pier gives a strong sense of structural strength but in no way interferes with the view which is to be obtained at this point.

Church—Did you see the hotel fire?

Gotham—Yes.

"Totally destroyed, I suppose?"

"Everything but a few sheets of writing paper on which was printed in large letters: 'This hotel is absoluetly fireproof.'"—Yonkers Statesman.

A Group of Delegates to the Second Annual Assembly of the Royal Architectural Institute of Canada, before the University of Toronto.

SECOND ANNUAL ASSEMBLY OF R.A.I.C.—Condensed Proceedings of Convention of National Association Held Recently in Toronto—Federation of Provincial Bodies and Architectural Education Broadly Discussed—Winnipeg Selected for 1910 Assembly.

WITH THE EXCEPTION of the first organization meeting, held by the Royal Architectural Institute of Canada, the recent annual Assembly held in the rooms of the Ontario Association of Architects, Toronto, will be one of the most notable in its history. The very important question of the federation of all the architectural organizations of Canada, with the Royal Architectural Institute, was the one great, important subject before the Assembly.

This is, without question, the most important and most difficult problem the Institute has as yet been obliged to face, in so far as it is fraught with so many intricate problems, occasioned by the widely different character of the charters held by the several provincial associations, and it is only through the patient, conscientious, and unselfish handling of this subject that a strong Dominion federation may be effected.

That a national organization of architects in Canada will be enabled to effect the raising of the standard of the profession in Canada, and the giving of the profession the status it deserves, is a fact which no architect, who has the interests of his profession at heart, can gainsay, and, as one sat and listened to the many important, and the many trivial objections raised by some of the provincial associations, and the careful, painstaking and patient way in which they were handled by the members present at the Assembly, he was impressed with the sacrificing, conscientious and broad minded attitude of these men, who have given their time and effort for the promotion of an organization, the benefits of which the architectural profession in Canada will enjoy for decades to come.

The Assembly was opened on the morning of October 5, and, in the absence of His Worship, the Mayor of Toronto, Mr. Gouinlock, President of the Ontario Association, welcomed the Assembly to the city of Toronto on behalf of the O.A.A. Mr. Gouinlock expressed his pleasure at being accorded the honor of welcoming the Institute to the city, and also to the rooms of the Ontario Association. He said that if only they could be assured of the united efforts of the provincial associations with those of the Institute, he was sure they would be able to obtain those beneficial results that they were striving for. The Ontario Association, he was sure, would do its utmost to entertain the visiting members of the Institute, while they were in the city, and he wanted them to under-

stand that, while they were in Toronto, the home of the O.A.A. was the home of the Institute.

President's Address

Since our last annual meeting in Ottawa many important events have transpired. The granting of permission to adopt the prefix "Royal" by his Most Gracious Majesty, King Edward, the alliance with the Royal Institute of British Architects, and the consent of such men as Lord Strathcona and Mount Royal, Sir Aston Webb, R.A., Sir George A. Drummond, Sir William C. Macdonald, and Sir Hugh Graham, and many others to become honorary members, speaks volumes for the future progress and prosperity of the Royal Institute, and now that the preliminary work of the institute is about complete, it will be in order that we all should endeavor to accomplish the great object of our institute, namely, the better education of the coming architect. That, gentlemen, is the main point we have to keep in view. (Hear, hear.) This can be accomplished by a united effort on the part of all associations and their members throughout the Dominion. An article published in CONSTRUCTION for September last is worthy of perusal by all architects, and I have no doubt it thoroughly meets the views of all who have the advancement of the profession at heart. Some opposition has been given by a certain few who would seem to take exception to the efforts the institute is making towards the goal of progress and the future high standing of our architects. For what reason this opposition is put forth, no one can fathom, but I think it will eventually pass away. The aim of the institute is a noble one and must prevail. In time these few malcontents will see the error of their ways, as their kind have done before now in other countries, and I venture to prophecy that they will eventually be numbered among our strongest allies. A submitted grievance from them is that we have taken in members who are practising illegally. But we have not accepted one man who is not properly qualified. Therefore their assertion is not correct.

An outline of the whole of the proceedings of the past year will be given to you by our Hon. and worthy secretary, Mr. Chausse. Therefore, I need not delay this meeting by repeating the details of the great work which has been done during that time. Before taking my seat, however, I desire to thank especially our vice-president, Mr. Baker, for the great interest and noble work that he has done in connection with the alliance of this institute with the Royal Institute of British Architects. I would like also to thank Mr. Chausse, our worthy secretary, and Mr. Watts, the treasurer, for the very excellent work they both have done in the interests of the institute. I desire to thank at the same time all members of the different associations who have lent their assistance to the institute. Our acknowledgments are due to the press, and especially to CONSTRUCTION, for its able articles on Future Federation.

May I, in conclusion, make brief reference to a personal matter? It is to express my thanks to our Winnipeg members for the cordial manner in which they received me at their home in Winnipeg on the occasion of my recent trip out West. The Vancouver members were equally kind towards me in welcoming me to their city, and I wish to thank them most heartily.

I have also to thank the members of the institute for their attendance here to-day. I sincerely hope that the institute will benefit by their deliberations. For the present there is nothing else that I can bring forward which would be appropriate to an introductory address. Our first act of business will be the nomination of scrutineers for the election of officers and council, and the nomination of scrutineers for the election of members.

Secretary's Report

Secretary Chausse then read the report of the Council, which was most interesting. It traced the whole history of the formation and progress of the Institute up to the last meeting of the Council, and he read the account of the various stages through which the Institute had passed, dating from April 12, 1907, at which time post cards were sent to architects in every portion of the Dominion of Canada, suggesting the formation of a national association, to the First General Assembly held at Ottawa, in October of 1908. To read carefully through these various stages in the history of the organization, gives one some idea of the sterling work performed by the promoters of the Institute. The report further referred to the fact that permission had been given by His Majesty King Edward VII. to adopt the prefix "Royal" to the title of the Institute. It referred also to Lord Grey's favor in giving his name as patron to the Association, and also the alliance with the Royal Institute of British Architects. According to the report of membership, the Royal Institute was composed of the best element of the profession, it having now 237 members, composed of 125 fellows, 70 associates, 24 honorary members, and 18 corresponding members. The report also regretted to chronicle the death of one of the vice-presidents of the Institute, Mr. Maurice Perrault. It was he who moved the resolution for the formation of the Society at its first meeting in Montreal, August 19, 1907.

Treasurer's Report

The treasurer's report showed the Institute to be in a healthy condition financially, having a balance of cash in bank of $803.61. A feature of this report to be commented upon is the exceedingly economical manner in which the funds of the association are being handled, and the report, as a whole, stands greatly to the credit of those responsible for conducting this most important branch of the Institute's work.

Afternoon Session, October 5th

In the afternoon session of October 5, the subject most discussed was the federation of the architectural bodies of Canada. Mr. Chausse read his report regarding the steps that had been taken in this direction, and presented a communication which he had sent on the 9th of June, 1909, to the secretaries of each of the seven societies which were represented at the conference held in Toronto on April 6, 1909. The letter read as follows:

"Enclosed please find the report of the conference concerning "the federation of the various architectural bodies in the Do-"minion, held in Toronto, 6th April last, and I beg to call the "special attention of your society to the resolution unanimously "adopted at that conference and which you are kindly requested "to consider. The general annual assembly of the Institute will "be held in Toronto on October 5th and 6th, 1909."

On the 3rd of September he sent another letter, as follows:

"On 9th of June last I had the pleasure of mailing your "society the report of the conference concerning the federation "of the various architectural bodies in the Dominion, held in "Toronto, 6th April, 1909, with the request that your society "consider above and send a delegation to the general annual "assembly of the Royal Institute, which will be held in Toronto, "Ont., on October 5th and 6th, 1909.

"I now take the liberty of reminding your society that I "would be very pleased to be informed of the names of its "delegates, and of the intended action of your association on "the subject of federation as suggested in the enclosed report."
Letter from O A A

The only reply he had received was from the secretary of the Ontario Association of Architects, dated September 15, which read as follows:

"Alcide Chaussé, Esq., Secretary R.A.I.C., Montreal: Dear "Sir,—The Committee of the Ontario Association of Architects "which met the Council of the R.A.I.C. on the 6th April, in "Toronto, will be the representation or delegates of this Asso-"ciation at the meeting to be held in October next, as this com-"mittee was appointed at our annual meeting in January, 1909,

"to consider the question of affiliation and report at our next "annual meeting in January, 1910, and therefore has not yet "reported.

"The names are: Messrs. F. S. Baker, Traders' Bank Build-"ing, Toronto, chairman; E. Burke, 28 Toronto street, Toronto; "E. L. Horwood, Bank Street Chambers, Ottawa; W. A. Lang-"ton, 88 King street east, Toronto; and A. H. Gregg, 59 Yonge "street, Toronto. Yours truly, WM. R. GREGG."

He received the following letter from the Alberta Association of Architects, dated September 27, which read as follows:

"In reply to your letter of the 7th inst., we are again asking "Mr. John Archibald to represent us at the meeting in Toronto next week."

"John Archibald, Esq.: Dear Sir,—At the last meeting of our "Council the matter of the scheme of federation suggested by "the O.A.A. again came up for discussion and I was requested "to write to you and ask if you would be so good as to again "represent our association at the meeting in Toronto next week.

"Our views on this matter are as follows: With reference "to clauses 1 and 2, we agree with these provided that mem-"bership in the official provincial bodies will be by examination "or such other tests as are required under the charters of the "Quebec and Alberta Associations, and until such examinations "or other tests are compulsory throughout the Dominion we "cannot recognize membership of the Royal Architectural In-"stitute of Canada as entitling members to join our association "and to practise in this province.

"With reference to clause 3, we do not object to the principle "of a per capita contribution provided we are satisfied that our "association will receive some benefits in return.

"With reference to clause 4, we are agreeable to this method "of voting provided the delegates' expenses are paid by the "Institute.

"As previously expressed, we are in full accord with the "attitude you have taken and the views you have expressed, "and we are satisfied to leave our interests in your hands. "Again thanking you for the help you have rendered us, I am, "yours very truly, H. M. WHIDDINGTON, Hon. Secretary, "Strathcona."

He had also received a letter from Mr. Archibald that morning, which read as follows:

"A. Chaussé, Esq., Secretary Royal Architectural Institute "of Canada, Montreal, Que.: Dear Sir,—At a meeting of a spe-"cial committee appointed by the Council of the P.Q.A.A. to "consider the scheme of federation of the Architectural Institute "of Canada, the following reselution was adopted: 'After dis-" 'cussing the subject thoroughly, it was resolved, That whereas " 'the Royal Architectural Institute of Canada is not composed " 'entirely of members of our profession, the Province of Quebec " 'Association of Architects refuses to recognize them as a body " 'competent to initiate a scheme of federation; at the same time " 'we recognize that the adoption of some scheme of federation " 'would be advantageous to the profession throughout the Do-" 'minion, but that it should emanate from the joint action of " 'the present legally incorporated professional associations. We " 'consider the time is opportune for an expression of opinion " 'between the said provincial associations, and that immediate " 'steps should be taken to communicate with the said associa-" 'tions in order to arrive at joint concerted action.'

"It was decided to communicate with the following associa-"tions: Alberta Association of Architects, Ontario Association "of Architects, Manitoba Association of Architects; also the "Toronto Association and the Regina Association. And the "meeting adjourned.

"We are in receipt of the following telegram from the Alberta "Association of Architects: 'Fully agree with views contained " 'your letter written you Toronto, H. M. Whiddington, Alberta " 'Assn. Architects.' Yours truly, JNO. S. ARCHIBALD."

Mr. Chausse went on to state that a letter was sent by Mr. Archibald to the secretary of the different provincial associations, but not addressed to the Institute. He stated that he had received a copy of the document by accident. The letter, which gave the date of Montreal, September 4, 1909, gives the resolution quoted above as having been adopted at a meeting of the Special Committee of the P.Q.A.A.

Mr. Chausse believed it seemed to discuss the first proposal of the Institute to add certain articles to its present by-laws, which were not entertained at the conference, for Mr. Archibald, after quoting the resolution of the Special Committee, in the words already read, went on to say:

"In further explanation of this resolution, we consider that "we, as provincial associations, have nothing whatever to do "with the amending of any by-laws of the Architectural "Institute of Canada. Furthermore, no care has been exercised "in examining applications for membership in their association, "and as a result their association is not composed entirely of "members of the profession. This fact they recognize in their "proposed amendment of article 59 of the by-law of their Insti-"tute, wherein they are prepared to federate with any associa-"tion in the Dominion (consisting in whole or in part of profes-"sional members). We of the P.Q.A.A. recognize the fact that, "irrespective of professional ethics, we are prevented by legal "enactment from taking into our association other than those "who belong to the practising staff of our profession.

"The other suggested amendments of the by-laws of the "Architectural Institute of Canada are childish, and could "not in any way be made to assimilate with existing conditions "as found in the Dominion.

"The P.Q.A.A. intend communicating their views to the meet-"ing of the Architectural Institute to be held in Toronto next "month, and if such views meet with the approval of your "association it will be desirable that concerted action be taken "by all provincial associations so that the Architectural "Institute of Canada may have no doubts whatever on the views "entertained by the provincial associations. Yours truly,

"JNO. S. ARCHIBALD."

Mr. Baker stated that he also had received a letter that morning from Mr. Archibald in answer to one to Mr. Archibald by the committee of the Ontario Association of Architects. Mr. Archibald's letter was as follows:

"Dear Sir,—I beg to acknowledge receipt of yours of the "2nd inst. Your Association is evidently laboring under a "mistake when they put me down as seconding Mr. Lang-"ton's resolution re federation of the Architectural Institutes "of Canada. The resolution I moved at the meeting last April, "was merely that the scheme proposed by the Ontario Asso-"ciation of Architects be referred to the respective provincial "bodies for consideration, and reported upon at a later meet-"ing. I note that the report of the Architectural Institute "gives the same impression.

"Further, Article 5 of the section of the Ontario Asso-"ciation of Architects was not read at the meeting referred "to in April. The P. Q. A. A. are now putting themselves on "record that they do not consider the Architectural Institute "of Canada a competent body to issue such a movement.

"Yours truly, (Signed) JNO. S. ARCHIBALD"

Discussion

These letters brought out a very lively discussion, and it seemed to be the belief of those present that a very serious misunderstanding existed between the Alberta and Quebec Associations, and the Institute as to the manner in which the Institute aimed to bring about a federation.

It was stated by the President, Mr. Monette, and Mr Chausse, all of whom are members of the Quebec Association, that the letter did not come from the Council of the Province of Quebec Association of Architects, and that the Report, as submitted by Mr. Archibald, would hardly be official until it had been approved by the Annual Assembly of the Q.A.A.

In the discussion that followed, there seemed to be a diversity of opinion as to the wording of the several clauses in Project "A", so that the operations of the Institute would not interfere with the rights granted the above mentioned two provincial associations through the charters they held. The members present did not approve of any method that would tend to take from any Provincial Association such powers as they now possess, and it was generally conceded that some method should be devised whereby future members of the Royal Institute of Architects should be admitted only through the Provincial Associations. Discussion followed as to whether the Institute, at its Assembly, should instruct its Council to follow a different course in the formulating of a basis upon which federation might be accomplished, or whether it was better to appoint a committee with power to negotiate with the provincial associations and other architectural bodies with a view to drawing up a scheme of amalgamation or federation. The latter, however, most of the members present thought would be simply deferring the matter, and it seemed to be the general opinion that the Assembly should give the Council recommendations, of a more or less definite nature, that would facilitate the establishment of some basis of operation. All through the discussion it was very plain to be seen that the Royal Institute was in no way desirous of laying down any arbitrary regulations under which the provincial bodies might be federated with it, but displayed a very broad inclination towards some harmonious and amicable "give and take" attitude.

With regard to Mr. Archibald's proposal that the Institute should have been formed by delegates from the various Provincial Associations, it was pointed out that the delegates at the first meeting for the organization

of the Institute, were representative men from almost every architectural body in Canada.

Clause 3 of Project "A", came in for some discussion, with regard to the portion of the fees that the Provincial Associations should hand over to the Royal Institute.

After some discussion over Clauses 4 and 5, the subject, "The Possibilities of a National Status for Architects in Canada," was discussed by Mr. Gordon, Mr. Watton and Mr. Hynes.

Possibilities of a National Status of Architects in Canada

Voluntary Co-operation the Main Need

Mr. Gordon said:—I have not prepared any set paper on this subject, and though it has some relation to the question which we have just been discussing it is not exactly the same. The possibility of a Federal Association of Architects has been a "live question" for some time past, but the subject we have to discuss for a little while now is the possibility of a national status for architects. In other words, is it possible that from the Atlantic to the Pacific, throughout the whole breadth of Canada, there shall be a national status by which Canadian architects shall be recognized in all the provinces of the Dominion?

