CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

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Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662
Toronto Office, 44-46 Lombard Street. Phone Main 6764.
New York Office, 206 Broadway.

Published on the second Tuesday of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI — MONTREAL, JANUARY, 1914 — No. 1

Fifty Per Cent. Preference Unjust.

The campaign that is now being conducted in an effort to effect the lowering of our tariff is being watched with interest by the members of the textile industry and it is hard indeed to anticipate just how far these efforts will be successful. The fact that there has been a considerable reduction in the United States tariff has given these agitators a plank with which they are able to stir up public opinion here in Canada, without giving a proper understanding of conditions. There is no gainsaying the fact but that the commercial life of this country is governed to a certain extent by the daily happenings in the commercial life of our Southern neighbor, but in such things as tariff reduction, the steps taken should be taken very slowly and seriously and our best plan is to study closely the results that will make themselves manifest during the next few years in the United States before we take any step towards granting an open door to the products of that country.

Last month, a delegation of about a dozen representatives of the various farmers' organizations in eastern and western Canada waited upon Premier Borden asking among other things, that the British Preference be increased to fifty per cent. now and free trade established within five years. This was a renewal of the proposition made to the Canadian Manufacturers' Association at their convention held in Ottawa in 1912 at which time it was looked upon as a freak idea put forward by some free trade enthusiast who knew little about manufacturing conditions here in Canada and not much more about farming conditions.

The question that should be earnestly considered is the effect such a preference to the mother country in the way of tariff would have upon Canadian industry. There is no doubt but that under such a tariff, the textile industry would practically cease to exist. Even at the present time what a preference averaging around twenty-five per cent. textile manufacturers find it very difficult to carry on a profitable business. This is especially marked in the woolen trade, and it is only by specialization in other branches of the textile trade on lines on which reasonable tariff has been maintained that any prosperity is shown. With this in mind, these agitators often hold forth with the idea that if the textile industry can not prosper in Canada under the conditions which exist at the present time, or under practically free trade with Great Britain, it should not exist in this country. They do not take into consideration the fact that the cost of manufacturing in this country is very much greater than in Great Britain. In the woolen industry wages in this country are about fifty per cent. higher than in England. The cost of machinery is more, the cost of erecting a plant is greater, as well as the cost of fuel, interest charges, etc., which altogether bring the cost of woolen manufacturing in this country up to practically thirty per cent. higher than in England. Our manufacturers are also handicapped by having a comparatively small market, all of which makes for increase of manufacturing.

Now, clothing next to food is the chief essential of the people of this country and the per capita consumption of clothing is greater in this country than in any other country in the world. In the woolen branch, the country is capable of producing practically seventy-five per cent. of the grades of raw material necessary for the entire amount of woolens consumed. In the cotton, we are in close proximity to the great source of raw material. We have an abundance of the labor necessary for such an industry, but here again as in every other industry in this country, production costs are greater than on similar lines in Great Britain. The impracticability of such an increase in the British Preference so far as the textile industry is concerned must therefore be clearly seen. If the textile industry in all its branches is indigenous to this country, as we believe it is, we think that the proper steps should be taken to equalize manufacturing conditions between the two countries.

In granting Great Britain fifty per cent. preference, or free trade, the consumer would not notice the benefit. This is clearly illustrated by what is happening in the woolen trade at the present time. With a tariff in this country under which British manufacturers can enter their goods, underselling the products of Canadian mills, the cost of clothing to the Canadian consumer is not one iota cheaper than before such a tariff went into effect. It is the middle man, the distributor, that is getting the difference. He regulates the price at which the consumer buys his clothes and alongside of the profit made on each yard by the wholesaler and the retailer, the manufacturers' profit sinks into comparative insignificance. Tariff has but little to do with the regulating of the prices of clothing to the consumer and even under free trade, it is doubtful whether an appreciable difference for the better could be noticed. Our legislators will do well to give this subject their earnest consideration. The textile industry has been the goat for a good many tariff reformers and it is now about time that it was given some consideration, in view of the fact that no industry is more necessary to Canadian industrial development than the textile industry.

Result of United States Tariff Discouraging.

There is such a similarity between conditions in this country and the United States that our woolen manufacturers are studying the situation in that country very closely. Of course, the United States tariff is still much higher on woolen goods than the Canadian tariff but the reduction has been so radical that woolen manufacturers there, have been forced to practically readjust their business and during the past year have had a very trying time in this regard, having anticipated the change many months ago. The woolen and worsted manufacturers have stood up under the disadvantage and are making every possible effort to make things go under present conditions.

Speaking of the prospects for the industry, President Andrew Adie, of the United States Worsted Company had the following to say on the matter. "No one can yet forecast what direct effect the new schedule will have upon the future of our business. Supply and demand the world over will have its effects for and against. This applies not only to raw material, but to the finished article as well.

"The consensus of opinion is that the American manufacturer on certain classes of goods will be able to hold his own against all comers, and especially will this be true of the best equipped mills, economically managed and turning out honest goods of superior quality, style and finish, suitable for the American market.

"After a careful study of all the phases of the new tariff law and having formulated plans to meet the new conditions, I firmly hope and believe that our industry will prosper. No legitimate business in this or any country will fall by the wayside under any conditions if we have within ourselves the true fighting spirit, coupled with our best endeavor.

"There are many serious questions involved by the change of tariff, and none more important than the question of the food supply of the United States. Wool growers are already taking steps to reduce their flocks and this means a shortage of mutton and wool, and therefore higher prices for these necessities of life. The **prevailing idea** that the reduction in tariff will materially decrease the cost of living is already proving a fallacy in regard to many commodities. European manufacturers are raising their prices on manufactured articles and thereby increasing profits at the expense of the American public."

That the new tariff in the United States has failed in its purpose, that is in reducing the cost of living, is being realized and the adverse effect on legitimate domestic industry is being felt very keenly. An adjustment of conditions to such an extent as to deprive workmen of their means of livelihood does not reduce the cost of living very much and this is just what is happening in the United States. The woolen and worsted industry is feeling the change severely, a large number of mills have either shut down or curtailed and thousands of workmen have been thrown out of employment. Woolen mills in America must be protected to such a degree as to absolutely counterbalance the decreased cost of manufacture in European countries.

Safety First in Textile Mills

The "safety first" movement has attracted much attention all over the continent and perhaps no movement has been more worthy of earnest consideration from employers and employees alike than this. The result is that in practically every line of industry we now see a tendency towards showing more consideration to human life and human welfare, more consideration for the lives and conveniences of the workmen and on all sides steps are being taken to minimize the danger of accident by various means. Workmen's compensation laws are recognized as necessary legislation in all industrial countries and laws compelling employers to provide safeguards over all danger points in machinery and elsewhere are now recognized as being a necessary part of our industrial activity.

In the textile industry, the field for such a movement as the safety first movement is great, perhaps larger than most employers and employees realize. In the first place, with the complicated machinery necessary the shaftings, belts, etc., and the "green" help that manufacturers are now compelled to employ on account of the scarcity of suitable labor the danger from accident is made apparent. Although the machinery that is now being placed on the market has most of these danger points guarded, this is not found to be the case on the older makes of machinery and employers do well to see that this condition is rectified. The lives of workmen are too valuable to be risked unnecessarily and manufacturers will be serving their own interests by providing safety devices in all such cases.

The safety first scheme can be worked to advantage in every department of the mill and every operative can be instrumental in its advancement and in the minimizing of danger, either to body or health. No matter what room one enters in a mill one will see workmen taking unnecessary risks, cleaning machines when they are running, or oiling intricate parts when they are in motion, or some such unnecessary operation. These are all risks that endanger the lives of the operative and establish a precedent, in that new help will probably follow the example, and when the accident occurs, as it most surely does sooner or later, the employer is compelled to pay a compensation. It is surely up to the workmen to exert every effort to minimize danger and also to every old hand to set a good example in this regard.