It seems to me that in many ways we very often start at the wrong end. We start by assuming that certain things—very desirable things—must be legally enacted at once. We have got the old error in our minds, many of us—I know I have—that we can do almost anything by Act of Parliament. But we find, fortunately, that we cannot always get Acts of Parliament passed. Then sometimes we can get Acts of Parliament which do not accomplish the things we intended them to accomplish. However, I am not going to approach this subject from its legislative side at all, but from quite another point of view.

We are all agreed, I am sure, that it is desirable that we should have a national status for architects, because it would enhance the profession of the architects, it would raise the standard of architecture, and have a more stimulating effect upon the individual architect. The desirability is therefore conceded. What we wish to consider now for a brief space is the possibility of having a national status.

We have been talking for quite a long time this afternoon about existing architectural organizations, what this one holds and what the other one is willing to leave, and the conflict of views that are held by different people in different provinces and by different people in the same province is such as to make it seem there is little likelihood of any immediate solution of the problem of a national status for architects. I think we must first of all get rid of the idea that we can change the existing organizations. We have at least two provincial associations whose franchises give them very strong powers, and it is not in human nature to expect these bodies to surrender anything of the power they have. Then we have other organizations, some of them voluntary in character, who have by many years work accomplished certain things. We can hardly expect them to revolutionize their associations. But we may expect that in the process of years, as we practise co-operation, education, and enlightenment, and as we carry on such discussions as we have had here to-day—I say we may expect an appreciable amelioration of the existing conditions of the profession, but, gentlemen, it will be a slow process. But there is one thing we ought at once to all set our minds working upon, and that is the elimination from the existing conditions of, may I say the suspicions which architects sometimes nurse one towards the other in the different provinces? While, therefore, we cannot alter the organizations we can go a long way to improve the existing condition of things and so make for the possibilities of a national status.

It is quite wrong that there should be such great differences of opinion and differences of feeling and differences of aim among the architects in the different parts of the country, so that one man is suspicious of another man, and one implies that another is being actuated by provincial or sectional views. We must get rid of that. We must come to a place of mutual trust and understanding, the place which I hope we are all seeking and from which we can unite in an effort to advance and elevate the architects' profession. With mistrust and differences of feeling cleared away, the next question is how are we going to approach the problem of securing a national status. I think we are perhaps aiming at too much when we are striving to secure federation all at once. I felt that as we were discussing the matter this afternoon. It seems to me that where there are such divergencies of opinion, we should advance by stages of evolution. First let us seek to co-operate one with another to attain mutual betterment, and when we have thus demonstrated to one another that although there may be differences of opinion upon minor points our aims are the same; then with a closer relationship and a greater trust one in the other we may go from co-operation to affiliation, rubbing off the corners here and there, getting more and more into closer touch each with the other until we are ripe for organized union or federation. And then we should be able to have a national status that would be recognized and upheld by law.

But there is a more important and more immediate matter than getting a national status which would have legal sanction. We want a national status that can be accomplished along other lines, and it seems to me that this is what we ought ourselves to strive to do at once: This national status I refer to now must be along voluntary lines to commence, whatever the future may bring about. Whatever our progress may justify in the future, at the start the co-operation towards a national status must be, as I say, along voluntary lines. And in doing this we want to assure our friends in Quebec and Alberta that we have no idea or desire to encroach upon their provincial statutory prerogatives, and no intention of lessening their provincial status. But we do have a great desire to produce a national feeling and obtain national results in architecture. (Hear, hear). We must ask ourselves and we must ask all the architects in Canada to give something and to do something towards this movement, for anything that means anything costs something. Therefore, while there may not be any need for any surrender of any of our legal rights there must be a giving up, a comprise, a modification of our opinions and views here and there in order that we may arrive at something like unanimity of action in an attempt to reach a national status.

Let me point out, after these few preliminary remarks, what lines I think we ought to proceed upon.

First of all, it seems to me that the status of an architect should be founded upon his ethical dignity as a professional man. I know there are those who submit that it is the artistic side of our profession that gives it its high importance and significance. But to-night, although I am willing to grant that, because it has an artistic side, that because it is an art, we look upon our profession in the high and affectionate way we do, still, after all, architecture is a business as well as an art, and in the practice and exercise of this business the first fundamental principle is surely the ethical side.

I do not know whether it is possible, but it seems to me that it is possible, that all provincial architectural bodies ought to unite upon the formulation and the promulgation and the publication, and the continual publication and the insistance of an ethical code. We have of course had our ethical codes. At different stages of our existence these have been passed upon, and printed—and then laid away. (Laughter). Friends, what we want first of all, above all, is to hold up and insist upon before the members of our profession, from ocean to ocean, is a proper ethical practise of our profession, so that those who are weak-kneed may be strengthened, so that others who may be in fault may be guided by the force of the opinion of the profession as a whole to do only that which is ethical and proper to the practise of the profession. That is the first thing towards the building up of a national status.

Then, while this institute cannot in a full sense be an educative body, yet the institute can be a very important element in the promulgation of architectural education throughout the country. We ought to aim at an educational status for the whole of Canada. We should seek to stimulate the provincial bodies in this respect; we should seek to stimulate the provincial governments to contribute to our universities, if not to endow a chair of architecture in the different universities, or found a college of architecture. By this means we might do a very great deal to raise the standard of architectural education in all our provinces, and indeed create a national educational standard for the Dominion. There is a tremendous field of opportunities for work here.

Then when we have accomplished that, I think we might well turn our efforts to improving the relationship of the architects with their clients and the public. In other words, we may direct our efforts to the framing of a national status of fees, and to the regulating of all matters of that nature that come into the relations between the architect and his client. These are the three great lines upon which we can at once enter in relation to the setting up of a national status of architecture throughout the country, and I believe that when we have made progress on these lines it will be a very easy matter for us not only to federate but a very easy matter for us to get from not only the provincial governments, but also from the Dominion Government, all the legislation we think necessary for the further safe-guarding of our profession and for the further uplifting of architecture and the progress of our art.

Aims and Aspirations Should be High

Mr. Hynes, at the call of the President, followed with a brief speech. "I heartily agree," he said, "with everything that Mr. Gordon has said, and in every particular, but I cannot add very much to the subject he has so ably discussed. The first thing that occurs to me in relation to the setting up of a national status is that we ought not to appear small and set up any low standard. Let our aims and aspirations be on a high standard. In every one of the learned professions, a good high standard has been taken in this country. Our legal men and our medical men stand very high not only in their profession in their own country, but when they have come into professional contact with the practitioners of other lands they have maintained a high reputation, and I hope that in relation to our own profession, upon educational and other lines we shall have the highest and best standard that it is possible to attain. In other architectural societies, such for example as the American Institute they accept men who are of proved worth, and in Illinois members are admitted only after a course of examinations. In this connection I may say that I look more to an educational standard than to any standard set up by legislative enaction. The great crying need of our profession here, it seems to me, is the provision of improved opportunities for young men to get a thorough grounding before they start to practise; better means are badly needed for technical training. In regard again to educational or legislative standards, I submit that it cannot be expected any legislative body will prohibit a man from making a livelihood because he may not be, let us say, sufficiently artistic. We cannot expect to raise the status of the architectural profession from a legislative source. It can only be properly done through the educational authorities. As regards educational facilities, I think here the architectural profession has assumed a burden which really is not its own. The profession cannot very well carry on an educational course and bring those who intended to be the architects of the future through a thorough training. This work properly belongs to the educational department of the government. Particularly in Canada, where the provincial governments assume the responsibility for higher education, it is their duty to see that the facilities are pro-

vided which it is necessary architectural students should have. Our organizations can urge on the governments to fulfil its duty in this regard, and if the professional bodies were to agitate until such grants were made to the universities that the proper education of the architect could be fully provided for, with opportunities to develop the practical as well as the art side, it would be no difficult matter to raise the status of the profession to the level it ought to occupy. (Applause).

High National Status Possible of Attainment

Mr. Watts, in concluding the discussion, said: Mr. Gordon has expressed my ideas, and I think the ideas of all who are present, in regard to the subject of a national status for architects in this country. With respect to the possibilities of having such status, I think we may confidently say that all things are possible. To put it briefly, the righteousness of the cause will exalt the status and the profession if we only go on the lines suggested by Mr. Gordon and raise the ethics of our profession to the highest point practicable.

Touching on federation it occurred to me that we have a very striking illustration of difficulties overcome and a splendid cause gained in the case of our own country. At one time people in British Columbia refused to be called Canadians, and after the days of Upper and Lower Canada, and in the early days of the federation, I am told that on Dominion Day, the black flag was hoisted in certain parts of the Maritime Provinces. Now mark the change. All differences and difficulties have been happily overcome, and from the far east to the far west, we are all united and contented and proud to form part of one great Dominion. There is a good example for us to follow. It is hardly to be expected that we shall see the federation of all the architectural societies of the Dominion in a full sense until a few years good hard work has been accomplished towards that end. It requires the work of large, broad minded men, but the task is worth while. I am certain it would be a grand thing for the profession if we had this Dominion federation. We have to continue quietly at work. We are on the right lines to-day in having passed this resolution which puts the matter in the hands of the Council. The provincial associations can hardly call us selfish. The question will have to be thrashed out by the council and these societies, and at our next assembly I hope the Council will be able to make a report showing good faith and earnestness on both sides with a promise of a scheme which will unite us all in one national object. (Applause).

Session of Wednesday, Aug. 6th

Most of the session of Wednesday morning, Aug. 6th, was taken up with some minor amendments to the by-laws of the Institute, the most important changes in which were amendments to Clauses 49 and 50, which were made to read as follows:—

"Clause 49.—New by-laws or alteration or repeal of said by-laws may be made in the following manner: Notification of proposed new by-laws or of alteration or repeal of existing by-laws, shall be given to the Honorable Secretary, signed by at least two voting members, not later than two months before the date of the General Assembly."

"Clause 50.—The Hon. Secretary shall issue notices of proposition, specifying the proposed new by-law or alteration or repeal of any existing by-law, which may be thus proposed, and send same to all members of the Royal Institute, not less than one month before the General Annual Assembly. That new by-law, or alteration or repeal, be adopted or rejected with the General Annual Assembly, and not less than two-thirds of the votes cast, shall be required to effect any change. The Council may also propose new by-laws or alteration or repeal of existing by-laws, and may submit same to the General Annual Assembly, as above."

The proposed amendment to the schedule of charges, by which a rate would be fixed for the preparation of plans, within specification and supervision, after some discussion, was withdrawn. After some minor amendments to the rules for architectural competition, it was unanimously agreed to hold the 1910 Assembly in Winnipeg, the date to be fixed by the Council, after a consultation with the members of the Manitoba Architects' Association.

Scrutineers reported on seven new names that had been submitted for membership, none of which were elected, due to the fact that, in each case, there were more than 10 per cent. of negative votes. Mr. Baker gave notice of a motion to be made at the next meeting, proposing to discontinue the present method of electing members, and that thereafter the Institute should proceed with the election by a show of hands at the meeting, instead of by letter ballot. It seemed to be the general opinion of those present that this method would be impracticable, and Mr. Baker, finally agreed to give the existing method a trial, and withdrew his notice to present the motion.

Officers for 1910

The following officers for 1910 were declared elected:

President.—Mr. A. F. Dunlop, Montreal.

Vice-Presidents.—Messrs. J. Z. Resther, Montreal; Sam Hooper, Winnipeg; and Edmund Burke, Toronto.

Honorary Secretary.—Mr. Alcide Chausse, Montreal.

Honorary Treasurer.—Mr. J. W. H. Watts, Ottawa.

COUNCIL.

Mr. W. H. Archer, Vancouver, 18.
Mr. C. B. Chappell, Charlottetown, 19.
Mr. T. Daoust, Montreal, 22.
Mr. D. Ewart, Ottawa, 21.
Mr. C. E. Fairweather, St. John, N.B., 11.
Mr. A. H. Gregg, Toronto, 6.
Mr. H. E. Gates, Halifax, 20.
Mr. H. B. Gordon, Toronto, 20.
Mr. E. L. Horwood, Ottawa, 14.
Mr. G. A. Monette, Montreal, 22.
Mr. J. P. Hynes, Toronto, 13.
Mr. R. P. LeMay, Quebec, 9.
Mr. S. Frank Peters, Winnipeg, 13.
Mr. J. E. Wize, Edmonton, 13.

AUDITORS.

Messrs. J. Fennings Taylor and Colborne P. Meredith, Ottawa.

Note.—The elections were by Letter Ballot, and, accordingly the ballots were blank and the members were at liberty to vote for any member for any office. The Scrutineers found that most of the members voted, for the office of President, for Messrs. A. F. Dunlop and F. S. Baker. The former was re-elected on a very small majority. For the offices of Vice-Presidents, members voted for Messrs. J. Z. Resther, Edmund Burke, Sam Hooper and F. S. Baker. On this election again Mr. Baker was beaten on a small majority, and, as some of the members voted for Mr. Baker as member of the Council, his votes were divided, and though he received a larger number of votes in all, he was not elected to any office. Mr. Baker is a worker in the Council and regrets were expressed that he was not re-elected. At the Meeting of the Council, held after the Assembly, on the 6th October, Mr. A. H. Gregg, resigned as member of the Council, and Mr. F. S. Baker was elected to fill the vacant position, so, after all, through the sacrifice of Mr. Gregg, the Institute is fortunate in still having Mr. Baker on the Council.

The President, returning thanks for election, said:—

Gentlemen, I am very much obliged to you for the honor that you have accorded me this afternoon, but when I was elected as president last year, I said that I hoped when the time came round for the next president to be elected you would select a gentleman for the office from the city in which the annual meeting was to be held. I think it is only right that this honor should be moved from one city to another. I do not think it is right that one man should monopolize the office of president for year after year. I have filled the position now for two years, and I think I am in duty bound to vacate the chair and allow you to put another member of the Institute in my place. That is the way I feel about it. While I appreciate the honor very much, I really would like to see a change. I think it would be helping the progress of the Institute. Of course, I am in your hands. At the same time, I must say again that I think it would be a benefit to the Institute if the presidency were shifted from one city to another as we change the place of our annual general assemblies. With a president from Toronto serving a term and then another from Winnipeg, we shall see a progressive Institute whose officers will, as it were, "keep the ball rolling" in the way of advancement. Therefore I would like to ask you to accept my resignation and take the necessary steps to elect as president whoever might be approved by this meeting.

The feeling of the meeting, however, was that, insofar as Mr. Dunlop had given such very excellent service during the early stages of the formation of the Institution, and, in view of the fact that it had been the wish of the

(*Continued on Page 74*).

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CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 Toronto, October, 1909 No. 12

Current Topics

POLE DWELLINGS four thousand years old, similar to those discovered in the north of Switzerland, have been unearthed in a swamp on the plateau east of Lake Vetter, 120 miles north-west of Stockholm. The excavations disclosed petrified apples, wheat kernels, nuts, pottery, flint and horn implements, amber ornaments and wild boar teeth, which the calcareous mud in which they were embedded, has kept in a good state of preservation.

* * *

ONE OF THE PECULIAR CUSTOMS which obtain in Egypt is the secrecy maintained by the Government regarding the names of successful bidders for contracts and of those receiving concessions. Information of this character is not frequently given out, and it is only occasionally that such names are published in the "Journal Official." It is said, however, that some plan of early and public announcement of contractors' and concessionaires' names is now under advisement.

* * *

WINNIPEG'S PHENOMENAL GROWTH was strikingly brought out in a recent report which showed that during the first seven months of this year permits were issued for new buildings entailing a total expenditure of $6,500,000. This amount is practically double that recorded in the same period of last year. The buildings under construction, according to the report, include 20 warehouses, factories and additions; 11 schools and educational institutions; 20 business and office structures, and 22 apartment houses, several of the latter costing about $200,000 each. It is also pointed out, that since the first of the year, about 1,700 substantial residences have either been erected or are now being built, and that the progress made in this direction during 1909 will be something truly remarkable.

THE FIRST GRAIN ELEVATOR in Russian Asia will soon be built at Tchalabinsk, on the Siberian Railway, with a capacity of 50,000 cars of grain per annum (cars average from 12 to 15 tons each). This undertaking, it is believed, will pave the way for a large number of similar improvements through that country. Tchalabinsk is near the border between European and Asiatic Russia.

* * *

THE CARPENTERS' STRIKE at Winnipeg has practically resolved itself into a strike without strikers. A rather paradoxical situation, we admit, but at least this is the pith and substance of a recent press report. It seems that the contractors and the men have come to terms in a number of instances, and that the strife in general has materially lessened. The prospects are that any existing difficulty will be adjusted in the near future.

* * *

MEERSCHAUM AS A BUILDING MATERIAL is something that is quite out of the ordinary, yet the town of Vallecas, Spain, is built almost entirely of this product. On the outskirts of the town are great quarries of meerschaum too coarse for pipe making, so it is therefore used extensively for construction purposes. As a result the town has an ivory whiteness which shines resplendently in the Spanish sun. The meerschaum comes from the earth yellow and turns white after ten days bleaching in the sun.

* * *

OWING TO AN INCREASED NUMBER of papers and discussions, and the large volume of business to be transacted, the Executive of National Association of Cement users (U.S.) has decided to give the exhibitors and those who will be in attendance at the Sixth Annual Convention, the benefit of one day more than has been customary in the past. An announcement to this effect has just been sent out from the Association's headquarters in Philadelphia, stating that the next convention will be held at Chicago from February 21-25, inclusive.

* * *

A MARVELLOUS MOSAIC PAVEMENT according to the Venice Correspondent of the London Morning Post, has been discovered beneath the floor of the great Cathedral of Aquileia. During drainage operation, says the writer, the whole of the right aisle, 154 feet by 27, was laid bare, resulting in the discovery at the depth of a metre of a beautiful and absolutely perfect mosaic floor, of which not a single piece is missing. The mosaic is believed to be the largest in existence, as it extends over the whole nave and left aisle as well, and the indication are that it stretches beyond the church as far as the huge campanile. The design depicts birds, beasts and fishes, a shepherd with Pan's pipes in one hand and a sheep over his shoulders, a stork with a snake in its beak, and two dolphins. The date of the mosaic is uncertain, but the design itself is most unique.

* * *

LAW HAS JUST BEEN PASSED in France prohibiting the use of white lead. After the lapse of three years, the use of white lead or paint containing it is to be prohibited for every description of painting work. This legislation is due to a petition unanimously endorsed by the labor unions of France, asking that the use of white lead in paint be prohibited on the grounds that it was very injurious to health. The bill to prohibit its uses was introduced in 1906, but as investigation in 86 of the 88 departments in France, as well as Algeria and Tunis, showed that only a low percentage of mortality among painters could be ascribed to this cause, the bill was defeated. However, another bill for the same purpose was shortly introduced. It was enacted by the lower house of the French Congress in 1907 and was discussed in the Senate and by joint committee from time to time until July 13, 1909, when it became a law.

THE REBUILDING OF THREE RIVERS is rapidly approaching the final stage, and by the time the snow falls the streets of the burned district will have again taken on their erstwhile business-like appearance. Quite a number of new structures were commenced within the past few weeks, and work on these is being expedited so as to have buildings under roof before winter sets in. The new buildings are said to be of a good type in general, and many show a great improvement architecturally over the structures which they have replaced.

* * *

THE TOTAL QUANTITY of Portland, natural, and puzzolan cements produced last year in the United States was 52,910,925 barrels, valued at $44,477,653. As compared with 1907, whose production was 52,230,342 barrels, valued at $55,903,851, the year showed an increase of 1.3 per cent. in quantity and a decrease of 20 per cent. in value. The total Portland cement production was 51,072,612 barrels, valued at $43,547,679. This is an increase in quantity of 4.6 per cent. and a decrease in value of 19.3 per cent. compared with the figures for 1907. The average price per barrel was 85 cents. Of the four types of Portland cement, divided according to the kinds of raw material used, 40.6 per cent. was made from cement rock and pure limestone, 45 per cent. from limestone and clay or shale, 5.5 per cent. from marl and clay, and 8.9 per cent. from slag and limestone. The production of Portland cement has shown an increase each year. The natural cement industry, on the other hand, reached its maximum in 1899, with an output of 9,868,179 barrels, since which year it has shown an almost continuous decrease, until now it has become a relatively unimportant factor in the cement situation. The natural cement produced in the United States in 1908 amounted to 1,686,862 barrels, valued at $834,509, which was a decrease of 41 per cent. in quantity and 43 per cent. in value under the preceding year. Of puzzolan cement, made by mixing blast furnace slag and slaked lime, there was manufactured 151,451 barrels, valued at $95,468, a heavy decrease when compared with the production reported for 1907.

* * *

WHILE THE ANNUAL OUTPUT of cement in the United States has assumed enormous proportions, Canada has by no means been slow in the development of this important industry. Each succeeding year has seen the production steadily increasing, and the recent merger of the various cement companies has brought within the focus of the public's eye the magnitude of Canadian resources and enterprise in this direction. Perhaps the most gratifying feature of this development is the fact that the cement industry in Canada has now practically reached that point when it is no longer necessary for Canadian contractors and engineers to make their purchase in foreign markets; and also that the importation of cement in late years has showed a most marked curtailment. According to a recent Government bulletin, the use of domestic made cement has increased from 600,000 barrels in 1903 to 2,600,000 barrels in 1908. Previous to 1904 the imports of Portland cement were larger than the total Canadian production; while for 1909 it is estimated that they will not represent more than 14 per cent. of the total consumption. In 1908, 23 cement plants were in operation in Canada, with a total daily capacity of 27,500 barrels, or an annual output of some 8,250,000 barrels if all were running full time; although the price of cement was somewhat lower than in 1907, the sales were far greater than in any previous year. The value of cement sold in 1908 was $3,709,139; average price per barrel, $1.39; wages paid, $1,275,638; number of men employed, 3,029.

A RECENT COMMUNICATION to the Department of Trade and Commerce from Trade Commissioner D. H Ross, Stock Exchange, Melbourne, Australia, in which reference is made to enquiries received regarding asbestos boiler covering, etc., states that catalogues and quotations for wholesale quantities upon the basis of f.o.b. steamer New York—together with a few small samples of asbestos goods—sent to the Commissioners' office would probably result in a number of orders being secured by Canadian manufacturers in both Melbourne and Adelaide.

* * *

CANADA IS THE GREATEST PRODUCER of asbestos in the world, and yet the Dominion has done but little to convert the raw material into the manufactured product. In this respect the United States leads all other countries, although according to a brochure just issued by the U.S. Geological Survey, much less than one per-cent. of the material used is mined across the border. An idea as to the relative importance of the two countries as regards this mineral can be gleaned from the fact that Canada last year (1908) produced 65,534 tons valued at $2,547,507, while the output of the United States amounted to but 936 tons valued at $19,624. The brochure goes on to show that there are only two active mines in the United States at present, one in Vermont and the other in Georgia, although deposits of asbestos are known to exist in the Grand Canyon of Aryina, Wyoming, and in California. In view of the fact that these properties are lying dormant, and are not being developed, it is quite evident that the manufacturers of the United States find in Canada an asbestos that is vastly superior to the product to be obtained in their own country; and it is also equally as evident that Canada, through the lack of an export duty on this mineral, has been aiding her neighbor to the south to build up a manufacturing industry which, by the very nature of things, should practically be an exclusive enterprise of the Dominion itself. Canada's nearest competitor in the production of asbestos is possibly Russia, whose output in 1907 was 10,308 tons.

* * *

IN A RECENT NUMBER of the publications of the German health office, a report appears with very full details regarding the tests applied to a new pigment called vitralin, a highly lustrous paint which can be applied to surfaces with the same ease as ordinary paints, with a basis of white lead, or zinc white. Its chief value is for disinfecting, and it is prepared and sold more specifically for use in rooms, etc., where it is desired to combat pathogenic germs. In this respect it seems to be far in advance of all of the ordinary substances applied to walls, containing lime or lead compounds. Tests were made by spreading the pigment over glass, porcelain, brick and wood with satisfactory results. The disinfectant property remains for a considerable time in the coating of paint, although after the lapse of a year it was found to be distinctly weaker—i.e., a longer time was required to bring about complete destruction of bacteria. The conclusion of the investigators was that the specific disinfectant property of vitralin results from the oxidation of the linseed oil which forms an important constituent of this paint, as of most paints. Further, this oxidation is dependent upon the presence of a certain degree of moisture, and, naturally, of oxygen; and warmth as well as light is an important factor in favoring the formation of the active germicidal agent. This property of vitralin is likewise unaffected by prolonged exposure to powerful antiseptic agents, such as corrosive sublimate, formalin, kirsol-sulphuric acid, etc. It is quite possible that the paint, owing to the antiseptic properties, will be used in the warfare which is being so persistently waged in Germany against tuberculosis.

Four family cottage, built of concrete blocks, at Paisley, Scotland, where this form of construction is coming much into evidence.

CONCRETE BLOCK CONSTRUCTION ABROAD.—European and Other Countries Adopting Manufactured Stone with Gratifying Results.—Work Shows Consideration of Architectural and Constructive Detail.—Illustrations of Introductory Use of Concrete Blocks in Scotland

WHILE HOLLOW CONCRETE BLOCKS are gradually attaining a more widespread recognition as a building material, and while their use is to be seen in almost every city, town and village on this continent, yet in too many instances buildings so constructed are at the best repulsive architecturally, cold in aspect, and an eye-sore to the community in which they are erected. This is not because the concrete block—that is the well made and properly cured block—is possessed of any inherent defect, nor because its use does not admit of the constructive and decorative possibilities of other materials, but rather because of the fact that so many individuals have gone in this field of industry without any previous experience or knowledge of concrete or the principles of construction, and have created a class of work, which no matter how liberally we view it, has been prejudicial to the interests of concrete block construction.

Perhaps the greatest drawback in this country, to the development of any new industry, has been the element of "haste." We compliment ourselves on our own initiative, and the manner in which we grasp and undertake new things, and point with pride to the progress we make in their exploitations and use. Quite often we jump into a new enterprise or industry, buy the necessary equipment, become our own task master and apprentice to-day, and to-morrow launch out as full fledged manufacturers or contractors ready for anything which comes our way. In our eagerness to "get a going," we are often prone in the early stages, to sacrifice that thoroughness in our work, which must eventually be considered, if we are to succeed; and that is precisely what has happened in the early development of the concrete block industry.

It is not intended, however, that this criticism should apply to everyone engaged in this line of business. There are many concerns that have taken hold of the work in a thorough and intelligent manner, and the buildings erected by them reflect no little credit as regards their enterprise and skill. Again, it must be remembered in this connection, that other materials such as wood, stone, brick, etc., when first used showed a crudity of form that rendered them in appearance, far inferior to the primitive concrete block. With all materials, beauty has been evolved from utility, and in this respect the concrete block has shown much earlier manifestations than any other medium that has been adopted in building construction.

But, however, if we stop to consider the initial results in this country, as compared with the results attained in some of the European countries, where the industry is practically in its infancy and where the same concrete block machines and materials are used, we cannot help but become conscious of the fact that those abroad have greatly surpassed us in this class of work. The reason for this is that the foreign manufacturer or contractor, especially in construction work, puts forth his very best efforts, and does his utmost to obtain the most satisfactory and highest results possible. It is freely admitted throughout the Dominion and the United States, that the rank and file who have received their education and training abroad are more thorough and methodical in what they undertake, than are those who are engaged in similar walks of life on this continent.

This house shows the introductory use of concrete blocks in Scotland. It is a two-family dwelling located on the main Glasgow Road, Paisley, and was the first concrete block house built at that place. Note how carefully the architectural and constructive detail has been considered and the thorough manner in which the work has been executed.

Terrace of concrete block houses at Burnside (near Glasgow), Scotland, providing accommodation for nine families. This illustration shows how well adapted this material is to meet the needs of economical and well constructed dwellings of the attached type.

The European's success lies in the fact that he makes a study of his problem, his means of production, his materials, the possibilities which his field offers, and the results to be obtained. In construction work, he brings into play the very best of architectural and engineering skill, and is prepared, when starting out with a new enterprise, to turn out the best quality of materials and the highest grade of workmanship, that it is possible to produce.

In connection with this article, we are publishing several illustrations of hollow concrete block construction, as seen in residential work across the Atlantic, believing that these views will serve to more adequately give the reader an idea of what is being attained there in this respect, than can any verbal description. Most of these buildings are in the vicinity of Glasgow, Scotland, and they have been constructed in a locality where wood and brick structures are unknown, and where stone has been the principle building material for centuries. These illustrations show a pleasing range in house design, and a consideration of architectural and constructive details which readily commend the use of concrete blocks where economical, artistic and substantially built houses are desired. In each instance the walls are solidly built, quiet and inviting in appearance, and lacking that repelling monotony which has too often characterized work of this kind; and while these houses simply serve to show the introductory use of concrete blocks in Scotland, it is quite evident from the thorough and highly creditable manner in which the work has been executed, that this class of material will be assured an important and permanent place in the future building undertakings of that country.

More progress has possibly been made in the development of this type of construction in England, Scotland and Ireland, than in any other section of Europe, although in the continental countries considerable headway is being made, and here and there in different parts are to be seen a sufficient number of instances of hollow concrete block construction, to satisfactorily demonstrate that this manner of erecting buildings is being widely recognized and adopted. In Italy the investigations of a prominent firm of engineers and contractors, who visited the American continent to study the merits of this type of construction, has been followed by a most marked progress in this line. In Spain a number of concrete block houses have been built with good results. In Germany, France, Austria and Switzerland, many buildings of this kind have been built and are now under construction, and in Russia the initial work is now being done to introduce this character of building material, with no little success.

One feature which must impress any visitor to Europe is the permanency of construction to be seen in all countries. The respective governments there demand a better class of building in general than do we on this continent, and the wisdom of more strict building regulations is readily discerned in the low annual fire loss, as compared to the loss sustained each year in Canada and the United States. Little or no wood is used in the external construction of a building, and every step is taken to reduce the danger of fire to the lowest point possible. The main thing there is to produce economical, durable and sanitary buildings, and this very fact has been favorable to concrete block construction, in that five-sixths of the materials used consist of sand and gravel, easily obtained in any locality, which brings the cost down to a low figure ,and gives the hollow concrete block, in this respect, a decided advantage.

Two family cottage at Dumbarton, Scotland. A simply and pleasingly designed small double dwelling, executed in concrete block, the front of the building being of panel blocks, while the remaining portion of the walls is carried out in blocks of the rock-faced type.

But European countries, however, are not the only foreign parts which are displaying marked activity in the development of this important industry. There is in fact no civilized country in the world but where the application of concrete blocks to building construction is to be seen. Their use is becoming more evident in urban and rural construction, in factories and warehouses, schools and churches, the town residence and the farm-house, and they are even to be seen in more important buildings. The Provincial Capital Building at Zamboanga, Philippine Islands, shows an interesting example of their use, the blocks having been made and laid up by native Moras, a semi-savage people. In Khartum, Egypt, the Public Works Department of the

Detached concrete block residence, Paisley, Scotland. Note the ashlar effect, with panel trim at corners and plain trim around windows and doors.

Four family concrete block house, Paisley, Scotland. Note how monotony of rock face is relieved by introduction of panel blocks and broken ashlar effects.

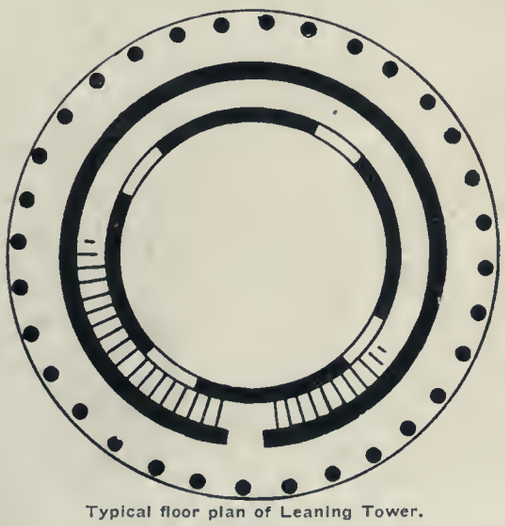
Sudan Government are using a large number of machines and employing concrete block in extensive construction work; and they have also come prominently into use in Australia, New Zealand, India, China and Japan, and in nearly every Central and South American country.

It seems quite manifest in view of the expansion which is taking place abroad, that concrete blocks are destined to play an important part in the future building construction of foreign countries. It is equally as evident that they will also be a big factor in our own development in this respect. In districts in Canada where suitable clay is not to be found, concrete blocks will undoubtedly come to be accepted as a most durable, sanitary and economical method of construction. The accompanying illustrations amply attest to the highly satisfactory results that can be obtained. All that is necessary to attain highly satisfactory work in this direction is that we assimilate the "thoroughness" of the European and study our materials and problems as he does. This continent has invented and perfected the modern concrete block machine, and most encouraging progress has been made in its use; but the European has shown us a consideration for architectural and constructive detail in the manufacture and application of this character of building material that is well worthy of imitation.

The photographs used to illustrate this article were kindly loaned CONSTRUCTION by the Ideal Concrete Machinery Company of London, Ont., and the very excellent character of these houses are fully demonstrative of the high standard of concrete block work, which is produced on the machine manufactured by this company. Ther is no machine on the market capable of meeting either the architectural or constructive requirements of the builder in concrete block work, more fully than the "Ideal"; and, for this reason it is employed in practically every civilized country on the globe, and has done much to popularize this economic and sanitary form of construction.