Linked with this feature of safety first is the interest the employer should show in the welfare of his workmen, both in and out of the shop. Safety first means safeguards to health and happiness as well as safeguards from bodily injury, and the employer who is interested in this manner is serving his own interests as well as the interests of his workmen. The efficiency and reliabiltiy of his workmen is a principal consideration, one that should occupy the attention of every manufacturer. The contented workman is the one who will be most efficient and reliable and contentment is only gained by making working and living conditions as safe and as pleasant as possible.

Editorial Comment

Press dispatches from Great Britain in connection with the proposed exhibition train of British made goods to tour Canada are to the effect that British manufacturers are not showing any real interest in the scheme. Some firms are convinced their goods could not be adequately advertised under such conditions and in any case it would have been surprising if the average British firm with inherited conservative instincts had embraced such a proposal with enthusism. It is understood though that several firms who hitherto held aloof have been strongly urged by their Canadian agents to associate themselves with the scheme. The promoter hopes to sell advertising space to the value of thirty thousand pounds.

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Coming at a time when trade is considerably depressed throughout the Dominion, the announcements made recently by various cotton manufacturing concerns in the country in connection with new mills and extensions which will be built during the coming year, call attention to the sound position of the cotton industry in this country at the present time. There is still a considerable market for our domestic mills in this country. According to the census of production taken in 1911, the value of the production of Canadian cotton mills in 1910 amounted to some $25,000,000, while last year, the importations of cotton goods into Canada amounted over $36,000,000, consisting principally of grey and white cotton fabrics, bleached and unbleached; cotton fabrics, printed, dyed or colored; threads, cotton bags, and clothing. The growth of the cotton industry has been somewhat slow up to this time and distributors have deplored this fact in that they have been unable to get suitable delivery of their orders and have therefore been caused considerable inconvenience, so that they will be pleased to note the proposed extensions for the coming year. At the present time, most of the mills are very busy, but so far this season, the outlook is none too good and orders are coming in slowly. Help is now plentiful and mill managers and overseers are very much pleased with the situation as it now exists in the mills.

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Many of the textile manufacturing concerns situated in Montreal were rather seriously effected by the shutting off of the water supply of the city for upwards of eight days, caused by the breaking of a conduit through which the water supply came. During that time, the danger of fire was very great and it was only by exerting the utmost vigilance that the city was saved from a very serious disaster. Besides being in danger in this way, the textile concerns, as well as other industries were much inconvenienced by not having supply sufficient for heating and manufacturing purposes and in many cases large concerns were forced to close down on this account. It is almost impossible to imagine that such a situation could exist in a city the size of Montreal and now that the danger is past without any serious consequences it is probable that a thorough investigation will be held into the government of the city and result in the clearing out of most of the rottenness that seems to pervade many of the departments of the Civic Government. The Civic Government of Montreal has been in the hands of unscrupulous grafters much too long and it is hoped that the recent alarming situation will arouse all right-thinking citizens to an extent that there will be no let-up until the government of the city is placed in the hands of those who will have the interests of the city at heart and not their own personal interests. Until that exists, Montreal will not regain the prestige which it has lost through the situation that has just existed.

The Woolen Trade in the United Kingdom

By Our London Representative.

The state of the woolen cloth-trade in the United Kingdom shows a good deal of dullness here and there, and many complaints as regards new business is being heard. Tweed manufacturers in the Dewsbury and Batley districts, especially those engaged in the production of stylish fabrics of medium quality, are fairly well employed and in one or two cases are running their mills overtime. Those manufacturers, who are producing overcoating cloth are rather heavily hit by the poor demand, but the depression in worsted cloths made in other districts has caused more activity in tweeds and serges—the latter in navy blue selling well on home and oversea account. Business with Canada is reported to me to be fairly brisk and prices of all classes of fabrics are fully maintained. There is more movement in the blanket trade, though it is not up to the expectation of producers. Best whites for Canada are being taken by merchants with some freedom, and colored rugs for motorists and travellers generally are also being eagerly sought. In the Spen Valley carpet manufacturers are busy on Brussels and tapestry, whilst in the Liversedge district the export trade of flannel for Canada and other countries is fairly active. At Leeds fewer mills are now fully employed than has been the case for some time. Many are short of orders, but there is no concession in the price of goods, which are all along remaining very firm. There is a better feeling regarding the spring trade and some good orders have been booked. Woolen merchants are now busily engaged getting off their spring bunches. The demand from Canada in Leeds, I am informed, is not so good just now "but manufacturers are hoping that the new year will bring signs of activity." So far the American demand is extremely small. There is not much change in style. Serges and costume cloths are selling as well as anything in medium slower qualities. In Hawick reports on trade are far from satisfactory. The new season may show a change for the better, but until there is a decided turning of public taste to the Cheviot makes little permanent improvement can be anticipitated at Hawick. Huddersfield manufacturers complain that new business is disappointing. As regards Canada the outlook has emproved recently and business in tweeds with the Dominion is on the upward grade, but the demand in the better makes is lifeless. Quotations for piece goods remain firm, but manufacturers find some difficulty in trying to cover fully the cost of raw materials and the margin of profit appears to be smaller than ever. Indeed, all hope of any recovery in the winter trade has been abandoned, for it is now too late for one to expect any sort of a run on overcoatings. South America is dealing heavily in Huddersfield in lightweight fabrics, especially worsted with a top-sack weave. In the Rockdale districts the flannel trade in December and even during the first couple of weeks of January, is one of the quietest. Most of the manufacturers are working on repeat orders and many new orders have been refused on account of the unrenumerative prices offered. The manufacturers are doing their best to establish an advance in prices in the early part of 1914 and stocks are reported to be very light. There has been lately an increase in the shipments to Canada and new business is coming in from the Dominion moderately. At Leicester fancy hosiery makers are not busy. In plain hosiery there is some short time running in face of stock-taking.

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It may not be out of place here if I make a reference to the cotton industry in England as a whole. Now the cloth manufacturers of Lancashire are not producing at their full capacity. Many mills are just creeping along and the trade depression is forcing many manufacturers to conduct their business on a very much hand-to-mouth principle. Some give their operatives Saturday, Sunday and Monday, off work, whilst others stop a portion of their looms from time to time according as orders come in. Others while keeping all their operatives at work the whole day, stop one loom out of three or four. It is estimated that in Burnley the production is curtailed by 20 to 25 per cent, at Darwen, where there are indications of declining trade in the narrow cloth section of the weaving industry, 450 looms are idle; at Nelson and Colne, 5,000 operatives are on four days a week (in Colne alone there are 25,000 looms and fully 15,000 are on short time). In Blackburn many looms are standing idle and 4,256 looms are on short time, whilst in the Bury district where there are 44,000 looms, 250 are stopped and 1,000 are on short time. It must be admitted that the cotton industry in Lancashire at the time I write —and this state of affairs is likely to continue until the middle of January and probably longer, because there is talk of extending the Christmas holidays— is in anything but a flourishing condition and many employees are drawing out-of-work pay from their unions.—J. R. B.

THE THOROUGH PREPARATION OF DOMESTIC WOOLS

By HARRY TWIGG.

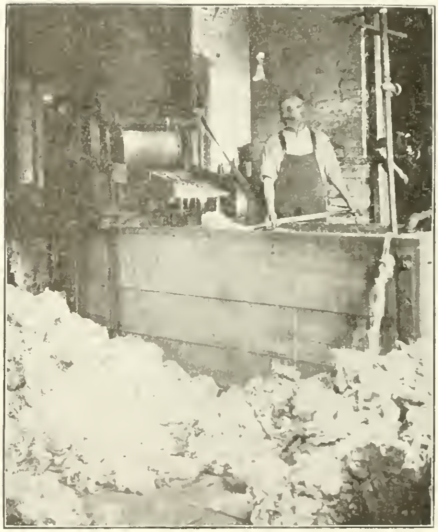
(Specially Written for the Canadian Textile Journal.)

Maybe you think that our Preparation of Domestic Wools proceeds rather slowly. It is a matter, however, which can not be hastened to advantage. Our editor appears to be of this mind also; for it is himself who has suggested the revised title at the head of the appended contribution as one specially suited to cover whatever may follow. It would be well for the woolen trade of the Dominion if more mill men were of the editor's way of thinking. It has long been noted that there remains not a little room at the top of the procession for an ambitious few who should attack the problem heartily and systematically, as it deserves to be handled. The manufacture of Canadian wools is a problem perennial and provocative but then a tough task ought to stir one's honest energies to victoriously grapple with it—outside of political avenues of approach—shouldn't it?

We were last month discussing the opening out and dusting of the places by machinery, preliminary to mill scouring. It is to be hoped that some folks received a mild mental jolt from this, seeing that its importance is so universally ignored. Until it is better recognized we intend to keep on writing it up as we have done for years past. Our wools are within the factory precincts now; and moving forward. The next step will naturally be their washing, or "scouring," as it is termed—although the latter would by implication point to severer methods than the former. Try washing a batch of wool which has been opened and cleaned as we have recommended against another which has not, and note the marked difference between them. The disparity extends not alone to washing processes, but will be found to maintain throughout succeeding operations as well.

The first thing to be said in connection with wool washing is that you had best make use of clear soft water if choice is to be had. A wool washing-machine is of course, advisable, but not many of the smaller mills deem themselves justified in spending so much money for anything connected with this stage of the manufacture. Indeed such a machine is not so essential where the stock is first opened and cleaned, more particularily, where there is available a good head of water. Consequently a home-made contrivance is improvised, consisting usually of a pair of rectangnlar wooden tanks known as "steepbox" and "rinsebox," respectively. These are of somewhat varying dimensions; but for the first named a tank built of two and a half or three inch spruce, pine, or cypress plank, two and half feet wide inside measurement; two feet, and eight inches in depth inside; and six to seven feet log inside is well proportioned For the other tank one built of like lumber; the same in width and depth; and five and a half to six feet long (inside dimensions all), makes a very common and convenient size. Shall we describe these two somewhat in detail at this point for the special information of some new Ontario pioneer? Not that we claim to be a carpenter—only an embryonic, "wood butcher," possibly; yet we've helped to build several and believe that we can sketch a representative pair lucidly enough for any handy man to put them together for himself.

Have your lumber dressed smoothly on both sides, and on its edges. Cut the lengths for bottom and sides ten to twelve inches longer than the inside dimensions of the forthcoming tank; and the end pieces a half to three-quarters of an inch longer. Let the bottom also, be wider than the finished tank by an inch at either side. Now square joint the lengths for the bottom and bolt them together with half-inch, or five-eighths-inch rods and plow a mortice one-quarter to three-eighths of an inch deep across each end at the proper distances to receive the end pieces. In the same way plow out the sides near the ends and bolt these down to the bottom. You will next insert



the end pieces in the mortices and bolt them down also, and afterwards draw the sides up to them through a stout hardwood cleat placed at each corner. You are then ready for steam connections. Plan to have an inch steam pipe enter, not at the open top of the box, but below through one of the sides or ends, just within the bottom; securing same with lock-nuts, washers and rubber or asbestos sheet packing without and within. You require a "false bottom" to save the wool, and to allow dirt to sift through. Nail a smooth board four inches wide all around the sides and ends inside at the bottom of the box for this to rest upon. Then fit perforated lengths of one and a quarter to one and a half inch lumber across with their ends supported thus, and finish with a two and a half inch strip screwed or tacked on along each side within, to hold the false bottom in place. Provide a good plug hole and plug or other outlet. A perforated brass, or sheet iron false bottom, in sections, is to be preferred to a wooden one, and it is a good plan to finish off around the top of the box with a three-quarter inch hardwood strip, morticed where the heads or nuts of the bolt rods occur. Permit us also, to remind you that a coat of paint over the outside surface costs but little and adds considerably to the value and appearance of the tanks. A sloping rack at one end of the box top, upon which to lift the wool after steeping completes this primitive but effective apparatus for wool washing. A few mills invest in a set of squeeze rolls to take the place of the draining rack, but these are useful only in proportion, as they actually accomplish their work. We append a cut of such an outfit. It will be noticed that a four-pronged fork is used for handling the stock.

The rinse box is put together in the same way as the steeping box; but in this case the perforated false bottom need be only three inches above the real bottom, and is formed of brass or copper sheeting. At one end is a slot about half an inch by fifteen inches in size cut through just above the lower bottom lengthwise in the centre. A gatevalve with lever handle outside lets water under pressure, enter through this elongated opening; while at the opposite end is another opening perhaps seven inches by nine inches, or larger, for the purpose of emptying the box quickly. This opening is operated by a wooden slide, and level handle. Commencing about sixteen inches from the outlet end the supports on either side for the upper bottom begin to curve upwards with a sweep, and describe almost a semicircle until they reach the top of the rinse box. About four additional supports are cut out of three-quarter inch lumber with a bandsaw and nailed along the plank bottom of the box at regular intervals—with copper nails; and these with the two side pieces carry a perforated copper or brass sheet which follows the curve of the supports and is attached to them (by means of copper nails always).

When the water is permitted to enter, the outlet being closed, a quantity of washed wool is thrown loosely into the rinse box, and the water rushes it along the curved bottom sheeting and over across the length of the box, backward again repeatedly. When the water has nearly filled the box, the outlet is raised a little, and, if the rinse box has been properly constructed and the force of water is sufficient, the wool rolls over and over quietly from end to end till the dirt is fully rinsed out of it through the openings below. There is no more useful thing about a woolen mill than a good rinse box plentifully supplied with water.

In larger factories these simple arrangements are replaced by a regular wool washing machine, consisting of three, "bowls," or tanks usually the construction of which is familiar to every reader of the advertisements in our textile press. The first two bowls contain detergents, the third clean water, while between each two bowls is placed a heavy set of squeeze rollers to crush the dung locks in the stock, and to keep the dirty water to the rear always. The automatic washing machine has the advantage of speed, and besides it gives the wool more time and motion in the scouring baths, and is thus calculated to take more foreign matters out of it. The up-to-date practice now-a-days is to connect a washing apparatus of this sort with a self-feeding rotary wool dryer, and duster; when a single reliable workman is able to look after the whole, excepting that another man or boy is required to sheet up, and remove the clean wool from the rear of the duster. It will therefore, be readily understood that the money invested in modern wool cleaning machinery brings ample returns in the course of a few years. Much is wasted in some of our mills by sheer ignorance and parsimony. We have in mind a dyer who was obliged to keep begging for six years for a small but necessary connection for his washing machine. Many ugly accidents and vexing delays had happened for want of it, and, when at last it was ordered with very bad grace, the whole bill amounted to only $16. An apron for his self-feeder he had tried to get for over eleven years and was still without it when last I saw him. It isn't the Canadian wool grower alone who leaves large room for improvement.

The great majority of wool washers in this country and the United States employ caustic soda soaps and a commercial carbonate of soda of excellent purity, known to the trade as, "soda ash." Theoretically this is not the wisest practice, but scientific theory in this instance is made to give way before economy and possible results. There are soaps and soaps, and it behooves the wool scourer to get something better than a rancid loaded article for the mill's money. Nothing short of a real practical test lasting over several days can furnish proof of the actual value of soaps offered. The more dishonest among soap dealers will do their utmost to "soft soap," and beat you. When you find a soap to suit you, see that it is kept up to sample. It pays to buy enough ahead for six months use. Soap vastly improves with ageing, since saponification proceeds long after the article is first manufactured. Soda ash, however, is our main reliance for all very greasy wools. It is the skin wools as a class which make the greatest demands for soap suds. After we get greasy wool started in the washing baths it will be found to almost wash itself right along for hours without further replenishing of the baths soap or soda. This is due to the heavy percentage of native potash combined with the grease and dirt of the fleeces. It is this familiar feature illustrated in Canadian Unwashed Fleece which makes it so easy to free the wool from its natural oil, if not from its chaff and dung. After handling a lot of such stock you may have noticed how readily you could wash the dirt from your hands with only warm water. That was because the potash of the wool took the place of toilet soap for you. In skin wools it is the reverse. The potash salts have nearly all been abstracted from this class of stock in the pulling processes and detergents must accordingly be supplied at regular intervals throughout their washing to take its place.