LEANING TOWER OF PISA.

THE LEANING TOWER OF PISA is one of the wonders of the world, and, from a builder's standpoint, probably the most unusual ever constructed. Various reasons have from time to time been suggested for its peculiar construction, but the theory most generally accepted is that the foundation settled on one side during construction and that the building was then completed, the columns in the upper stories being made somewhat longer on the lower side to prevent, it is supposed, too great an incline. The tower was begun in 1174, and was not completed until 1350. It is eight stories high (180



Typical floor plan of Leaning Tower.

feet) and about 13 feet out of plumb. The circumference at the base is 160 feet. The tower is built entirely of marble. The columns number 207. In the belfry there are seven bells, and from the top is one of the most magnificent views in Italy. A circular staircase around an open well leads to the top. It is said that Galileo,

Famous Leaning Tower of Pisa.

whose ideas of the pendulum were suggested by a swinging lamp in the adjoining cathedral, later made his experiment with strings hanging from the inclined side of this tower.

AN IMPORTANT WORK which takes about ten years to complete, has just begun at St. Peter's Rome. It is the repaving of the vast edifice, which the feet of the crowds visiting it during succeeding centuries have worn away. It is estimated that it will cost about £80,000 to restore the 12,000 square metres of pavement damaged, and this only represents about one-half of the total surface. The restoration will be a work of patience, for it is intended to supply the place of each old stone with one precisely similar. But it is here that the difficulty presents itself. Where are the marbles to be obtained? Many of the species used for the original pavement are no longer obtainable. They came from the ancient Roman temples, from the columns and tablets found buried in the earth, and to-day such finds are very rare. Nevertheless the Chapter of St. Peter's has been able to acquire some of these rare marbles. The remaining portions will have to be sought from the quarries of Carrara.

BY A RECENT DEGREE the government of Venezuela has exempted sanitary water-closets, urinals, inodorous sewers, and kindred appliances from import duty. This offers a good opening to manufacturers who are looking for markets abroad. Venezuela is one of the several Latin American countries which is taking vigorous steps to bring their sanitary system up to a high standard.

PLUMBING SYSTEMS.—Principles on Which They Should be Founded.—By William Gerhard, C.E.

PLUMBING WORK comprises means and appliances for supplying buildings with water, for removing water fouled by use, and for removing storm water from roofs and paved courts and areas. I shall here consider only the removal of the water which has been used in buildings. This removal is accomplished by a system of fixtures, traps, waste, soil and drain-pipes, with the necessary vent pipes; these together constitute the house drainage system.

The individual house drainage systems form the units composing together the joint sewer system of a community. To be effective, the house drainage system must be correctly laid out and operated properly. Every such system should fulfil certain requirements, which I will state briefly.

1. The house drainage system should remove from the building quickly and completely all liquid wastes, including human excreta, water used for washing and bathing purposes, kitchen water, and sometimes, though not always, the storm water. The removal of the house sewage should be effected before decomposition sets in. It should be accomplished without contaminating the soil, the air, or the water.

2. A house plumbing system should he so arranged that under no circumstances will there be an escape of sewer air into any room in the building. This is accomplished by the proper and safe trapping of all outlets.

3. Foul gases, originating in the house pipes, should be diluted, oxidized, and thus rendered inocuous. The entire pipe system should be without long dead ends, where the air would stagnate.

These are the three general requirements which every system must fulfil.

I come now to some more specific advice, contained in the following maxims:

1. Each building should have a separate connection with the street sewer. Large buildings may require several connections, and these are better than one pipe of a very large size.

2. All the drain, soil, waste, and vent pipes within the building, and up to a point five feet outside, should be of heavy cast-iron pipe, with lead-caulked joints or of galvanized screw jointed pipe with recessed drainage fittings. No earthenware or tile drains should be allowed within the building.

3. All pipe conduits for sewage should be constructed air and water tight, to prevent leakage of sewage and of sewer air.

4. All the horizontal and vertical pipes should be carried as straight as possible. Offsets on vertical ventlines should be made under 45 degrees.

5. On horizontal lines use Y branches, not tees, for junctions or connections.

6. All the pipe conduits, traps, cleanouts, as well as the fixtures, should be kept exposed and easily accessible for inspection or repairs.

7. All the pipe conduits should be of minimum diameter consistent with volume of sewage or waste water to be carried, because in this way the flow of water is more concentrated, and the pipes are flushed out better.

8. All pine conduits should have good supports, good alignment, and a sufficient fall.

9. All soil and vent pipes should be extended the full size to the roof, or even enlarged at the roof, to prevent closing of the pipes by hoar frost in cold climates. No pipe above the roof should be less than 4 inches.

10. The number of vertical stacks in a building should be reduced to a minimum, and this can be accomplished by concentrating the plumbing work and making branches as short as possible.

11. Reduce the number of fixtures and arrange them as much as possible, and as much as is consistent with convenient use, in vertical groups. A single soil pipe may answer for the fixtures on the number of floors.

12. Place plumbing fixtures only in ventilated rooms, and confine the plumbing to bath and toilet rooms, to kitchen, pantry and laundry.

13. All the plumbing fixtures should be trapped separately and safely. The trapped waste from one fixture should never pass through another trap before reaching the soil pipe or the house drain.

14. Fixtures should be of non-absorbent material; all sharp corners should be avoided, glazed and smooth surfaces are required. Wood and porous stone should be condemned as unsuitable.

15. Modern plumbing work dispenses entirely, and properly so, with the former wooden enclosures of fixtures.

16. There are certain pipes in every house which should never be connected to a sewer or soil pipe—for instance, the overflow pipe from the house tank, and in particular the wastes from refrigerators or ice boxes These should drop over a trapped and water supplied sink.

17. Avoid having in the house any fixture which is not in daily use, as the evaporation of water will soon unseal the trap.

Each plumbing fixture should be arranged to empty quickly, like a flush tank. All pipe conduits should be well flushed, and if the grade is slight, special flushing appliances for the house drain should be provided.

These are the leading axoms, which I shall require you to keep well in your mind. Note also the following summary of requirements: (1) Good and durable material; (2) good workmanship; (3) good supports, fall and alignment; (4) proper junctions; (5) direct and short runs; (6) accessibility of all parts; (7) safe trapping of the fixtures; (8) perfect ventilation; (9) powerful flushing; (10) instant removal of all wastes from the building; (11) noiselessness in action; (12) protection against freezing of the plumbing; (13) prevention of unnecessary waste of water; (14) simplicity of arrangement, concentration of work; (15) avoidance of all complicated mechanical apparatus.

These rules should be applied, where the plumbing is in charge of a health officer, to all new work for which plans are submitted to him. They also should be made to apply to inspections of old plumbing work.

Let me mention here one popular fallacy, viz., that "only nickel-plated plumbing work" can be sanitary. I want to assure you that you can have just as sanitary plumbing work if you use iron or lead piping, which can be made to look well by aluminium bronzing or enamel painting.

THE NOBLEST BRIDGE IN THE WORLD is Waterloo Bridge, according to the artist Canova, who considered that it was "alone worth coming from Rome to London to see." The French engineer Dupin, in his memoir on the public works of England, called the bridge "a colossal monument worthy of Sesostris and the Cæsars." Waterloo Bridge was erected by a joint-stock company, the cost was a million, and the constructor was Sir John Rennie. It was opened on the second anniversary of Waterloo by the Prince Regent, who had with him many royal dukes, the Duke of Wellington, and many British officers who had taken part in the battle. Up till the early 'seventies tolls were charged on the bridge, and for the six years preceding 1873 there was an income of more than £21,000 per annum.—STATE TRADE GAZETTE.

THE MODERN CHURCH.—What Should It Be?—Hysteria in Art More Dangerous than Ignorance.—Architect's First and Foremost Duty Should be to Satisfy Requirements of Problem Before Him.—Mysticism and Inspired Architecture Uncalled for. By J. STEWART BARNEY

Much discussion has been engaged in recently with regard to the establishment of a New World Type of Architecture. Mr. J. Stewart Barney, of New York City, is unquestionably one of the most prominent architects in America, who appears to have extremely strong ideas with regard to the establishment of a New Era in Architecture on this Continent. Mr. Barney stands out as a Free Thinker in the profession, a man who with his statements has frightened the prebendaries, deans and curates of the old school of architecture. He believes that we should not import our ideas from the Old World, and that buildings should be designed with consideration for utilitarian as well as the artistic effect. He further contends that we have much to fear from hysteria in art in architecture. His more recent statements with regard to his views in these matters have caused a very wide discussion. His article pertaining to church architecture in America, reproduced herewith from a recent issue of "Munsey's" magazine, while it will not meet with the approval of many of our Old School Architects, has much in it that will prove interesting to the architect of the more practical turn of mind, who appreciates the necessity of being influenced in his work by modern and local conditions.—EDITOR.

The Broadway Tabernacle (Congregational), Broadway and Fifty-sixth street, New York, designed by J. Stewart Barney. While thoroughly ecclesiastical in character, this church is remarkable as combining, on a limited site, a large auditorium and a twelve-story office building for parish work.

THE QUESTION is often asked why, in a great modern city like New York, there may be found, often almost side by side, churches that suggest the soaring Gothic cathedrals of fifteenth-century France, the colonnaded temples of Rome, or the flat-domed mosques of Byzantium. The answer is simple. It is because photography has given to the modern architect the architecture of all countries, periods, and styles, from which he may gather inspiration. There is no reason why one should not find here the forms and ideas of a dozen periods and a dozen countries, endlessly combined and modified, flourishing in incongruous variety; whereas there were many good reasons why this condition of affairs could not exist in the Middle Ages.

An expert can, upon examining the details of a medieval cathedral, read within a few years the date of the building and within a small radius its position in Europe, simply because at that particular period, in that particular locality, they were all saying the same thing. On account of the limited means of communication and the scarcity of written records, the history of architecture was then written by hand in stone, and communicated from generation to generation, and carried from locality to locality, by word of mouth or by personal instruction. The architect stamped upon his work his own personality; but as he had little information as to that which had preceded him, or which was beyond the limits of his immediate neighborhood, the change he made was so slight that it was a natural process of evolution.

At the time of the invention of printing, we note a condition of affairs somewhat similar to that of to-day. The world was suddenly flooded with information which it was not yet prepared to receive, digest, and assimilate. The Renaissance was the result. At no period in the evolution of architecture, until the present, have such violent changes been brought about in so short a time. The architect suddenly came into possession of some of the records of the ancients, and his effort seems to have been to exhibit to the world the recently acquired knowledge of which he was so proud. The results were as pedantic as they were illogical.

The architect of to-day, on account of the great facility of travel and the wonderful advance which has been made in the science of photography, has within his grasp the entire architecture of the world, through all the ages. He can select anything that may suit his own particular taste, whether or not it truthfully expresses the needs and requirements of any particular congregation or creed.

Exactly what sort of a building our modern church will finally be is a question of interest and importance; but he would, indeed, be a bold man who would undertake to give a definite and final answer.

If the problem is impossible of definite solution, it is not for lack of discussion and debate. Many and able have been the champions of the contending schools. On the one hand we have the Gothicist, who holds that the classic renaissance, in sweeping away the medieval style, destroyed for all time the true idea of church architecture. On the other hand, it is urged that we are but carrying out the irresistible law of evolution by the universal adoption of the style of the Renaissance.

Again, we have the sentimentalist, who is carried away by the sentimental and historic associations which the buildings of Europe have for him. He, in turn, is met by the rationalist, who insists upon a truthful and logical expression of our requirements, and an absolute disregard of precedent in architecture, if it in any way interferes with this.

One of the champions of medievalism speaks thus * of the Renaissance and its effect upon architecture:

"Hell burst loose over all Europe, and during its dominance was developed, among other things, that

*Article by Ralph Adams Cram in the Architectural Review, under the title "Note on Architectural Style."

architectural style which modified and elaborated by Paris, is now offered us for universal acceptance."

This quotation represents one of the influences at work in the development of our ecclesiastical architecture. It follows this aphorism:

Classical architecture must not be used as the visible expression of Christian religion or Christian civilization.

And is followed by this blood-curdling statement:

"St. Peter's is Alexander VI. and Leo X. in concrete

St. Saviour's Chapel (Belmont Memorial), the central and largest chapel of the seven that encircle the Choir of the Episcopal Cathedral of St. John the Divine, New York. Designed by Heins & Lafarge. This chapel is of the Decorated Gothic type.

form, and any building modelled thereon expresses the debauchery, the blood-thirstiness, and the grinning hypocrisy of the time which, equally with its architecture, they were the incarnation."

This law unto God, man, and architect is delivered with the intolerance and absolutely uncompromising cruelty of the first inquisitor-general. Our modern Torquemada, with the pitiless despotism of the Inquisition, now thrusts out into utter pagan darkness all archi-

The Temple Emanu-el, the chief synagogue of New York. This is generally termed a Moorish church, but it is safe to assume that the architect, the late Leopold Eidlitz, was inspired by the Early Christian architecture, to which he has very cleverly adapted Moorish detail.

tects who are so steeped in sin and iniquity as to tolerate the sinful pagan forms. To his stern soul art is not a form of amusement. It is a sermon, if not a penance. He claims to breathe into every stone the intense heat of his religious fervor, and in some mysterious manner this advocate of mysticism in architecture reads in the actual architectural forms the religious faith of the architect.

The sincerity of his words, which no one has the right to doubt, would have influence upon all devout

The Synagogue Shearith Israel, Central Park West and Seventieth Street, New York. Designed by Brunner & Tyron. This is probably the best example of a modern place of worship built for an Orthodox Jewish congregation.

Christians seeking the services of an architect, had he not been guilty of accusing "the classical practitioners" in no uncertain terms of a "scheme" to retain in their hands commissions that would otherwise go to men of his own school. This might suggest that his holy horror was not entirely due to the fact that "a recrudescence of religion, a reassertion of the finality of the catholic faith and the indestructibility of the visible

St. Columba's Chapel, one of the seven chapels of the Episcopal Cathedral of St. John the Divine, New York. Designed by Heins & Lafarge. The round pillars recall the Norman pillars in Durham Cathedral, while the window tracery is of a much later period.

church, formed no part" of this "scheme," but it might have a tendency to weaken his hold on the ministerial world, and force him to meet this sinful classic "propaganda" with an equally subtle one published in religious papers.

Another influence is expressed in the following quotation:*

"The church . . . makes a radical mistake when it

*Article by Thomas Hastings in the Architectural Review, under the title "A Plea for the Renaissance in Ecclesiastical Architecture."

dictates a medieval style. To this no self-respecting architect with real convictions who truly knows and loves his art can submit."

This is preceded by a gentle truism:

"If the church would seem to be what it really is, its architecture must be the outward expression of its

St. Ignatiuss Church (Episcopal), West End Avenue and Eighty-seventh Street, New York, designed by Charles C. Haight. A free and clever American interpretation of the Anglican parish church.

real life; to be one thing and seem another is lacking in sincerity and in truth."

This "plea for the Renaissance in ecclesiastical architecture" is as platitudinous as the arguments against it are dictatorial, but as both make a great point of the outward expression in architectural forms of the truth and sincerity of the church, it will be interesting to know how the advocate of the Renaissance proposes to accomplish this.

He first admits that "the church may require the

St. Patrick's Cathedral (Roman Catholic). This great church, designed by the late James Renwick, is in the style generally known as Late French Gothic; the details, however, might more correctly be called Decorated English Gothic.

Latin or Greek cross in plan, the high central aisle and transept, clearstory windows, flying buttresses, and the many motives generally associated with Gothic architecture, but it makes a radical mistake when it dictates a medieval style." Therefore, if, according to his own statement, the church may employ the motives generally associated with Gothic architecture, we must infer that it is only the Gothic detail to which he objects, and to which he says that "no self-respecting architect can submit." Therefore, simply by the use of Renaissance details for our churches, truth and sincerity will be expressed, even though we use all of the motives generally associated with the Gothic architecture.

But he also states very distinctly that "style is only a matter of detail." Therefore, in advocating the selection of a style, although elsewhere this same writer declares that the "question of selecting the style" is one of the crying evils of modern times.

After he has decided that it is, after all, necessary to select a style, it is hard to understand why he selects the Renaissance, when he states, farther on:

"The Renaissance churches are not religious in character, they are not conducive to religious thought, they do not appeal to the emotional side of our nature, or lend themselves to church worship."

He explains this as follows:

"Fortunately, never since the cave-dwellers and mound-builders, until modern times, did any people ever undertake such a thing as to interfere with the great historic continuity of style. Now, forsooth, it is no

St. Charles Borromeo's Church (Roman Catholic), West One Hundred and Forty-first Street, New York, designed by George H. Streeton. This illustration is interesting as showing the charming enect of the play of light and shade in a vaulted Gothic roof.

longer a question of the study of character—to make a church look like a church; it is only a question of selecting the style."