Many wool washers start their three bowl machines for a morning—for nearly all sorts of wool—with one to one and a half pailsful of soda ash in the first and long compartment; together with a couple of pailsful of a good strong soap solution. The second bowl gets a similar amount of soda ash, but no soap; and in the third bowl is put only clear water, whether cold or warm. The first bath may run from 120° to 140°Fahrenheit, and the second from 115° to 130°Fahrenheit, according to the stock being treated. A higher range of heat than these is reprehensible, as it is liable to affect the soft wool fibres to their serious detriment. We are aware that many writers on the subject advocate a limit of 120°Fahrenheit; but there are many wools which in actual practice can not be washed clean at that heat. So that they pass straight through the machine without loss of time it will be found that 140°Fahrenheit does such no harm, but rather good. There is much for a novice to learn in wool scouring. The carder and spinner on the one hand demand that you furnish them stock which comes from washing and drying, unimpaired in natural strength and elasticity; while on the other hand the dyer must find it clean enough to put his trickiest dyes on. Between the two you will be taught that wool scouring is no job for a slouch. Added to this you will be expected to remember the trade word and counter sign, "Production," and to toil away contentedly with such apparatus, detergents and water as is provided you; otherwise you will told again that, "A poor workman always quarrels with his tools."

Having begun with about the usual additions for a day's start, the wool scourer requires to watch how the stock comes out, sepecially should it be a quality of wool he has not been recently washing. He must then be guided by judgment and experience for the day's output. Likely enough the wool will not come out quite so nice at first as it will after an hour's run. This is often so; therefore it is not well to make any rash and radical change all at once. Then, too, he may be called upon to wash several different sorts in the course of the day without opportunity of changing his baths. If so let him plan to take his cleaner stock first if possible, and to finish off with the more dirty lots. Nor should coarse wool precede fine, because a little of the former mixed through the latter might perhaps work serious harm somewhere upstairs. Lastly the thorough cleaning out of the machine at the close of each day should be insisted upon. There will always be some waste wool left from this, but with care the amount of it can be kept down. Let it be well rinsed and put into the first suitable batch for washing which comes along so that nothing may be lost.

Keep the different bearings of the complicated mechanism well oiled—not drenched, however. See that attention is given at odd slack times to the belts, more particularly those driving the squeeze rolls. Have an eye to the values. Pack the rolls regularly. The best, and cheapest thing in the long run for that is coarse white wool slubbing. We get it in bales from "t' owd coontry," made on purpose for roll packing. At the close of the day's work and the cleaning of the machine, fill the bowls again with clean water so that everything may be ready for the next morning's start. Lastly use a thermometer, and weigh your soap and soda.

CALENDARS.

"The Dyers," A.D. 63.—From a Fresco in the "House of Vettii," Pompei, Italy, is the title of the reproduction portrayed on the attractive calendar being sent out this year by The Textile Finishing Machinery Company, Providence, R.I. The House of Vettii was discovered during the excavations of Pompei in 1895 and the frescoes on the walls were found to be little damaged, the colors being almost as bright as when first painted. The original is reproduced exactly in both design and color, making a most attractive calendar.

Vibration of Ring Rails.

Written specially for the Canadian Textile Journal.

As a rule, most mill men conceive the idea, that if the roving is uniform and of the proper hank, that the spinning will run well. The writer has often been called to make investigations in mills where the spinning was continually running bad. In most cases I found the trouble in the condition of the spinning frames. In this short article, I want to point out one of the chief causes of bad spinning. In most mills when the spinning runs badly the blame is generally placed on the carder. In fact, I know of a mill in Falls River, Mass., where a dozen or more good carders lost their positions when the real trouble was traced by the writer and found to be in the vibration of the ring rails. When the spinning runs badly owing to the vibrations of the ring rails the majority of the ends break at the head end of the frame. There is of course always more vibration at the driving end of the frame.

In operation, it is very essential that the spindle, which passes through the ring, should be equally distant from every point on the inside of the ring. Therefore, any wear that exists in the bushings in which the lifter rods slide, makes it impossible to keep the spindle an equal distance from every point on the inside of the ring. I would like to have every manufacturer make the following test to prove the above point. Go to any ring frame that has been in operation a few years, stop it when the rail is at its highest point, press on the rail, and then measure the distance from the spindle to the ring on the side the rail is pressed, and then measure the other side, and the spindle will be found out of the true position it should occupy at all times. When you have the slightest play in the lifter rods, the least vibration will give the ring rail a slight lateral oscillation that will give a jerking action to the end and cause it to break often. To reason out the above, think how a large ring will increase the pull on the yarn. Therefore, any vibration of the ring rail will create a pull equal to a large ring on one side, and pull decreased to that of a smaller ring on the other. What else can you expect but a jerking action on the end. Can anything be plainer than this?

When you find after doffing a ring frame, the majority of the ends break at the head-end, you will in every case trace the trouble to the vibration of the rails. If you have an old frame that is giving you trouble, change the lifter rod bushing, so the slightest play will be destroyed, and you will be surprised at the difference in the running after.

Every sampson should be well packed so as to eliminate any possible vibration, for you know the mill itself creates enough vibration without having frames on only a few legs. If the sampsons of the ring frame are not properly packed, if the lifter rod bushings are worn, a slight wear in the head end journal, will cause the ring rail to vibrate to such an extent at the head end as to cause the spinning to be bad continually. That is what I found in the mill in question. So before placing the blame on the carder for poor spinning first examine the above parts, and perhaps this article will prove a blessing to many carders and make his mill life a bit more cheerful. The carder as a rule must shoulder other people's mistakes.

COTTON GOODS IN CANADA

Extracts from the Report of Commercial Agent, W. A. Graham Clark, of the United States Department of Commerce on the Manufacture of Cotton Goods in Canada

In order to show the quality of goods made by the Canadian mills about 50 samples have been furnished the Bureau of Foreign and Domestic Commerce, together with description and statements as to the company by which made, and the mill, jobbing, and retail price. These samples (Nos. 1-57) are described on pages 46-48. They not only give some idea of the goods made by the local mills but the prices also afford an indication of the distribution prices.

Retail Prices.

As previously noted, the retail prices in Canada are along the line of those in the United States, except that they have a regular 17-cent price where we have none between 15 and 19 cents, and also that their retail prices are not so fixed and 16, 18, and other prices are very common; also they usually sell at 20 and 30 cents instead of 19 and 29 cents, etc. Cloths largely made by the Canadian mills, especially those retailing up to 15 cents, are priced about the same in Canada and the United States, but on many of the grades higher than this the goods, on account of the duty and smaller competition, are frequently retailed at higher prices than in the United States.

In general, cotton goods retail at the same price in Winnipeg as in Montreal, but from Winnipeg to the coast the prices are frequently slightly higher on account of the greater freight, smaller volume of business, etc. In British Columbia the copper is rarely seen and the 5-cent piece is the lowest coin used, with the result that in practically all places of business, even in the post offices, payments have to be made in multiples of 5 cents. In the stores a purchase amounting to 52 cents, for instance, is paid for with 50 cents, while a purchase amounting to 53 cents is charged as 55 cents. The retail prices on cottons in Vancouver run $8\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, 18, 20, 25, 30, 35, 40, 45, 50, and 75 cents. The $8\frac{1}{2}$-cent cloth is 3 yards for a quarter, the $12\frac{1}{2}$-cent cloth is 2 yards for a quarter, the 18-cent cloth is 2 yards for 35 cents, etc., but a single yard would cost 10, 15, or 20 cents, as the case might be. On some goods such as the 15-cent retail print, for which the price is practically the same all over Canada and which the mills sell at a restricted price of 10 cents a yard less 15 per cent. the eastern jobbers sell at 10 cents while the western jobbers sell at $10\frac{1}{4}$ cents so as to cover the additional freight.

Jobbers in Canada usually figure on $12\frac{1}{2}$ per cent. as their standard of cost of doing business and retailers on $17\frac{1}{2}$ to 20 per cent. To cover expenses and profit Canadian jobbers add 15 to 25 per cent. to their cost price, while retailers add about 30 per cent. to their cost price. On coarse staples, the profit on which necessarily depends on the turnover, usually four to six turnovers a year, the jobber frequently has only 10 per cent. between his buying and selling price; but, on the other hand, on specialties he often is able to add more than the 25 per cent. which ordinarily marks his limit. The cost of rent, clerk hire, etc., is usually less in Canada than in the United States, comparing similar sized concerns in similar towns, so that both jobbers and retailers are able to get on with smaller margins. With the exception of some of the big department stores, which buy in wholesale quantities, the Canadian retailer buys Canadian cottons through jobbers Some of the department stores say that they could handle more American cottons in some lines if they could buy direct from American mills as they do from Canadian mills.

It has been shown that to eastern Canadian points the English have a lower freight rate on cottons than do the Americans. This also holds true of Vancouver, to which the rate from England by boat and rail is 150s. ($36.50) per ton of 2,240 pounds, or $1.63 per 100 pounds, as compared with less-than-carload rates from New York of $1.78 per 100 pounds. The rates are the same to Vancouver from New York, Chicago, and Montreal. The rail rate on carload lots is reduced from $1.78 to $1.23, but very rarely is their bulk enough to take advantage of this, so that in the general course of business the English have the advantage in freight. As previously noted, however, the cheaper freight from England is usually more than offset by the extra charges they make for packing, putting up, samples, etc.

Competition with Goods from the United States.

The Canadian mills are not keeping pace with the demands of their home market, but they are enlarging, and if a line is imported in considerable quantities they soon get out an imitation. Their print designs are largely based on the American, which are more novel and more suited to the Canadian taste than the usual English designs. They have practically driven American gray sheetings off the market with similar pure-sized goods. Their standard construction in gray sheetings, by the way, seems to be the 64 by 60 in widths of 33 to 36 inches. On some lines of American goods, such as ducklings fleece, printed scrims, Stiefels, and blue drills, the Canadian mills, in spite of many attempts, have not yet been able to make an article that will meet the demands of the consumers, and there is still a good market for such articles as "Serpentine crape," which they have imitated with the lighter "Japonette crape" of the same width and construction; "Lonsdale superfine cambric," which they have imitated with the "Lansdowne superfine cambric A," the "Wabasso A cambric," and others. The Canadians are not entirely copyists, as they have some good designs in their print works, but the neighboring American industry being so much the larger they naturally have to follow their lead in many cases, and if an American specialty invades their market to any extent they try to replace it as soon as possible with a similar one made by their mills.

The preferential duty tends to keep out American piece goods to a large extent, but the importers say that in some cases they could still afford to buy American goods if they were made to suit the market. In most cases American and Canadian tastes are about the same, but there are differences. For instance, on butter cloths a large importer at

Winnipeg said that he had sold 10,000 pieces of 100 yards of butter cloth, but could get no delivery for several months because of the local mills being sold up. He said he would fill in with American butter cloth, but that his trade demanded 32-inch widths, while he could get only 36-inch widths from the United States. Similarly he said he could use American black denim if he could get any, but that American imitations of the Canadian black denim were not satisfactory in color, that the Canadian demanded a bright live black, while the samples sent from the United States had more of a dead, greenish-black finish. In Canada over three-fourths of the trade in denims is in black denims, made with black warp and filling, with a smaller demand for gold back, cadet, and other kinds.

Products of Dominion Textile Co. (Ltd.)

The Dominion Textile Co. is foremost in imitating and displacing American cottons, and on ordinary prints, for instance, now has the great bulk of the trade up to the 15-cent retail class. At 15 cents and above they meet strong English competition. All Canadian prints are made at their Magog Print Works. They now have six classes of shirting prints, which are marked, respectively, "L.X." "3," "C," "D.C." "T.B.," and "G.C."

The "L.X." are narrow 26/27 inch subcount prints that are sold by the mill at $6\frac{1}{2}$ cents a yard less $12\frac{1}{2}$ per cent. The $12\frac{1}{2}$ per cent. is the trade discount assigned to the jobber as his margin and he has to sell the retailer at the "list" or restricted price of $6\frac{1}{2}$ cents. Some of these 26/27 inch prints actually measure only $25\frac{1}{2}$ inches, but the demand for such narrow prints in Canada is small, anyhow.

The "3" prints are 29/30 inches wide, come in indigo, aniline, regatta, blouse, plates, reds, cardinals browns, omish, pinks, lilacs, and chambray, and are sold by the mill at 8 cents a yard less 15 per cent. In assorted lots the same price is charged for all kinds, but if indigos only are specified a higher price is charged.

The "C" prints are 31/32 inches wide and seem to be more largely sold than those of any other class. They come in regatta, blouse, pinks, cardinals, solid colors, borders, omish, two-tone stripes, aniline, etc., and are sold by the mill at 10 cents a yard less 15 per cent.

The "D.C." prints are 31/32 inches wide and sold assorted in indigo, navy and gold, navy and white, and Copenhagen at 10 cents a yard less 15 per cent. with increased price for indigos alone.

The "T.B." German prints, guaranteed pure indigo dyed, are 29/30 inches wide and sold at 11 cents a yard less $17\frac{1}{2}$ per cent. They are heavy prints with large designs and used especially by the Doukhobors and Mennonites of Western Canada.

The "G.C. indigo" prints are 30/31 inches wide and are sold by the mill at $13\frac{1}{2}$ cents a yard less 15 per cent.

The Dominion in addition makes printed delaines, challies, foulards, crapes, dress ducks, drapery cloths, tickings, etc.

The Dominion makes gray sheetings from 25 to 40 inches wide, its "Bengal" and "Bombay" brands being mainly 33 to 36 inches and the "Mount Royal wide grays" 40 inches wide. The gray drills are mainly of the 29-inch width, with some up to 34 inches, and gray twills of the 36-inch width. The Dominion makes three grades of ordinary gray ducks: "Savannah," of which the 6-ounce invoices from the mill at $11\frac{1}{2}$ cents and the 12-ounce at $21\frac{3}{8}$ cents a yard; "Trident," $12\frac{1}{8}$ and $22\frac{1}{2}$ cents for the 6 and 12 ounces, respectively; and "Eagle," $14\frac{1}{8}$ cents for the 6-ounce on up to $26\frac{5}{8}$ cents for the 12-ounce. Its gray cantons run from 25 to 31 inches and the bleached cantons from 22 to $29\frac{1}{2}$ inches. The wide gray and bleached sheetings are made in 6 to 11 quarter widths.

The Dominion bleached shirtings, cambrics, and longcloths are mainly 35/36 inches wide; bleached interlinings 36/37 inches. The white summer suitings are 36/37 inches; white duck suitings, $26\frac{1}{2}$/27 inches; and bleached drills, 30/31 inches. The circular pillow cottons are 40 to 50 inches wide and pillow slips, 40, 42, 44, and 46 inches.

The Dominion quilts run 60 by 80, 72 by 70, 71 by 81, 70 by 90, and 72 by 90, with mill prices of 75 cents to $1.10 each. The gray huck and honey comb towels run from $52\frac{1}{2}$ to 90 cents a dozen at the mill, with bleached towels in fancies up to as high as $1.42 a dozen. The 32-inch butter cloths sell at the mill for $2\frac{3}{4}$ to 4 cents a yard.

The Dominion makes two classes of cotton blankets, the "Dragon," which sells in the 10/4 width at $82\frac{1}{2}$ cents and in the 11/4 width at $1, and the "Ibex," which sells in the 10/4 width at $87\frac{1}{2}$ cents, in the 11/4 width at $1.05, and in the 12/4 width at $1.25 at the mill. The Dominion blankets are made entirely by the Montmorency mill near Quebec, which turns out about 7,500 pairs a week, and which has an up-to-date equipment with 14 German-made napping machines. The Montmorency mill has a complete waste-spinning plant with 17 sets of triple cards for making waste yarns on the German woolen principle. The mill buys cotton waste from the United States, as well as from other mills, and makes many blends for sale to hosiery mills and to mills needing colored waste filling for flannelettes, cottonades, etc. The most popular yarn blend made for underwear purposes is produced by running 1 brown lap to 12 white.