After this it would seem inconsistent on his part to advocate the selection of the Renaissance style, which, according to his own statement, was founded on "a revolution which took place in the architectural evolution," a revolution so sudden and violent that in the very brief period of three generations it produced "the dawn of the real Renaissance." This could hardly be said to be following his principles—"the great accumulated principles of architectural composition and all rational motives of construction, unchangeable through the ages." And again, he certainly would not advocate adopting a style which, as he has already admitted, is not religious in its character, simply because he thinks that in time it might be made so. What becomes of the sincerity and truth of the church during this experimental period?

He allows that "we can study and find inspiration in the great principles of Gothic composition, but to adapt the style"—which he has defined as a mere matter of

detail—"to modern conditions of life is an inexcusable anachronism." This seems to be another statement of the principle that the use of Renaissance details for our

The Chapel of the Good Shepherd, in the General Theological Seminary (Episcopal), New York, designed by Charles C. Haight. This view shows the Rood Screen, a prominent feature of the English type of Collegiate Chapel.

churches will give to our church architecture the real, living spirit of religion. Such a position is rendered more extraordinary by the fact that he dwells upon the religious fervor of the Gothic architects, saying that "their very souls were in this work, praising God with every chisel-stroke," and complaining bitterly of the lack of religious fervor of the modern workman, who thinks only of his wage.

He would apparently have us conclude that truth and sincerity in our ecclesiastical architecture will be obtained by building Renaissance churches, which are "not conducive to religious thought," and decorating their exteriors with pagan detail, carved by irreligious workmen. Yet, might it not almost be considered sacrilegious to call upon the architect to express in this way an "outward and visible sign of an inward and spiritual grace?"

Still another influence is represented by the following

First Church of Christ (Scientist), Central Park West and Ninety-sixth Street, New York, designed by Carrere & Hastings. A costly church building in the Modern French style, with notably rich and elaborate decorations, verging on the Baroque.

quotation from an article* written by a well-known literateur under the title: "What Do Our Church Buildings Express?"

"This origin of temple, church, and synagogue in a subterranean tomb or cave should not be forgotten when examining the religious edifices of ancient and modern peoples."

The writer apparently is one of those poetic souls who insist that the beauty of architecture must be that of association. He bases his criticism of a building upon the resemblance which he imagines that he sees between it and some old-world structure with which he is more or less familiar, and which produced upon him certain

The Rhinelander Memorial Church (Episcopal), East Eighty-eighth Street, New York, designed by J. Stewart Barney. Early English timber roof, Modern English glass, Late French Gothic octagonal apse, vaulted aisles, and clear story are here combined, harmonized, and adapted to a modern city church.

effects. The resemblance does not necessarily have to be striking for him to see it, as is shown by the fact that the Broadway Tabernacle, in New York, a building which is distinctly practical and is French Gothic of the fifteenth century, has for him "a faint flavor of the Orient."

Hysteria in art is more dangerous than ignorance, though less criminal than chicanery. In the amateur, if well developed, it is incurable. In the professional, it takes the form of business policy, which he changes to suit the fashion. It is generally seen in its most acute stage in the writers of hysterical articles on the subject of art and architecture. These call upon the architect "to say something to the point which cannot be misunderstood by believers." They ask:

Why should not some great composer arise in this

Amity Baptist Church, South Fifty-fourth Street, Brooklyn, designed by Rossiter & Wright. This illustrates some of the latest methods of construction, and though rather plain in its treatment, is a new note in church architecture, indicating great possibilities of future development.

the most ennobled and majestic of all arts and voice mankind's yearning for another and a better world in terms of architecture?

*An article by Charles De Kay, published in the Review of Reviews.

It would be indeed interesting to the architects if this author were to write another article under the title: "What Should Our Church Buildings Express?"

If he thinks that an architect should express, by the details on the exterior of a church, the congregation who worships within, the architectural profession will be glad to learn what particular form of detail suggests Catholicism, Methodism, Presbyterianism, Spiritualism, or any of the many "isms" that we have to house in this country. What traditional forms has a sect which has existed for less than fifty years, such as the Christian Scientists? On the other hand, what architectural traditions has the Jewish religion, which has existed for thousands of years? Would he consider it proper to build in New York, on a limited piece of land, a New England meeting-house, which would be rendered ridiculous by the surrounding skyscrapers, in order to express to the "puzzled wayfarer" that this was the home of a New England Congregational church?

Architecturally speaking, "shingles and clapboards" might be considered "cheap and tawdry," as has been suggested by the champion of mysticism; but to regard them as "a perpetual reminder of our meanness and our hypocrisy," or of those qualities in our Puritan forefathers, seems unnecessarily severe upon the shingles, not to mention our forefathers.

"A church is a house of God, a place of His earthly habitation." True, of course, but it will be "wrought in the fashion of heavenly things, a visible type of heaven itself" only in the souls of the devout.

God may have given "Solomon the plan and the fashion of the temple," but it will be held only by those steeped in the depths of mysticism and superstition that this is true of the cathedrals of the Middle Ages. Rational, beautiful, inspiring; but not inspired. We may "bow before the rocky masses of Durham," but all are not impressed by the "mysterious caverns of Cologne."

It is difficult for a trained architect to criticize the architecture of his own period. One might be tempted to follow the lead of a distinguished church architect,* who, in an elaborate work on "Church Building," took occasion to publish an unfortunate reproduction of the work of a brother professional, and to refer to it as "crushed and apologetic," as "modern trick of cottage walls—bad even at the best. Instead," he continued, "we have quite the reverse"; and there followed some irresistibly charming pen-and-ink drawings, made by his associate in business. These sketches, if ever built, may perhaps accomplish the artistic effect promised by both sketcher and scribe, but they do not prove anything.

It is dangerous to criticize an art when one is engaged in the practise of that art. One might be charged with criticizing a competitor for personal reasons. The architect who was reported to have said that the buildings of West Point would set American architecture back hundreds of years might be accused of this; even by those who agree with him that there is not the slightest connection between mysticism and modern gunnery.

The rationalists hold that the architect's first and foremost duty is to satisfy the practical requirements of the problem before him. If the truthful expression of these requirements does not at once seem beautiful to us on account of its novelty, then, rather than disregard those requirements out of a scrupulous respect for the past, let us leave to coming generations the task of rendering their external expression beautiful. The most beautiful buildings of the past are those which most nearly suit their requirements. Should we, in designing an automobile, follow the lines of the Roman chariot, the sedan-chair, or the stage-coach?

An architect was once asked if, in his opinion, a man who was not thoroughly inspired with the ideas of Christianity could design a church building. He replied:

"Must I be a shoemaker in order to build a shop in which shoes are to be sold?"

This remark might, at the first blush, be considered irreverent, but upon examination it will be found that it implied no disrespect to religion. The speaker merely declined to allow that there was necessarily any association between the religion of an architect and his artistic expression of the needs of any particular creed. It is within the bounds of possibility to conceive of a devout but absolutely inartistic Christian, or of a most talented artist who was absolutely irreligious.

In church architecture, as in all architecture, the first and most important considerations are the practical requirements. It is true that sometimes practical requirements, if truthfully expressed, chase away ghosts and fantoms. It is hard to conceive of a family ghost hiding in a closet that is instantly flooded with light thrown on by a switch worked by opening the door. The spirit of Christianity, however, does not hide itself away in the dark, cloistered corners, nor allow itself only to be seen in the sunbeams transmitted through painted windows, nor does it have to be aroused by the tones of the echo organ tucked away in the vaults of our cathedrals.

Mysticism, inspired architecture, and meaningless jargon have no place with us.

"PEOPLE WHO LIVE IN GLASS HOUSES should not throw stones at their neighbors" is an adage which promises to have more than an allegorical significance. Glass houses have come, and glass bricks as building units are said to possess both a structural and hygienic value which in many cases will render them most desirable. As for "throwing stones," the watchful eye of the law will perhaps prevent any great danger in this respect, and even should the guardian of the peace take a nap long enough for some culprit to hurl a missile, it is quite possible that glass bricks will be found to withstand the shock equally as well as most other materials. Whether or not the trades representing the masons and the glaziers will conflict as to whose work it is to lay such brick, as the steel workers have done in certain parts by trying to insist that the placing of the steel reinforcing rods in the concrete was their innate right, is something which the labor organizations will adjust in their own. The main thing is that glass bricks have come into use, and that a number of interesting examples of their use is to be seen in certain European countries. Germany uses them for building purposes with no little degree of success. In Berlin is constructed a small villa, the walls of which are built of glass bricks of several shades of dark green and blue. The glass bricks are especially adapted to construction where light, cleanliness, and neatness are particularly in demand. In Hamburg they are utilized in place of windows. They admit light in walls which police regulations require to be fireproof and windowless.

In addition to admitting light to dark hallways, rooms, etc., they are said to possess the same strength as ordinary clay bricks. They are also utilized in walls in yards and in partitions in the interior of houses, salesrooms, offices, workshops, etc., as well as for the construction of verandahs, hothouses, kiosks, bathrooms, hospitals, ice factories, butcher shops, railroad stations, breweries, stables, and in other places where cleanliness, light and uniform temperature are especially desired.

The bricks are also made with a wire coating for fireproof walls. In some of the recently erected buildings in Milan, Italy, bricks made of glass have been adopted for ground and upper floors on account of the light obtained. They are also coming into use for partition work in some of the hospitals on account of hygienic principles.

In one of the leading banking institutions of the city of Turin the lobby office floor, which is about 36 by 58 feet, is entirely paved with glass bricks laid in iron frames for the purpose of admitting light into the basement where are located numerous private boxes or vaults.

*Ralph Adams Cram.

ARE BUILDING CONTRACTORS BUSINESS MEN, IF NOT, WHY?—Lack of Commercial Qualifications Detrimental to Individual and the Trade.

BEFORE A CONFERENCE of building contractors recently, held at Harrogate (Eng.), Mr. Jas. Townsley, for many years prominently identified with the building interests of Great Britain, gave a short paper which, while designed only to point out a condition existing in his own country, nevertheless had a more widespread application, and may, therefore, be of interest to those who are engaged in building construction in Canada. After a brief introduction, in which it was explained that the remarks were not intended as personal thrusts, but more to point out certain evils which have resulted to the trade from the lack of proper qualification on the part of many contractors, Mr. Townsley said:

Acting in a secretarial capacity to several trade organizations, and from a varied experience gained over a period of thirty or more years in the building up of a business, I have had ample opportunity for study and the acquiring of knowledge in the particular subject I have chosen to speak upon. Careful observation has led me to form opinions from time to time on the business habits of those who have elected to set up in trade as building contractors. We all know with what ease men set up in this calling, and how many of them do not possess even an elementary knowledge of business. I speak but generally when I say that most of our contractors are men whose only qualification is a practical knowledge of the trade, which, though useful in its way, is by no means the only essential necessary. Business to-day, as in all times—is a serious engagement, as distinguished from trivial transactions. Its healthy pursuit requires skill, thought, industry, arrangement, calculation, prudence, punctuality, perseverance, etc. The difference in men and their success may be attributed, in a measure, to the difference in their business habits. In fact, a large capital and excellent opportunities without them, I think you will agree, will only provoke greater disaster, and a more widespread ruin. Business therefore is a study, and he who would avoid the many pitfalls to which a business man is subject, must of necessity give his mind seriously to mastering the principles of commercial life. I do not say that before he can succeed he must be proficient in such knowledge, but I do say that the man who really desires to succeed will studiously seek to acquire such a grasp of the laws governing business practice, that he can at all times readily discriminate, arrive at fair conclusions, and act accordingly. But to-day we have to deplore an absence of such qualifications. If we select indiscriminately 100 firms to-day in business as building contractors, we shall find on analysis that a decided majority of them, judged from the standard I am setting up, are altogether unfitted for business. They are incapable of making up a tender—they lack knowledge of even ordinary bookkeeping—of finance and its careful and economic manipulation, they have no idea,—to indite a decent letter is impossible to them—to judge the fairness of an agreement submitted to them is beyond their capacity, and in matters of a minor character they are terribly negligent and incompetent. In taking on a contract, this class of man has very little regard for the value of money so long as he secures the work. Stress of competition compels him to accept a low-priced schedule, including a bare margin of profit, and this he will often sacrifice by his willingness to give extended credit, or by submitting to unfair conditions.

Another phase of a building contractor's business life which tends to destroy his chances of success, is the habit of speaking disparagingly of a competitor. He fails to see that he is revealing a strong trait in his own nature for unfairness. Have we not all met with such men, who because they have suffered disappointment, at once abuse a competitor, and seek to poison the mind of another against him. We are impressed with these men, but certainly not for good, and our opinion of this class of person is that the less confidentially we treat them, the better will it be for ourselves. A wise business man will rarely, if ever, refer to an opponent, except in complimentary terms. A good business training will teach a man the unwisdom of taking on more work than he can conveniently manage, putting all his eggs into one basket, as it were, a truism with which we all agree, yet how often do we find this kind of procedure obtaining amongst those who lack a knowledge of business principles? I have known many men in my own time, who with limited capital have commenced on their own account, and who have felt flattered at receiving the support of some firm likely to give them considerable help. They have accepted order after order, and ultimately discovered that they have been serving an impecunious firm, and thereby lost the major portion of their capital, if not the whole.

Another point which must have forced itself upon us all at one time or another, is the silly practice of those who claim to be practical men, of taking work by contract, and because they work themselves—make no allowance for the cost of the labor. Of course, business conducted on these lines cannot hope to succeed, yet it serves to harass the bona fide firm, and to destroy the prospects of remunerative trading. By this and other stupid methods of doing business, we see how unfitted is the man who attempts to conduct a business without a reasonable knowledge of what is required of him. So far, my observations have been directed mainly against the small man who, without suitable training, enters upon an enterprise with a knowledge most vague, but I would not judge him necessarily by the extent of his business, for a man may be very big from a point of turnover and yet be devoid of business qualifications.

The empire of Rome fell because it did not deserve to live, and so many firms have brought about their own ruin by neglecting to observe those rules and regulations which common prudence dictates. It may be argued that those firms which to-day stand in the front rank of this particular trade had a small beginning and yet have succeeded. True, but if we could only get back to their inception, I think we should find that underlying their success was not a depraved, inconsiderate reasoning, but a stability of character, backed by integrity and justice, which in themselves deserves success, and invariably secure it.

Turning again to our text, and judging it from a federation point of view, the utter lack of business acumen amongst associated members and non-members alike is amazing. If a man means well, and is determined to go straight, what objection can he have to federation? By ignoring its principles can he hope to improve the trade he represents, or secure better prices for his goods or his work? Certainly not, neither can he secure from his oppressors those fair conditions of trading to which all men are entitled. To fail to give support to any honest effort, directed to the improvement of trading conditions is, to my thinking, a serious misdemeanour, and unworthy of any man not exclusively engrossed in selfish pursuits. The law of federation places upon each of its members a responsibility in regard to the rights of others, and who will deny that others have rights equally with ourselves, and if this be so, why should we ignore the claims of federation, unless we secretly and selfishly desire to secure those rights and apply them to our own use. The business man who ignores his competitors, and treats them, as too often he does, with contempt and derision, contributes in no small degree to present embarrassment—inconvenience—and ultimate difficulty.

In conclusion, I might ask why should the building

trade be so denuded of business men? The reason, I think, is not far to seek. Much of the building trade is simplicity itself, and can be undertaken by any ordinarily intelligent person—that is, so far as its technique is concerned. An operative bricklayer requires very little plant to enable him to start out as a jobbing bricklayer and if he survives the initial stage of his business career he will soon attempt contracting in a small way and thus he continues on his course, gaining knowledge by his experience, which is useful in itself, but, judging from results, he very often neglects to improve his mind in commercial knowledge, hence my contention that the average person engaged in the building trade is seriously lacking in those attributes which make the business man. The same might be said of almost each branch of the building trade. This fact induces many illiterate operatives to make a venture, which not infrequently becomes a real struggle for existence, and before they can realize their position they are so involved that failure is inevitable.

Many other reasons might be assigned for the dearth of business men in our ranks, reasons which will occur to most thinking people, therefore I need not introduce them here. Thus my views on the question are but briefly stated, and it may be thought that I have overlooked those firms who do conduct their business on sound business lines and with great acceptance to all who trade with them. That such firms do exist goes without saying, but they are few and far between compared with the vast numbers who pose as business men, when, as a matter of fact, they are but one step removed from the operative. To disparage the humble effort to succeed is not my purpose. I merely seek to answer a question and to give my reasons for the conclusions arrived at. If on the other hand it is expected of me to suggest by what means those engaged in the building trades might, the better qualify for the higher standard of excellence to which I refer, I would urge them to avail themselves of every opportunity to extend their knowledge and improve their powers of observation by constant comparison with the methods of good business men and the study of suitable books—to give prompt attention to any commands of a customer—just as they would to a telephone call—having made a promise or undertaken a duty, see that it is carried out—no matter at what cost of displeasure or inconvenience—reply promptly to all communications, and where an urgent answer is needed spend the amount required in telegraphing, or send a special messenger—never repeat what a friend discloses in confidence—learn to judge without prompting what is impartable information and what should be treated with discretion—study to be fair-minded to all parties, and avoid exacting the last shilling from a customer—just try to serve other people, as we should like them to serve us.

TA CHING GOVERNMENT BANK.

THE TA CHING GOVERNMENT BANK (illustrated on this page) at the corner of Szechuon and Hankow roads, Shanghai, has been erected from the designs of Messrs. Atkinson & Dallas, of 4 Peking road, Shanghai. The building is four stories in height, with attics above, built of red brick, and having Ningpo stone dressings and facings at parts as shown, and treated in a free treatment of the English Renaissance style. The principal entrance to the banking hall in the Hankow road is of an ornate character in stone, and has a wrought iron gate with grill above, opening into a spacious vestibule. This feature in the elevation, which is slightly projected at this point from the general building line, is carried up as a tower, which rises to a height of 110 feet above the ground level. Where this tower rises beyond the roof it is carried up square, with similar features on all four faces, while the upper part breaks off into a circular shape, and is surmounted by a copper-covered dome. The corner at Hankow and Szechuen roads is rounded off to an octagonal shape, and finished off with a low circular dome, also covered with copper. The lower story is divided into horizontal bands by strongly-marked joints, and a stone cornice projected at the floor level to form a balcony to the first floor windows, with wrought iron enclosures. The roof is covered with corrugated galvanized sheet iron.

Ta Ching Government Bank, Shanghai, China. A recent example of Western World architecture in the Orient. Atkinson & Dallas, Shanghai, Architects.

CEMENT THE REMEDY FOR NATION'S FIRE LOSSES.—Appalling Figures of Annual Devastation in the United States.—By Richard L. Humphrey.

IN its mad rush toward a prosperity unparalleled in the history of civilization this nation has permitted abuses which are as startling to the outside world as has been our advancement. Our priceless heritage of natural resources has been squandered with a prodigality that threatens the exhaustion of many of them before the end of another century. The most serious is the depletion of our magnificent forests which have been slashed and cut with such a ruthless hand that unless drastic measures are at once taken to save what remains and strive to replace what is already destroyed by the replanting of trees, our supply, according to the opinion of the Federal forest service, will be exhausted in thirty-five years.

The greatest waste of timber is caused by fires, and the record of the United States is the most shameful of all the world.

In 1907 the property destroyed by fire amounted to the enormous total of $215,000,000, a per capita loss of $2.51. Of this loss, $146,000,000 was in frame buildings and but $68,000,000 in brick and stone. This terrible waste is not equalled by any other nation.

Our per capita is nearly eight times that of Europe, which is reported by the National Board of Fire Underwriters as but thirty-three cents for six leading countries. Under similar conditions the fire loss in this country for 1907 would have been but $27,000,000 and $187,000,000 would have been saved. Nor is this all. The United States has the finest and most efficient fire fighting apparatus and private fire protection system in the world. Eliminating the loss through property destroyed in fires, the cost of fire protection for 1907, amounted to $241,401,442. There was paid to insurance companies in excess of what they returned as losses, $145,000,000; the fire departments cost fully $50,000,000 and private protection systems $18,000,000. Altogether the total cost of fires in the United States during 1907 amounted to $456,486,151, or $5.34 per capita, or nearly one-half the cost of new building construction for the same year, estimated at one billion dollars.

Confronted by such startling figures, we naturally look for the cause, and it is easy to find. This country is filled with buildings so faultily and flimsily constructed that they are a constant menace.

In our large cities are thousands of firetraps, and one of which may at any time cause a conflagration, that will wipe out millions of dollars' worth of property and destroy the lives of many people. Our villages and hamlets are for the most part a collection of firetraps. In many instances our theaters and assemblage halls are on the upper floors of frame buildings. It is a crime against humanity to permit public assemblages above the first floor in any building that is not fireproof.

It is a crime to have a public meeting place in any building that is not fireproof. The sooner the authorities are brought to such a realization of this as will lead to the adoption of adequate laws and their rigid enforcement, the sooner will these terrible holocausts cease. The people of Cleveland have had one fearful lesson in the past year in the burning of the Collinwood school house in which the lives of more than 150 little children were lost. While this may be charged up to bad construction, those responsible for the conditions which permit such structures to exist and to be occupied for such purposes should be criminally liable. One year ago another frightful object lesson was afforded in the fire which destroyed the Boyertown, Pa., opera house and resulted in the death of nearly 200 women and children who were unable to escape.

Instead of profiting by these awful experiences, as would naturally be supposed, the country, after the horror of the disaster has ceased to attract attention, lapses into an indifference which can only be removed by another similar disaster. Scattered all over this country are Collinwood school houses and Boyertown opera houses, and these disasters will recur until these buildings are removed and our methods of construction are changed. In 1906, according to the census authorities, more than 5,000 persons died from burns in this country.

Deplorable as is the needless and criminal loss of life in fires there is another phase of the question that is most serious—the enormous drain on our natural resources resulting from the annual destruction of millions of dollars' worth of property by fire, which is not possible under European standards. Last April, a conflagration at Chelsea, Mass., resulting in an insurance loss of more than eight million dollars. Such conflagrations are possible in practically every big city in the country. The fire marshal of Ohio, Mr. D. S. Creamer, states in his annual report for 1907 that a conflagration costing three hundred million dollars is entirely possible at any time in this city of Cleveland and in your sister city of Cincinnati.

These conditions are often attributed to a desire on the part of property owners to erect their buildings as cheaply as possible in order to obtain the highest return from their investment. While this may be true in some cases, I think the real reason is that we have not as yet outgrown our primitive conditions which necessarily prevail in newly settled countries. Proper, conservative and safe building laws are the result of years of experience, and that is why Europe shows up to such advantage when compared to this country.

While our building knowledge has hardly developed into a science, we are learning rapidly the methods and materials necessary to secure the safety desired. The American people are not slow in adopting improvements when once their value is established. In the last few years we have made wonderful strides toward better construction, under the helpful guidance of the United States government. For many years the Federal officials have realized the seriousness of these conditions and the utter lack of knowledge concerning the properties of building materials. With the government spending $40,000,000 annually in the construction of public works, it was found necessary to inaugurate an elaborate series of experiments in order that the money could be expended wisely, for the government does not insure its buildings, but rather strives to make them fireproof.

The task of finding out the best materials for such structures was assigned several years ago to the Technologic branch of the United States Geological Survey, under the direction of Dr. Joseph A. Holmes, expert in charge. These experiments have continued up to the present time and although they have been conducted primarily in behalf of the government, the results have been given freely to builders, engineers, architects and the public generally.

In the revision of the building laws of the country, the progress has been extremely slow for the reason that a certain inertia must be overcome in removing the prejudice against changing existing laws. The influence of various interests opposed to this revision for commercial reasons has been another factor in preventing the adoption of better laws. Adequate laws are the first essential in bringing about the conditions that will prevent the big annual fire losses. Laws must be enacted that will not only regulate new construction, but that will invest in the building authorities the right to condemn structures whose very existence is a menace to public safety.

This is especially true in great cities like New York where the presence of innumerable firetraps is a constant danger, which unless eliminated may some day result in

a conflagration that will sweep the city. Laws, no matter how perfect they may be, can be of no real value unless they are rigidly enforced. Many existing laws if enforced would prevent the erection of many dangerous structures.

The most potent influence in the attainment of buildings in which public safety is properly cared for, lies with the people. If everyone could be brought to a full realization of the dangers due to faulty construction, they would soon bring about a reform in methods that would result in permanent progress. It is the duty of the people to demand buildings of the highest fire-resistive type in which to live and work, in which their children may go to school, in which the sick and helpless may be cared for and in which the people may be amused. If the public would refuse to make use of a building known to be a firetrap, they would apply an effective remedy.

NEW YORK THE MECCA OF THE MONTREAL BUILDERS.

THE ANNUAL OUTING of the Montreal Builders' Exchange this year took the form of a most delightful jaunt to the American metropolis, where the many contractors and material men comprising the party who availed themselves of the opportunity thus offered for a respite from the cares and worries of business routine, had a most enjoyable and interesting time. That the party made the most of their trip is quite evident from the entertaining description of the journey and the places of interest visited while in New York, furnished by Mr. Lourer, secretary of the Exchange, which is as follows:

The annual "Labor Day" excursion of the Montreal Builders' Exchange has become one of the recognized social features of that progressive institution, and proved more popular than ever during the trip just concluded. In fact, "Labor Day" has gradually lengthened out to a fortnight's outing, and every year the interest taken by the members is evident by increasing numbers.

The movement was inaugurated four years ago, and commenced by chartering a steamer of the R. & O. Navigation Co. for a sail to Quebec and Ste. Anne de Beaupre. Since then pilgrimages have extended successively in the following years to Toronto, Niagara and Buffalo; to Boston and surrounding beaches; and finally, during the present September, to New York, when about 200 members and friends entrained by special Pullmans over the Rutland route to Albany, N.Y., and thence by the splendid palace steamer "Hendrik Hudson" down the "American Rhine," meals on board being included in the round trip. New York was reached Saturday night, 4th September, and a printed itinerary prepared by the secretary giving list of theatres, hotels and principal places of interest to visit, was supplied to each traveller.

Arrangements were made for automobile sight-seeing trips through the upper residential district and parks, the lower business section, and Chinatown. One of the centres of interest was naturally the Builders' Exchange on West 33rd street, where the builders combine club and business features, occupying two entire floors of 12,000 sq. ft. each. Here the Montreal delegation was most hospitably received and entertained by Mr. Ross W. Tucker, president of the board of governors, and an interesting visit paid to the exhibit department, conducted along similar lines to that now inaugurated by the Montreal Exchange in the new Eastern Townships Bank Building.

To builders, the monumental hotels and office buildings presented attractive features; and among the latter visited were the famous Singer and Metropolitan buildings; the City Investment Building, with its $400,000 lobby; and the Hudson terminal building, the largest office building in the world, covering two entire blocks, and having below ground an immense shopping arena, where everything from buttons to automobiles can be purchased, besides the terminals and freight departments in the depths of the earth. Here several members were entertained by the "Machinery Club," where all persons interested in machinery congregate in their splendid quarters on the top flat (24 stories up), for which they pay the modest annual rental of $40,000!!

The great terminal stations now in course of erection —the Pennsylvania and Grand Central—were also visited, and on account of their colossal proportions, some facts and figures may not be out of place here:

"The new station of the Pennsylvania Railroad Company, in New York City, representing the nucleus of an investment of $90,000,000 in improvements, will be ready for the public on December 1. The station, which was begun in 1902, occupies four blocks of ground, and through it run two tunnels which start in New Jersey, pass under the Hudson River, through Manhattan, under the East River, and come out on Long Island. It is said to be the most perfect passenger terminal in the world."

We notice finally the great works connected with rebuilding of the Grand Central Terminal, including the complete rearrangement of the tracks and the erection of the new station during continuance of regular traffic; the following statistics will give an idea of what changes will accomplish:

Total area of the old terminal, 23 acres.

Total area of new terminal, 64 acres.

The new terminal will provide 39 tracks on the upper or express level, and 15 tracks on the lower or local level, assuring ample means for handling the increased traffic for many years to come.

The present station building, which was erected in 1871 and enlarged in 1898 and 1900, will be entirely removed, making way for a structure of very much larger dimensions.

The new station at the street level will be 600 feet long, 300 feet wide and 105 feet high. Below the street level it will be 745 feet long, 480 feet wide and 45 feet deep.

All trains using the Grand Central Terminal are operated by electricity, the use of steam locomotives having been entirely discontinued.

The new terminal will be the best in point of construction in all the details of arrangement that money and engineering skill can provide.

With this brief notice of a most interesting and instructive outing, we must reluctantly draw to a close. On the 14th inst. the last stragglers of the Montreal battalion reported for "home duty," just in time to welcome their own back-to-Montreal homecomers. It proved the most successful of the four annual trips organized by the Builders' Exchange of Montreal, and again demonstrated the value as a "business asset" to all our members of getting to know each other better socially; and to realize that even successful competitors are not enemies to be avoided, but precisely those whose ability and good qualities are best discovered by friendly and genial intercourse.

AN AMUSING TYPOGRAPHICAL error appears in the advertisement of a well known cement stone company, in the annual publication of a western association of architects. This company bases some of its claims for approval on the non-staining properties of its stone, but the printer evidently not only disagrees with them on that point, but condemns them on one far more important, for the advertisement begins with "A manufactured non-sustaining cement stone." This is surely a "solar plexus" which neither the advertiser or the architects in issuing their year book, had anticipated. However, as the stone in question is being used extensively by the architects in that particular section of the Dominion, there is no real danger of the advertisement seriously affecting the interests of the manufacturers.

SECOND ANNUAL ASSEMBLY OF THE R.A.I.C.—Continued from Page 56.

Institution that he should retain the office, that his resignation should not be accepted. The President replied that he was in the hands of the Institute, and that, if it was their desire to have him retain the office, he would be pleased to do so, and, while thanking them very much for their vote, he still had his same views on the subject.

The question of federation was then opened by Mr. Gordon, who moved that Clause 1 of Project "A," shou'd read as follows:—

1.—*The Conference recognized the Royal Architectural Institute of Canada as a representative Canadian body.*

2.—*The Institute is of the opinion that the Architects of each Province should be recognized in a Provincial Association, and that in each Province where there is no Provincial Association, the members in the Institute, leaving any such Provinces, be urged to take steps towards the formation of such an Association.*

3.—*The candidates for election to the Institute, living in a Province where there is a Provincial Association of Architects, shou d, before being admitted to the Institute, become members of the Provincial Association, and that Clauses 3, 4 and 5 of the Project, be eliminated.*

This motion was seconded by Mr. Watts, and was carried.

Mr. Chausse then proposed a vote of thanks to the Ontario Association and to the various organizations and individuals that had been instrumental in making the Assembly a success. The proposition was carried by acclamation, and special thanks were accorded to Mr. Gordon and Mr. Hynes and the Toronto Architects' Club, for their co-operation.

Mr. Wickson made a motion expressing the appreciation of the Institute for the work done by the present members of Council, and Officers of the Institute, Mr. Watts and Mr. Chausse, who had performed a great deal of work in the interests of the organization during the past year.

A special vote of thanks was moved by the President for the vast amount of detail work done by Mr. Chausse. We might just note here that the Institute is exceedingly fortunate in having a man of the ability and energy of Mr. Chausse, as its Secretary. It would be exceedingly hard to find a man so capable, who would give up so much of his time to an undertaking which carries with it practically no remuneration, and it would be impossible to find a man who is better capable of taking care of the many details, in the manner that Mr. Chausse has. He has had a vast amount of correspondence to do, and a lot oft times of apparently discouraging organization work to handle.

Prof. Nobbs of McGill University, Montreal, gave an interesting talk in connection with twenty slides of representative Canadian buildings, that were thrown on the canvas. The descriptions and criticisms were entertaining, as well as being highly instructive.

Annual Banquet

The Annual Banquet of the Institute, which was held at the National Club, on Wednesday evening, was, to say the least, a most enjoyable one, and the various members and guests present seemed to fall in with the jovial spirit of the evening. President Dunlop occupied the chair.

The first Toast was that of "the Royal Institute of British Architects," responded to by Mr. F. S. Baker, Toronto. On behalf of the Royal Institute of British Architects, he wished to thank the Institute for the very cordial manner in which they had received the toast. He referred to the alliance that had taken place between the Royal Institute of British Architects, and the Royal Architectural Institute of Architects, since the last meeting in Ottawa, and, while he stated in Ottawa last year, that be believed the alliance might be brought about, he did not have any idea that it could have been accomplished within so short a time, and it was a matter of great gratification to the Royal Institute of British Architects, that this relationship has been consummated.

The next Toast was to "The Quebec Association of Architects," which was replied to by Mr. Monette, by singing the song "O Canada, Mon Pays et Mes Amours." The song was highly applauded, after which the President submitted the Toast "The Ontario Association of Architects," which was replied to by Mr. Gouinlock, President of the O. A. A.

Mr. Gouinlock, stated that they had been delighted to have had the honor shown his association by having the annual conference of the Institute in Toronto. The Ontario Association was doing its best to elevate the standard of architectural education. The O. A. A. was respected throughout the Province, and he believed that they were gaining ground in many ways, in view of the fact that they were receiving applications for admission this year, from men who had hitherto stood aloof for a number of years. Speaking on the question of the federation of the various Provincial Associations with the Royal Architectural Institute of Canada, he stated that it would be a very excellent thing, if conducted on proper lines. He believed that, if architects were going to make a success of the profession, and educate the public to their aims, they could only do so by united effort in the direction of giving better facilities for the education of students.