The Dominion sells considerable cotton yarn, and its January, 1913, quotations were as follows, per pound:

Yarns.	Gray. Cents.	Bleached. Cents.	Colored. Cents.
Single 8s to 16s	27	..	..
2-8s	28	31	32
2-16s	29	32	33
Carpet warp	28	.. ..	32

Owing to the higher cost of cotton, these prices are just 2 cents a pound above the yarn quotations of a year ago.

Products of Montreal Cottons (Ltd.)

The Dominion does not attempt the finer grades of white goods, and with the exception of those made by the Wabasso Mill this field is held by the Montreal Cottons (Ltd.). The Montreal's Victoria lawns and their "Lisle," "Imperial," and "Lingerie" muslins are all made in the 39/40 inch widths, the lawns running from $6\frac{3}{4}$ to $11\frac{1}{2}$ cents and the muslins from $8\frac{3}{4}$ to $10\frac{1}{2}$ cents a yard at the mill. Their white checked and white striped muslins come in 26, 27 and 28 inch widths, with a few 36 inches wide. Their underwear cloths—longcloths, cambrics, and nainsooks—are all made 35/36 inches. Their bleached Indian head suitings run from $8\frac{1}{2}$ to 12 cents a yard in the 28-inch width and 10 to $13\frac{1}{2}$ cents a yard in the 32-inch width at the mill, with $1\frac{1}{2}$ cents a yard extra for colors. Their costume ducks and drills in linen and cashmere finishes are mainly 28-inch, with a few 26 and 29 inch.

The sateens in black and colors, as made by the Montreal Cottons, are 27 to 32 inches wide, while their percalines are 35/36 inches. The percaline "Foulard," on which the Montreal Cottons' price list is said to be based, is the cheapest grade of cloth made by them, being a 25-inch, 68 by 52, plain-woven, filled and glazed lining. Their 1912 spring price list quotes this at $5\frac{1}{2}$ cents, while their 1913 spring price list quotes it at 6 cents a yard, which gives an idea of the rise in prices due to higher cotton.

Their moreens runs from 30 to 37 inches in width, and in colors their minimum is 10 pieces (500 yards) to a shade. Their tailors' silesias are all of the 39-40 inch, ladies' silesias of the 33-inch width, Surah twills 34 and 36 inches, and jeans 26-inch. Their canvases run from 23 to 32 inches. Their Italians are mainly 54 inches wide. Their pocketings are 28, 29, and 30 inches wide, and interlinings 36 inches. Their Turkey reds run from 29 to 36 inches wide, with prices from $5\frac{3}{4}$c. to $10\frac{1}{2}$c. a yard at the mill. These latter are mainly used for the backs of comforters, but the trade is not so large as it was formerly. They make 25-inch buntings, 36 and 40 inch barred mosquito cloth, and some 36 and 40-inch cheesecloth, as well as butter cloth in the 32-inch width that is preferred in Canada. They make a pique that sells at $10\frac{1}{2}$ cents at the mill, but the market on this line is mainly supplied by the English, with a few piques from the United States. The Montreal Cottons have quite a reputation not only for their ordinary white and dyed goods but for certain specialties that they have worked up to compete with imported goods, such as their shadow dress cloth, their black sateens with "spun glass" finish, poplins, etc. The Wabasso Cotton Co., at Three Rivers, and the Montreal Cottons (Ltd.), at Valleyfield, are the leaders in the manufacture of fine goods in Canada.

Products of Canadian Cottons (Ltd.)

The Canadian Cottons (Ltd.) make mainly the coarser grade of goods, as their field is the colored-goods section. Their awning stripes are made in the 30-inch width in three grades. They make 28-inch cottonades which they sell at 12 to $17\frac{1}{2}$ cents a yard, 29-inch cassimeres at 9 to $16\frac{1}{2}$ cents, and 28-inch denms at from 10 to as high as 20 cents a yard at the mill. They make about 50 different grades of denims, but the bulk of the demand is for the black denim in the 6, 7 and 8-ounce weights. Their ticks run 30, 32 and 36 inches wide, with a few 27 inches. Their colored shirtings run 23 to 30 inches; oxfords 25, 27 and 28 inches; and galateas (colored stripes) 27, 28 and 29 inches. Their apron ginghams are made in 35, 39, and 40 inch widths, and dress ginghams in widths from 23 to 36 inches. Their dress ginghams are the only goods made by the Canadian Cottons (Ltd.), on which they have "list" prices restricting the jobbers to sell at a fixed price. On their 7-cent dress gingham they give the jobber a trade discount of $12\frac{1}{2}$ per cent., and he has to sell the retailer at 7 cents. Similarly their 8-cent gingham carries a discount of 15 per cent., their 10 and 12 cent gingham a discount of 16 2/3 per cent, and their $22\frac{1}{2}$ -cent gingham a discount of 20 per cent.

The dress goods made by the Canadian Cottons come in 24, 30, 31, and 36 inch widths. Their flannelettes run from 23 to 36 inches in width and from 5 to 10 cents a yard at the mill; angolas from $6\frac{1}{4}$ to 10 cents a yard in 27 and 28 inch widths; and saxonys (bleached flannelettes) from 23 to 35 inches in width and from $5\frac{3}{4}$ to 12 cents a yard at the mill. Domets in white, cream and colors also run from 23 to 35 inches, in width. The 64-inch napped sheeting invoices from the mill at 24 cents and 72-inch at 31 cents, while silence cloths in the 56-inch width invoice at $52\frac{1}{2}$ cents and in the 64-inch width at $62\frac{1}{2}$ cents a yard. The "Kingcot" cotton blanket made by this concern invoices from the mill at $87\frac{1}{2}$ cents in the 10/4 width, \$1.05 in the 11/4 and \$1.25 in the 12/4 while the "Monarch" blanket invoices at $82\frac{1}{2}$ cents in the 10/4 and \$1 a piece in the 11/4 width.

NOTE:—The prices given here have mostly been changed since the report was written but will serve the purpose of comparison.—(Editor.)

Dominion Textile Company's Plans for 1914

Upon making inquiries following the recent reports that appeared in the daily press regarding the proposed extensions to be made to the Montmorency mill of the Dominion Textile Company, we learn that this company have completed plans which will rather more than double the number of spindles and the output of their hosiery and general yarn mill at Montmorency Falls, a portion of the machinery having already been contracted for. This addition will be started in the spring and will probably cost in the neighborhood of \$750,000.

We also understand that the same company have plans on foot for the erection of a 2000 loom mill to produce medium and fine count cloths, such as shirtings, whitewear, lawns, etc., from yarns ranging between 40's and 100's counts. This mill will be located in Montreal on land owned by the company and adjoining the Bleachery in which the cloth will be finished and which is considered to be one of the best equipped and most up-to-date bleacheries on the continent.

The Print Works, located at Magog, is also undergoing process of re-arranging. A large addition will be commenced in the spring which will increase the number of printing machines from twelve to twenty, giving an additional output of, in the neighborhood of 30,000,000 yards per year. These additions will rather more than keep pace with the requirements of the country in these particular lines, and will be brought about at a minimum cost, as there will be no additional overhead charge against this increased output, as the Company owns all the land required, and these extensions being of a nature of additions to existing plants, storehouse, power plants, machine shops, offices, etc., have already been provided for. Questioned with regard to the coarser lines of manufacture, we are told that there is no need for any additional machinery in any of the other lines of goods manufactured by this concern, as recent additions made by them and other companies manufacturing similar lines produce an output well in excess of recent requirements, when the demand was abnormally large.

BLENDING AND PREPARATORY PROCESS OF WOOLEN SPINNING---VIII.

By JOHN W. RADCLIFFE*

The woolen industry at the present time, besides consuming large quantities of fleece and skin wools, also absorbs large quantities of what are know as recovered fibres. These consist chiefly of materials pulled from rags, classified as "shoddy," "mungo" and "extract," as well as wastes of various descriptions, derived from the working up of different qualities of textile fibres. Whatever may be our views with regard to the introduction of such materials into woolen blends, there is no doubt but what the woolen industry has become a more extensive one since such materials were introduced.

By making a careful study of such recovered fibres, one is bound to acknowledge that they include types of materials which are superior to some classes of pure fleece wool and can be made up into yarns or fabrics of very acceptable quality. In fact, to discriminate between pure wool goods and those made from mixtures of wool and shoddy, will at times tax the deducing powers of the most ardent expert, and when it is considered that something like 1,200 tons of foreign rags, as well as about 700 tons of rags of English production, are consumed weekly in the United Kingdom alone, the industry at least claims recognition as one of vast importance.

"Shoddy" is the resultant fibre from the pulling up of soft rags, such as flannels, knitted goods or hosieries, whilst "mungo" is the material resulting from the pulling of hard cloth rags, as well as those of a highly milled character. It can therefore be understood by contrasting their respective sources of origin, that "shody" is often superior in quality to "mungo" as the fibre is less liable to be broken up in the former, than is experienced in the latter material.

It must be pointed out that rags are also classified by terms "new" or "old," and such terms indicate their origin so far as their condition or general appearance can be estimated. This variation is largely brought about by the fact that a large assortment of tailors' clippings are used in which the fibres are not so badly denatured as is often evidenced in fibres from rags which have been much worn, when they formed articles of clothing.

Rags which contain admixtures of vegetable and animal fibres, such for example as cotton and wool mixtures, if not required as "union" materials, must be subjected to the process of carbonization. This process dissolves out the vegetable fibres, leaving a residum of animal fibres known commercially as "extract." Thus, if rags are made up of wool and cotton, the cotton is dissolved out by the carbonization process leaving the wool fibres, which are afterwards classified as "extract." Recovered fibres of this class are usually of low quality, and very often the fibre has become weakened by excessive application of the chemical re-agents employed in the process by which they are recovered.

Rag sales are held at various centres, where the buyers assemble in much the same manner as at ordinary wool sales, and it is really remarkable how trained buyers can recognize the origin of the materials brought before them. By long practice and constant handling of rags, they can readily discriminate one variety from another, and can identify "Dutch," "American," "Belgium," "German," "Scandinavian," "Scotch" and "English" rags at sight. The prices vary according to the state of the trade, and according to the quality, whilst color is also a factor to be considered in regulating the value that is put upon them by the buyers. Stockings, comforters and soft-knitted goods generally are the most sought after for shoddy pulling, as they can invariably be relied upon for producing a fairly good length of fibre, so far as length is understood in the manufacture of woolen yarns. Rags emanating from such fabrics as melton and billiard cloths, are exceptionally of an highly milled character, and only pull very short in fibre, so that the mungo class to which they are subsequently allocated is never of a very high order so far as length of fibre is concerned.

The rags as collected by marine store dealers are in an unsorted condition, and before they can be put to use by shoddy and mungo manufacturers, they must undergo such classification as will tend to separate one quality or color from another, as well as to prevent hard substances which rags are liable to contain, getting into contact with the working parts of the machinery through which the rags will subsequently have to pass. In this way the soft or "shoddy" rags are separated from the "mungo" or hard rags and strict attention is paid to the sorting out of rags of the "union" class, or those in which animal and vagetable fibres are mixed, either in the material itself, or in the interwoven threads.

Rags resulting from articles of clothing, not usually tailors' clippings, often contain what are known as seams, and as these are very often intersected with cotton threads, they are sorted out and subjected to the carbonizing process. Whilst they are being sorted such things as buttons, hooks and eyes, etc., have to be removed, as there is danger of their striking fire when they come into contact with the pins of the rag grinding machine, should they be left in. They are also sorted for color, as a separation of the rags into groups of analagous colors or shades, enables a more specific treatment of the materials afterwards. All rags before being sorted should undergo some process of disinfection, as there is a possibility of infectious diseases being circulated by the handling of rags of a questionable nature.

When they have been thoroughly sorted, and the dust shaken from them, they are in readiness for undergoing the process of pulling into "shoddy" or "mungo" according to their respective qualities. The machine by which this is accomplished is both simple and ingenious, but marvellously effective. The most salient parts of which the rag grinding machine is composed is shown at Fig. 15, and the following description will give the reader some idea as to how the process of rag grinding is carried out.

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The rags are fed by the attendant upon the endless apron, A, which conveys them forward to the feed rollers B, which revolve very slowly in close relationship with the swift or cylinder, C. The swift contains straight and hardened steel pins arranged in rows around its entire surface of wood, and revolves in the direction indicated by the arrow. Its speed will vary from about 500 to 700 revs. per minute, the greater speed being employed for shoddy pulling, or the treatment of soft rags. It is very rare that the swift is more than 24 inches broad and 36 inches in diameter, and it is usual to keep two swifts for each machine.

The cost in depreciation of this class of machine is comparatively very heavy, as the steel pins of the swift become worn to short stumps after continuously running about eighteen weeks. Thus, if two swifts are kept for one machine, the one can be put in while the other is being repinned, thereby preventing any serious loss by the stoppage of the machine for repairs.

hard or metallic substance that may have escaped the vigilance of the sorters or machine attendants, and as such substances are heavier than the pulled material, they naturally fly from the swift at a different tangent, and this phenomenon is taken advanatage of by the position of receptacle at, "J."

When a new swift has been put in, or one in which the pins have been renewed, it is better to pull hard rags with it for a few weeks, as the new pins are rather vicious in their action, and tend to break the fibres when they have run for a short time. It is also advisable to allow a swift to run in one direction for a week or two, and then turn it around so that the pins become smooth on both sides, under these conditions the rag swift is at its best in about a month or six weeks, when soft rags can be treated and the best results secured.

The action of the pins, as they are constantly battering against the rags as they pass through the feed rollers, is such as to generate a fair

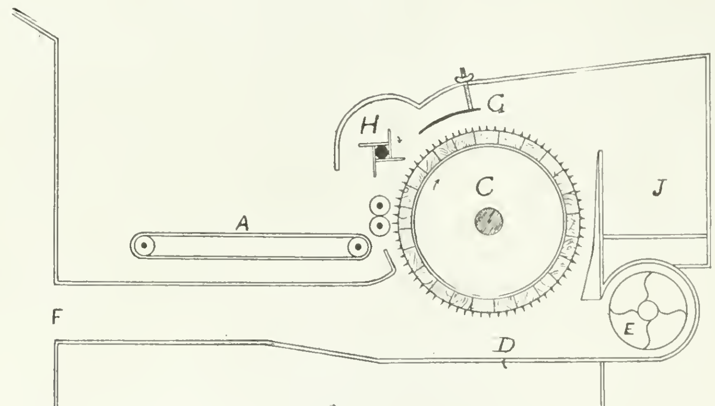


Fig. 15.

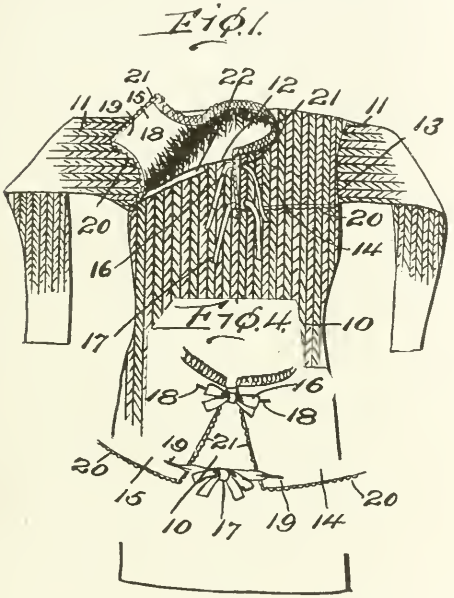
It will be understood therefore that the pulling or grinding up of the rags takes place between the feed rollers B and the cylinder of swift C. All the separated fibres or threads being light in weight, pass around the swift to the conduit, "D," when by means of the fan, "E," which revolves at something like 1,000 revolutions per minute, and the centrifugal force of the rag swift, the pulled material is extruded from the machine at the point marked, "F." Fitted conveninetly over swift, "C," is what is known as the baffle plate, "G," and this tends to prevent portions of unopened rags passing around the swift, as when such materials come into contact with the plate, "G," they are knocked back, and coming into contact with the beater or fan, "H," they are again returned to the feed sheet, "A," to undergo for a second time the challenge of the swift. Should any unopened rags pass the baffle plate, "G," the majority of them will fly into a receptacle arranged to receive them at, "J." This receptacle also receives any

amount of heat, so much so, that to safeguard against fire, both oil and water should be put upon the rags prior to pulling. To do this, the rags are spread out upon the floor, after sorting and dusting, and from 8 to 12% of brown pulling oil is sprayed upon them, as well as about 8% of warm soapy water. By reason of the heat being generated as mentioned, the water is evaporated as the rags are being pulled, as is also some portion of the brown pulling oil.