He referred to the architectural exhibit at the Toronto Exhibition, recently, and stated that it carried with it a national importance as far as the profession was concerned. All the architectural associations throughout the Dominion has assisted in making the exhibit worthy of the profession. Although it had been conducted under the auspices of the O. A. A., there were 34 or 35 exhibits from Toronto, Winnipeg and Montreal. This was the first opportunity the profession had been given to make a national exhibit and demonstrate the national character of the profession. Marked interest was shown in the exhibits, the room being thronged all the time, by people who were manifestly interested in what they saw there displayed.

He wished to appeal to the Institute for their support and interest, in order that they might widen the scope of the exhibit next year, by making it not merely a national, but international affair, through securing loan exhibits from the principal countries of Europe. The manager of the exhibition was going abroad shortly, and, if the Ontario Association had the support of not only the different provincial associations, but also of the Royal Institute of Canada, in having Manager Orr take with him letters of introduction from the president of the Royal Institute, and from the presidents of the Provincial Associations, to architectural bodies abroad, it would very appreciably help him to obtain a very representative loan from England, France and other countries.

The next toast proposed by the President, "The Health and Prosperity of the Manitoba Association of Architects," was received with considerable applause. The President referred to his recent trip to the Coast, and spoke in glowing terms of his visit to Winnipeg. He could not say too much for the enthusiastic, generally cordial reception he received at the hands of the Manitoba Association of Architects. He knew that this Association had the interests of the Institute at heart, in so far as they would not have received him as president of the R.A.I.C. as they had.

In response, Mr. Greenfield expressed his appreciation, on behalf of his Association, at the decision of the Insti-

tute to hold their Third Annual Assembly at Winnipeg. He was sure they would not be sorry that they had so decided, and that the Institute would be given a good, true Western welcome. He spoke of the growth of Winnipeg and the West, and, although he was an old Toronto boy, he now considered himself a Westerner. He expressed the sympathy of the Manitoba Association, with the objects and aims of the R.A.I.C. Canada was a country of great possibilities. It was bringing up a nation of young men, every one of whom had a determination that Canada should advance, and as Canada advanced, so would the architectural profession advance. The standard of architecture had been materially raised during the past two decades, and the profession now looked upon the young men to carry it up to a still higher standard. It was, therefore, the paramount duty of architectural organizations, to see that these young men secured a proper training. Architecture depended upon education; education depended upon character; and, if architects would throw into their work that character of moral, physical and mental ability that is theirs, he was sure there would rise up in Canada many monuments to their skill that would be to the credit, not only of the Dominion, but a credit to the whole world.

The next toast proposed by the President was that of "The Toronto Society of Architects," which was responded to by Mr. Lyle, who touched briefly upon the status of the architect and architectural education as conducted by the Toronto University. He did not believe that the architectural profession had, in the past, received the proper consideration and appreciation from the lay public, and he maintained that one of the important duties of the Institute was to, by some means or other, promote a lay interest in architecture. He believed that the Institute could generate such a current of opinion as would force the public to give better opportunities for the education of architectural students in the universities. McGill University, Montreal, had a very good course of architectural education, but the facilities provided for architectural education in Toronto University were a joke. It was not the fault of Mr. Wright, who had done everything in his power to improve this department, but had, unfortunately, been unsuccessful. He was of the opinion that the University authorities were shortcoming in their duty. Parents were of the opinion that, when they sent their children to this school of learning, proper facilities were provided to educate them, which, as far as architecture was concerned, was not a fact. He referred to some disputes and disagreements between the Ontario Association of Architects and the Toronto Association, and believed that the hatchet should be buried, and that the members of both organizations should get together and formulate some definite policy to lay before the University authorities. He also referred to the fact that some of our cities have inadequate building by-laws which were very loosely enforced. He believed that this was another subject for the association to take up.

Mr. Burke referred to an instance that came before his notice, of a young man from Newfoundland, who came to the city of Toronto, with a liberal education, and wanted to find some school wherein he could receive an architectural education. He tried the Architectural School in Toronto, but found that the course of training was so limited that he could make no progress, and had, eventually, to take a position in an architect's office. Mr. Burke thought this was a most unfortunate condition of affairs, and then proposed the toast "Our Guests," which was replied to by Mr. Berry on behalf of the Engineers' Club.

Mr. Berry stated that, owing to the numerous duties that an architect was obliged to perform in relation to the practice of his profession, he was unable to give sufficient attention to the engineering branch of building construction. He believed that, as in England, architects should call into consultation with them, engineers, on such work as designing of structural steel and reinforced concrete. He believed that the engineer would more than save his fees through the economies he would effect in the building. He hoped that his remarks would be received in the spirit in which they were offered, and believed that if there was a closer union between architects and engineers, it would be a great advantage to both.

The next toast, "Architectural Education," was proposed by Mr. Monette, and replied to by Mr. Hynes of Toronto. Mr. Hynes referred to the efforts that had been made by the Toronto Society of Architects, and the Ontario Association of Architects, to induce the Toronto University to provide better facilities for education. He believed that legislation should come first, education second, and registration third, but in his opinion things in Ontario had gotten reversed. However, to secure the desired end, as far as education was concerned, it required the united effort of the architects of the province of Ontario and the University Board and he hoped that the present meeting might bring about this result.

The following other toasts were then proposed: "The Press," "Our President," and "Our Secretary," all of which were responded to briefly.

CONCRETE WORK IN CHINA.

WHILE ON THIS CONTINENT and in European countries concrete is regarded as being the most recently accepted method of constructing houses and walls, at Swatow, a seaport town in China, it has long been a recognized industry. Work of this character was first instituted there several hundred years ago, and the absence of any buildings or walls constructed of bricks or other materials is conclusive proof of its stability and lasting qualities. The industry originated with a French priest, who constructed one of his chapels of this material.

In a late report, U.S. Consul Pontius gives the following interesting description of the nature of the concrete and the method of construction employed:

Very small pebbles or shale, sand, and lime are the ingredients of which the material is made. The mixture, after being thoroughly incorporated, is slightly moistened, and then pounded in a rough wooden mold which is elevated in a runway supported by firmly set poles, and in spite of the crude methods employed, a height of 60 feet can be easily reached. When the walls have been constructed, all supports are removed and the concrete is for some days exposed to the air. To this exposure is its characteristic solidity solely attributed. The walls vary from 12 to 16 inches in thickness, and the cost of construction is considerably less than brickwork. The thickness of the walls give absolute guaranty of fireproof qualities. Storehouses and buildings constructed of this material many years ago are conclusive proof of its strength and durability. No single instance has been known of the accidental collapsing of such concrete-built walls.

In some instances split bamboo poles have been used to reinforce the material, the wood preventing cracks from appearing and adding to the strength. Bamboo imbedded in the concrete in this manner does not rot, and it seems odd that the practice is not more general. Steel or iron reinforcing, owing to the added expense, is never used

LIVING ROOMS, LIBRARIES AND BOOK ROOMS.—Interiors Which Should Reflect Best Efforts of Architect and Decorator.—Modern Tendency to Combine Sitting Room with Library.—Woodwork, Color Scheme and Appointments.—Essentials to be Considered. ∴ ∴

IT would seem hardly necessary to make a distinction between libraries and book-rooms, for a real library is always a book-room, but of late the word "library" has lost its original significance, and is often used interchangeably with living-room. The average house does not contain sufficient space for a book-room pure and simple, and the tendency has been to combine the sitting-room with the library, a plan which has both advantages and disadvantages. There is an undoubted charm to the well-appointed living-room with its books and pictures and comfortable furniture, and if it does not have to serve as a reception-room, it meets the usual requirements very well. It is often the largest room in the house, and has grown to be an expected feature of the modern house. The shrinkage in the hall in the modern ground floor plan is largely due to the increased size of the living-room. It is in this big room that not infrequently the architect does his best work.

If the decorator is equally successful the color scheme is quiet and restful, and the room is probably the most attractive of the house; but it cannot be called a book-room, and "library" is usually misapplied. If the room has but a few books, say low, built-in cases on either side of the fireplace, the word library is inappropriate, and it is better to use the term living-room. Where bookcases extend around the entire wall and the atmosphere is one of books, "library" might be used, although in the average house this room will also be the living-room.

Whether the room has few or many volumes it has several distinctive features, and as it is the part of the home used most by the family it is worthy of the decorator's best efforts. In the well-designed house the architect has given every assistance to the decorator, and if the latter does not err, the room cannot fail to be attractive, unless it is marred by the unfortunate final touches, which many householders consider necessary. There is really very little to do to the living-room, for the architect has done so much. The well-designed trim, usually in the form of a high wainscot, the generous fireplace, often extending to the ceiling, and the built-in bookcases occupy most of the wall space. There is little space to be decorated, and the simpler this little is treated the better.

Where the trim is oak, the ceiling beamed, and the fireplace of brick, sand-finished plaster furnishes a satisfactory wall treatment. It suits the living-room as the more dainty wall coverings do the drawing-room, and provides a consistent background for the simple, sturdy furniture necessary in a room used as a library. Such a wall treatment makes superfluous many pictures. In fact the room is better for their absence unless they are few in number and carefully selected. Pictures and prints suit well the atmosphere of this room, but no matter what the wall decoration they should be made of secondary importance to the books. If there are many prints, a plain paper or textile makes a better background than plaster, which, by reason of a certain largeness and simplicity, is ill-suited to many pictures. It is a decoration in itself with its lights and shadows, and shows to best advantage when seen in large, unbroken masses. Whether stained or left in its natural color, it has great claims to consideration, particularly in a half-timbered house. Unstained plaster, if there is a good deal of oak woodwork in the room, gives splendid results. Many people find it colorless, but this is because they do not see color except in strong tones. They are not gifted with an eye for color, and have not been trained to look for it. To such as these, plaster, unless stained green or some other decided tone, has little attraction. Green plaster, if not too intense, is an attractive wall finish, so are the lighter browns and some yellows. It is impossible to "do over" plaster unless you cover it over, and the advice of one architect is to try your stain first in a closet or cupboard where a mistake will not prove fatal.

Before deciding the wall treatment for any room the amount of light must be taken into consideration, and this condition will be governed by the exposures, the number and size of the windows, and by the proximity of other buildings. If the house is in the country there will be other considerations. Sometimes the living-room is shaded by trees, sometimes by a piazza, both of which make a great difference in the amount of light.

In rooms with windows facing south and east cool greens, blues, browns if not too golden, mauves if they contain a good deal of blue, and most of the grays can be used. Mauve is a color little favored in decoration on this side of the water. We would not recommend it with stained oak, but used as English decorators employ it, with ivory paint and certain shades of green, it is very effective. In rooms having only eastern exposures cool colors should again be used, but they would better be a shade lighter than when chosen for south-east rooms, as east rooms are comparatively dark in the afternoon.

North-east rooms are attractive in warm but not intense tones. Terra-cotta, not too deep, light golden brown, tans, greens if they contain yellow, and warm grays are attractive here. The difference between the apparent light of a room hung in blue-green and one in yellow-green is marked. North rooms are brightened by buff, yellow, orange, by red if of an orange cast, also by light yellow, green, and warm gray. Green for a north room should be one-third yellow. Red should never be used for it absorbs light, nor should it be selected for a small room, no matter what exposure, for it contracts. Mauve has this latter quality though in less degree. A certain portly English queen, Anne, we believe, wore deep crimson on state occasions because it made her look smaller. The average house needs expansion rather than contraction, but an occasional room is helped by warm, deep brown, claret, mulberry, Venetian red, or old-fashioned crimson, but it must be chosen by "one who knows," otherwise the walls will be unduly prominent and proclaim themselves in no gentle manner.

Sometimes a crimson textile the color of old vestments is used with telling effect, but only when a background is needed for old Italian walnut furniture, or for rare Chinese teak, or for something else equally unusual. Where fine old furniture has to be taken into consideration, the woodwork is often especially designed for it and the conditions are not those of the average room. Crimson makes a beautiful background not only for furniture of certain types, but for the faded gold of old Florentine frames, and for gilt sconces and brass lamps. A dark room could not take this color unless it was artificially lighted.

North-west rooms receive steady light from the north all day, and a strong light from the west in the afternoon. The colors should be warm but not bright, else the room will seem garish at a time when it is most used. West rooms are comparatively dark in the morning, and well lighted in the afternoon. A morning-room facing west needs quite a different treatment from a living-room

facing west. What would make one cheerful and cozy would cause the other to be too bright. If a living-room with a western exposure is shaded by a piazza it can take a fairly warm tone, for nothing so successfully cuts off the sun as a piazza, a fact which has practically doomed the long veranda.

Color treatment in relation to the amount of light received in a room is a broad subject, and all such suggestions must be general, unless specific rooms are under discussion. Broadly speaking, rooms finished in dark wood need stronger tones than rooms where white paint or light woods are used, but there are many exceptions, notably the combination of unstained plaster with dark oak. A beautiful living-room is recalled where the trim is Circassian and the furniture old Italian walnut. On the walls is an oil stain of warm ivory color. Old-rose curtains, and rugs in which old-rose is the principal color form the only strong color-notes. It is a most successful room, but the color scheme could not be imitated with success unless the conditions were similar.

In a colonial living-room an old landscape paper is sometimes very effective, particularly if the bookcases are low, and the paper is regarded as a decoration in itself and not made a background for pictures. Some of these old papers are in two tones of gray, others are more brilliant and require plain curtains and comparatively plain rugs. The rugs for a library are usually deeper in coloring than those selected for a drawing-room, for the whole scheme of color is in a lower key. A rug lighter than the walls will throw a room out of scale, and it is well to remember the old rule that the floor should be darker than the walls, and the walls darker than the ceiling.

In a room where the trim is white the built-in bookcases should be of white also. Detached cases of mahogany are harmonious in a library done in colonial style. Sometimes a high, old-fashioned bookcase of mahogany is most effective in a room where the built-in cases are painted white. Placed between two windows, or where it will balance a door, it usually helps the proportions of the room. When finished with traceried glass it forms a fitting storing-place for books with fine bindings. Such a piece of furniture is particularly useful where there are rare books, for most built-in bookcases are without glass doors. If there are many books, and the locality is a dusty one, glass is necessary for protection, although the charm of the open shelf admits of no dispute. There is something very intimate and personal about shelves filled with volumes in reach of every member of the family, but the bindings often suffer from dust, heat, and dampness, particularly from heat, which is one of the great enemies of bookdom.

SECTIONAL BOOKCASES.

Where a library is constantly growing, sectional cases have many desirable features, and there is no question of the protection that this type of bookcase gives. Great improvements have been made in sectional designs, and it is now possible to buy bookcases which conform to all styles of interior trims. The old criticism that they were unnecessarily deep and consequently took up a great deal of room does not hold good, for the improved type is of admirable proportions. They are also recommended on the ground of economy and durability.

The low, built-in bookcase has been a great fad in this country, but its popularity is now diminishing. A scheme growing in favor is to sink the shelves in the walls, and, if the room is paneled, to place them in such a way as to add to architectural value. Frequently when a real book-room is desired the shelves are built flush with the walls, and if the books are not of sufficient number to line the room the additional space is paneled. Sometimes these panels are made with doors which can be removed at any time as additional shelves are needed. Rooms of this character have a dignity which it is not possible for the living-room-library to achieve, and while doubtless more costly in the beginning on account of the paneling, the extra cost, if space permits, would well be justified. In a living-room, the space on each side of the fireplace could be filled with shelves built flush with the walls, or one end of the room could be thus treated, and if the shelves balanced a fireplace or a group of windows, an additional beauty would be gained for the room. Architects delight in planning such schemes, and would doubtless be glad to depart oftener from cut-and-dried traditions.

In one delightful city house the bookcases are in the form of "alcoves," such as are seen in the Bodleian at Oxford and other famous English libraries. A great many volumes can be housed in this way, but it needs a master-hand to design the cases, also a large room where the light is well distributed—and such a place is always a library, never a living-room.

What the living-room-library walls should contain besides books depends on the extent of the wall space and the taste of the owners. It is seldom in the decorator's province to plan the pictures. This is sometimes fortunate, sometimes otherwise. Many beautiful living-rooms are ruined by crowded walls quite as often as by cluttered mantel-pieces. If the walls are hung in grass-cloth, buckram, burlap, or other plain textile, an excellent background is provided for photographs, prints, and engravings. Where the bookcases extend around the room, a print collection looks very well strung along the wall, over the cases. Black and whites are particularly effective thus treated. A good many prints can be used in this manner and not mar the quiet of the room, when, if hung hit or miss, or even with care, they would seem to fill the wall space. After the books are in place, if a few things are added, such as a beautiful picture, a decorative bas-relief, a really fine piece of bronze, little more is needed. The books in their colored bindings are part of the wall treatment, and this fact should be taken into consideration in planning the room. The books, the well-designed woodwork, and the comfortable furniture, the generous fireplace, above all the home-like, cozy atmosphere, make of this room the very heart of the house.—Virginia Robie in The House Beautiful.

VANCOUVER'S DEVELOPEMENT.

THE INDUSTRIAL DEVELOPMENT and building growth of Vancouver is strikingly reflected in a recent report of U.S. Consul-General Geo. N. West, who, in commenting upon the attention being paid to that city by outside investors, says: An American steel company proposes to erect a branch plant for making steel by the open-hearth process; also rolling mills, tube works, nut and bolt works, freight-car works, etc., with 1,500 employes to start. Another American concern from the State of Washington has bought 30 acres and will erect a branch iron works, with a blast furnace, machinery shop, etc. A saw-making company will build a new factory in the suburbs. A fish-packing company will erect a $1,500,000 cold-storage plant at Claxton, on the Skeena River, for freezing salmon and halibut for shipment in casks to eastern Canada, the United States, and Europe. These are only a few of the new industries, while many others are projected. Banks and business concerns are constructing new modern buildings, some from 5 to 13 stories high, many with steel frames. These and nearly all other new buildings have cement rubble concrete foundations. A few business structures and many dwellings are built of concrete blocks. The building permits issued from January 1 to September 18 covered $5,478,012 of construction work. Great activity is also manifest in real estate transactions, the daily transfers for several months having amounted to $500,000.

ARCHITECTURAL EDUCATION.*—Lack of Affiliation a Hindrance in the Attainment of Higher Ideals.—Educational Facilities in the United States.—Schools Raising Entrance Standards.—Ateiler System Approved for Supplemental Work at Universities.

BY RALPH A. CRAM

THE COMMITTEE ON EDUCATION has little to show in concrete form as the fruit of its work during the year 1908. Perhaps such results are not to be expected from a Committee which, by its nature, can have no official relation with the great educational institutions of the country. It can act only in an advisory capacity; it has no executive arm and is impotent to put any of its recommendations into practice. Were the institute possessed of a junior body, bearing to it the relation maintained by the English Architectural Association to the R. I. B. A., and acting as the concrete educational agency that stands between the office and the School of Architecture, taking over very largely the educational responsibilities of the institute, but subject to the advice and supervision of its Education Committee, then, in all probability, actual results would be more rapidly forthcoming than is now the case. For this reason, and without prejudicing the question from any other standpoint, the committee expresses the hope that a way may be found for the union of the Institute and the League in one powerful and co-operative organization.

At the last convention the committee asked and received a grant of $150 for prizes to be given in an intercollegiate competition between the advanced students in the several schools. This competition has not been held and the money has not been expended. The difficulties in the matter of time and conditions that developed as soon as the attempt was made to carry out the intention of the vote of the Institute were very great, and before these could be surmounted the available time, viz., the spring term, had passed. The committee believes that such a competition would now be possible, and therefore asks that the amount voted last year be transferred to the current year and placed at the disposal of the committee.

The committee has always endorsed in principle the teachings of advanced design by practicing architects in ateliers associated with the different schools. This atelier system has been maintained by Columbia,—the only school of architecture which accepts and enforces the scheme in its entirety—while, since the last report Pennsylvania has established an atelier under Professor Gret, intended of course for advanced men. Credit is allowed towards the master's degree to graduate students taking its work under suitable conditions. At Harvard the work in advanced design, under practicing architects, has been continued, the architects for the year being Mr. Day and Mr. Cram.

In its last report the committee urged most vigorously "that the pressing need of education to-day is not curtailment but extension." It was urged that the standard should be one preparatory year, four years in a school of architecture, one or two years of graduate work in Paris, Rome, an American Graduate School, or American ateliers, and finally a year of travel and observation undertaken on lines recommended by a board of advisors to meet the special inclinations, or remedy the special deficiencies of the student. Certain definite advances have been made during the last year towards the accomplishment of this end. The school at Harvard has definitely become a graduate school, a degree being necessary to all entering students. As was to be expected, this change has resulted in a decrease in the number of students, with a corresponding increase in ability: amongst the students are graduates not only of Harvard, but of Yale, Chicago and other universities.

A year ago there was every prospect that the Massachusetts Institute of Technology and Cornell would adopt five year courses in place of four years. At neither place has this reform been accomplished as yet, but at Cornell it is probable that a five year course will be announced during the current year. At the M. I. T., Professor Chandler has been unable as yet to convince the Trustees of the necessity of the change, which is sure, however, to come in time. Meanwhile, both at this school and at Cornell, the entrance requirements are being materially stiffened, which amounts more or less to the same thing, though leaving still undetermined the question of the source from which the student is to gain the preparatory training which may enable him to pass the more stringent examinations.

At Columbia where the lack of adequate facilities to this end has been felt, the rudiments of architecture have been included in the program of the Summer School, which students intending to enter the school in the following year will have to attend.

It is evident, therefore, that during the last two years a definite advance has been made towards the extending of the educational period from four to five years. That the institute has not been without influence in this matter is indicated by a letter from Professor Chandler of the M. I. T. to the chairman of the committee, in which he says:

"Even if no immediate practical results have been obtained from the meeting of the Committee on Architectural Education and the heads of those architectural schools invited to meet in consultation, I am sure that this evidence of active interest in these schools by the American Institute has planted good seed. It has served in my own case, to make more forceful my regular appeal to the Corporation in the president's report to require five years' attendance to attain the bachelor's degree. This time I have said that until now our experience alone governed our desires in this matter, but now there have come pressing demands from the architectural profession for a higher standard of graduation, which, if met, makes it important to lengthen the course. This same interest on the part of the American Institute for a higher standard of results is also a very effective stimulus to improve methods and to avoid ruts."

All the schools report a raising of entrance standards and a steady increase in the number of students, except at Harvard where, as has been said above, the change to a graduate school has of course meant a temporary falling off in numbers. At Pennsylvania two-thirds of the states and two foreign countries are represented, while at Columbia inquiries regarding admission have been received from England, Switzerland and Cuba, indicating that even abroad the advantages of an American training are being recognized as worth striving for.

In the matter of the general broadening of the curriculum until it comes to lay more stress on the humanities and the other arts allied to architecture, which it may be remembered was another of the specific recommendations of the committee in its report for 1907, no information is at hand from any of the schools to indicate that any definite action has been taken in this matter. Believing, as it does, that such a broadening on the lines of general culture is imperative, and that reforms of this nature

*Report of Committee on Education at last annual convention of the American Institute of Architects.

may be effected only by iteration and reiteration, the committee again asserts with all earnestness and emphasis that in its opinion "reasonable proficiency in Latin should be made a pre-requisite to a degree in architecture: that the study of the history of civilization and the development of architectural style as expressing the varying modes of this civilization be given the utmost prominence possible without unduly prejudicing the other branches of education"; and "that calculus, while valuable as a training agency, is by no means indispensable and might well be eliminated in favor of studies that tend more directly towards the development of general culture."

A subject of vast importance before the American Institute of Architects at this session is that of the proposed establishment of a governmental Bureau of the Fine Arts. It need hardly be said that to this committee such an action seems one of the most important in the line of education that could be taken by the government, and it has therefore its enthusiastic support. To this committee the time seems opportune, therefore, to recur to a principle enunciated in its report to the Convention of 1906, namely, the ideal to which we should work, of a Graduate School of Architecture, and the other arts as well, to be established in Washington, and having the closest possible relation to the proposed Bureau of Fine Arts whenever it shall be established. This committee is unanimous in its recognition of the masterly system of the teaching of design now maintained at Paris, and believes it only voices the convictions of the whole profession in acknowledging the great debt American architects are under to the French government for the courtesy accorded us in common with other nations of availing ourselves of the privileges of the Ecole des Beaux Arts. At the same time the committee repeats what it said in its 1906 report, viz., that "we object to considering our own schools merely as feeders for the School of Fine Arts in Paris." Within the last ten years the position of American students relative to those of other nationalities in Paris has wholly changed: then they were not recognized at the start as possessing any greater dynamic force and professional potentiality than any other nationality: now they are a power, and accepted as such at the start. It is safe to second to none in Paris.

And yet, if the contention of this committee as to the need of broad and general cultural studies in the making of an architect is exact, then the Ecole des Beaux Arts falls just in as far as it ignores and disregards the value of such humanistic training carried on simultaneously with the study of pure design. To this extent Paris fails of being the perfect and efficient agency we must demand of our graduate school. The best work done in the actual practice of architecture has been at the hands of Americans who have received their final training in Paris, not by the French architects themselves: but while this is true of many, and is a matter of great pride, it is equally true that a far larger number of Beaux Arts men have fallen by the wayside: not by reason of their indifferent furnishing for the practice of an exacting and exalted profession: not because of defects in the schools from which they graduated to Paris, but simply because, under the system there in vogue, they were not enabled to distinguish between the magnificent underlying principles and the frequently indifferent forms and not impeccable taste through which they were expressed. With no equipment for the applying of taste, weighing of value, and discrimination between essentials and inessentials furnished them through that co-ordinated study of the humanities and the artistic form of this manifestation, these students, left to their own devices except in matters of design, taught as a pure science, have been unable to sift the wheat from the tares, and, wolfing all, have demonstrated in practice that the matters that impressed them were less the enduring principles themselves than the very errant form through which they were manifested.

Now, considering the conspicuous ability demonstrated by the body of American students, as a whole, in Paris, and the fact that where failure has afterwards followed it may with some justice be traced more or less directly to the very quality in the Ecole des Beaux Arts which is diametrically opposed to the recommendation of this committee, and, as well to the general sense of the profession in America, it seems reasonable to urge upon the institute and its friends, the desirablility of keeping always before them the ideal of a great and national school at the seat of the government, where pure design shall be taught not less well than now holds in Paris, and after similar methods, but where those elements of inclusive culture and liberal humanism on which such stress is laid, may be inculcated in the student, as does not happen today in Paris, or in any other school instituted for the advanced training of men to fit them to play their due part in one of the greatest of the arts.

Until the end of time every prospective artist in any department of the Fine Arts must go to school, for the whole period of his life, to the monuments of past civilizations in Greece and Rome, Italy, France, Spain, Germany and England, but it is no longer necessary, and if unnecessary then most unfitting, that we should be compelled to depend for our crowning education on the charity or the friendliness of another contemporary people. Every nation develops its own type of civilization, solves its own diverse problems after its own native fashion. American civilization is other than that of France, or Italy, or England, and art, which is the flowering of civilization, as well as its touchstone, must vary accordingly, however at one it may be at root with the art of all men at all times.

This committee insists that in so upholding the idea of a great central Graduate School of Architecture for the United States, it shall not be charged with any lack of sympathy with the successful efforts now being made by several of the schools towards the teaching of advanced design, or with any intention of discrediting or discouraging the graduate courses that have been established. In each report made this committee has strenuously urged the raising of the standard both for admission to the several schools, and for the receiving of a degree in architecture. It would be a matter for congratulation were every school to establish a Graduate Course, as Harvard has done, but were this end achieved there would still be the same demand, in the opinion of the committee, for a central Graduate College to which should come men from the schools in every part of the country to contribute their quota of individuality derived from each school in all its desirable diversity, and to acquire from personal contact with other types of men and schools, the breadth and liberality of view which is one of the strong claims Paris now puts forth before architectural students.

Mechanical uniformity is the last thing to be desired as between one school and another: Cornell must differ from Harvard and the Massachusetts Institute of Technology from Columbia, just as the saving strength in the nation lies in the diversity that exists between Virginia and Ohio, Massachusetts and California. And as in the nation the individuality of the states is—theoretically at least—harmonized and co-ordinated by the Federal Government, so in architecture a great central Graduate School should prove both a clearing house and a vital inspiration, giving the several Graduate Schools and courses their true objectives, uniting them in the maintainence of a final school of the highest standards, that is neither French, nor English, nor German, but American.

It may be said that, granting the desirability of such a school, Washington is not the place for its foundation, since it is not in esse a world-capital like London, Paris,

or Berlin, but is such only in passe. The reply to this is that the only way to make it such is by the foundation of precisely such institutions as this: it is said to be necessary to go into the water in order to learn to swim, and if nothing is done to hasten the development of Washington into a world-capital, it is reasonably safe to say it will never become such. The locus of the school proposed has little to do with the principle involved, and actually need not be brought into the discussion at this time, but it may be well for those who question its fitness to ask themselves, after careful consideration, whether Chicago, Philadelphia, New York, or Boston is possessed, any one of them, of the qualities supposed to be lacking in Washington. In the natural course of events such a school as is proposed could not become a matter of fact for some years, and daily, Washington is acquiring something more of that metropolitan and universal character we now desiderate of the capitols of the Old Word. Acceptance of the principles, the proclamation of the ideal, is all that is asked for now: the working out in terms and space will be in accordance with actual conditions as they exist when the time comes for putting the ideal into concrete form.

Let us look forward then with eagerness and confidence, let us labor steadily and consistently towards the realization of this crowning ideal of architectural education in America, the establishing in Washington of a great school of Fine Arts, built on the everlasting foundations of art as it has shown itself at all times and amongst all peoples, but framed on lines of the broadest and most liberal culture, directed by men of our own blood and speech, and so conducted as to meet the demands of our own racial civilization, solve our own national problems, making our own successors in the best and broadest sense, American Architects.

T.S.A. ELECTS OFFICERS.

AT THE ANNUAL MEETING of the Toronto Society of Architects, held on October 19, the following officers were elected for the ensuing year: President, C. H. Acton Bond; vice-president, J. C. B. Horwood; secretary-treasurer, R. B. McGiffin; committee, J. P. Hynes and S. G. Beckett.

SOLIGNUM.

ARCHITECTS AND THE PUBLIC are both coming to more fully realize that wood preservatives possess an economic value which make them absolutely essential where wood is intended to withstand the ravages of time for any protracted period. Without the use of some element to arrest decay, the life of wood at the best is extremely short; while on the other hand, when subjected to some recognized treatment of this character, it is given a lasting quality which greatly enhances its value. A novel demonstration of use of wood preservatives was made by F. Sturgeon, Toronto, Dominion agent for Major & Co., of Hull, England, manufacturers of "Solignum," at the Canadian National Exhibition this year. Mr. Sturgeon's unique exhibit which is illustrated herewith, showed, apart from the excellent preservative qualities of this preparation, the high decorative possibilities which "Solignum" admits of, as the various colors in this small structure blended most harmoniously and without the slightest clash to the artistic eye. Everything was treated to one coat of "Solignum"—the shingles, half-timbered work, interior panelling, floors, chairs, and table. The interior panelling was an especially interesting feature, and demonstrated how "Solignum" brings out the grain of the wood, making even common pine and spruce look twice their value for an interior finish. The models of an English house, farm buildings and railway station, which were specially imported for the Exhibition, also strikingly demonstrated the uses of "Solignum," and created a great deal of interest, as they showed the gen-

Exhibit of F. Sturgeon, Dominion agent for Solignum, at the Canadian National Exhibition.

eral styles of buildings in the Old Country. These models are now being shown by the Montreal agents, Messrs. Wm. Stewart & Co., at the Builders' Exchange in that city.

A NEW CONTRACTING COMPANY.

CANADIAN CONTRACTS, LIMITED, is the name of a new engineering and contracting organization to which a charter has been granted. The headquarters of the company will be in Toronto and the capital is $100,000. The officers are: President, W. A. Lamport; Vice-President, William de Leigh Wilson; Managing Director and Secretary-Treasurer, C. H. Mortimer. The new company is well equipped for the carrying out of contracts for engineering work of all kinds, including the construction of power transmission and telephone lines.

ACCEPTS NEW POSITION.

MR. A. D. DAME, late sales manager of the Galt Art Metal Company, has accepted a position with the Expanded Metal and Fireproofing Company, Limited, of Toronto. Mr. Dame is well known to the trade, and he has a host of friends and acquaintances who wish him every success in his new position.

THE NEW RESERVOIR which is being constructed for the Metropolitan Water Board at Chingford, Essex, England, will be the largest of all London's lakes. It will extend to 416 acres, with a circumference of nearly five miles. The new channel for the River Lea, which is being built outside the reservoir, is three miles long. Among other materials there will be required 157,000 cubic yards of concrete, and 21,000 tons or 350 bargeloads of Portland cement. The time for the completion of the works is four years from March, 1908.

AN ENGLISH trade journal states that oil stains on concrete floors may be removed by using a mixture of one pound of oxalic acid in three gallons of water, with enough wheat flour added to make a paste that can be applied with a brush. Allow this to remain on the stains for two days, and then remove with clear water and a scrubbing brush. A second application will be found to remove the most stubborn case.