In pulling hard or "mungo" rags, the feed rollers are set nearer to the rag swift than is the case when pulling soft or "shoddy" rags. It is no aid to production to overfeed the rag machine, as the material will be better pulled if the feed sheet is just kept nicely covered with the materials it is required to have pulled, as the swift can not pull the rags if they are fed into the machine too thickly, and it only means that more unopened rags will be rejected by those parts of the machine which are designed for that purpose.

Improvements to Knitted Garment

The accompanying drawings are of an invention recently patented in the United States which provides for a number of improvements to knitted garments. One object is to provide a body garment with improved means for fastening without the use of buttons, hooks or the like. Also to provide a garment open at the top with flaps extending from the arm openings to the centre of the breast with means for securing such flaps at

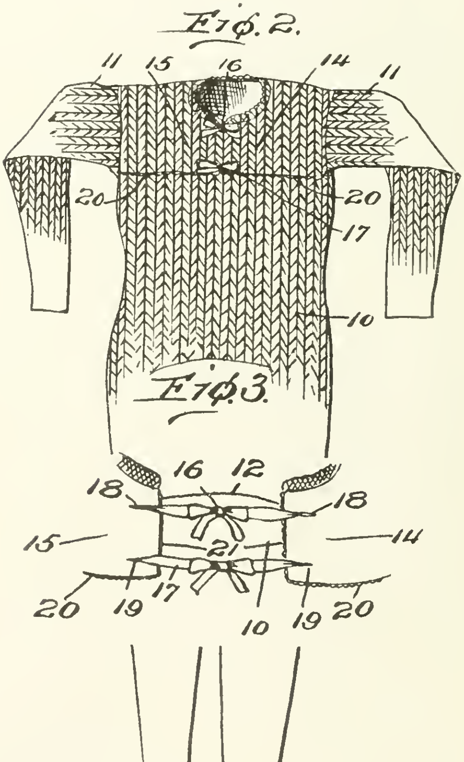


more than one point so that one fastening forms substantially a straight line across from the arm pits while the other fastening serves to support the front of the garment, also to provide a garment having flaps extending from the arm openings toward the centre with means for permitting adjustment of the flaps to compensate for the size of chest measure, also to provide a body garment composed of a fabric capable of transverse stretching with flaps extending from the arm openings toward the centre, such flaps being bound with material which is non-elastic or less elastic than the material from which the garment is constructed whereby the width of the garment between the shoulders may be adjusted to such size as is desired by manipulating the flaps.

In the drawings—Fig. 1 is a view of a body garment showing one of the flaps open and turned back. Fig. 2 is a view of a body garment having the flaps extending entirely together and tied. Fig. 3 is a fragmentary view showing the ends of the flaps spread apart for enlarging the bust measure of the garment. Fig. 4 is a fragmentary view showing the bottom corners of the flaps spread apart providing enlargement of the bust measure at a point substantially between the arm pits.

The improvement which forms the subject matter of this application is adapted to be applied to body garments of any usual and ordinary kind and here illustrated as applied to garments consisting of tubular knitted fabric. The garments are provided with sleeves all set in armholes or openings in substantially the usual manner. At the front the tubular material of the garment is cut on an upwardly curved line as indicated at 12, extending from a little above the bottom of the arm openings as indicated at 13 up to substantially the line of the neck openings as indicated more particularly at Fig. 1. The front is completed by flaps 14 and 15, the lower edges of which are secured somewhat below the lowest point of the curved line 12 and extends ordinarily substantially straight across from arm pit to arm pit, as indicated at Fig. 1.

The front of the body is provided with tapes or other cords or strings 16 and 17 while the flaps are provided with holes 18 and 19 similar to button holes through which the tapes 16 and 17 are inserted and tied, as indicated at Figs. 2, 3 and 4.



The lower edges of the flaps 14 and 15 are provided with a binding 20 which is preferably non-elastic or only slightly elastic while the front edges of the flaps are provided with a similar binding 21.

By employing the flaps as indicated several desirable functions are accomplished. As a first function, the upwardly curved portion of the body is held upwardly in position by the upper tape 16 while the lower tape 17 with the binding 20 serves to determine the desired measure from arm pit to arm pit which may be regulated as suggested at Figs. 3 and 4, the tapes 16 and 17 being capable of tying when the edges of the flaps are spaced apart to a considerable distance. Also as illustrated at Fig. 1, the use of the flaps and the upwardly curved portion form a double thickness over the chest of the wearer, the position of such double members being insured by the use of the two tapes and the use of the lower edges of the flaps as straight from arm pit to arm pit, prevents any gapping or stretching of the parts out of position to form a crack between the body portion and the flaps. It is found desirable at times to prevent too great elasticity of the upwardly curved portion 12 and for such purpose a strip 22 is secured upon each side of the centre of such length as is desired which will prevent the stretching of a portion of the curved line.

Notable Invention in Opening and Cleaning Textile Fibres

By Wm. SCOTT TAGGART, M.I., Mechanical Engineer.

The textile industry is the chief commercial factor of England (agriculture excepted), and its influence on innumerable other industries that are bound in it gives it an importance that no other industry can possibly attain. The comparatively short and relatively weak fibres of cotton come to Lancashire from every cotton field of the world, and emerge from the large factories as yarn, to be used for the finest and most beautifully designed laces, or the most highly finished product of the loom. The whole process of transforming the slabs of hard pressed bale cotton into the highly finished products of the spindle and the loom is an exceedingly complicated mechanical problem. Operations, successive steps, are necessary to bring the cotton fibres gradually from bulk masses down to a fine thread or yarn. Two processes are absolutely essential as preliminaries, viz., the cotton must be opened up into as loose a condition as possible, and a quantity of dirt, chiefly sand, leaves, seed husks, stalks, etc., must be eliminated. Strong heavy machinery, requiring high power to drive, is necessary for this work, and considering the delicate character of the cotton fibres, the beating operations, which both open the cotton and drive out the impurities, are usually severe. Nothing of any moment has been done to improve on the beater blade or porcupine cylinders in their action of dashing the cotton from the pedal nose or the nips of the rollers. The ponderous methods and high speeds used are out of all proportions to the requirements of the work, but hitherto nothing has been discovered that will give better, or even as satisfactory, results. The cotton starts on its career through the cotton mill, bruised and broken by this fearfully rough treatment, and no amount of delicate attention, which it afterwards receives, restores its value. The opening machines, moreover, require considerable attention in adjusting their various parts in order to minimize the amount of waste made. No matter how present opening machinery is set and regulated, their discrimination of dirt and good fibres is extremely poor, so in order to lower the amount of good fibres being driven away and becoming waste, a quantity of impurities is left in, and this must be dealt with by the card, thus putting extra work and strain on this class of machine. A solution of how to open cotton fibres without the rough, brutal treatment at present in vogue, and how to eliminate the impurity without wasting fibres, would be of inestimable value to a spinning mill. This problem has now been solved in an almost ideal manner by the process of an English inventor, Mr. William Youlton. The present type of opener has been discarded. The cotton is now fed into a cylindrical space, in the form of a slowly revolving perforated cage. A specially-constructed beater occupies the lower half of the cage, and runs just free of any contact with the perforated covers of the cage. The beater is built up by threading on a shaft a series of stamped out double arms or fingers, the adjacent arms being set a little in advance of each other, thus forming a series of fingers that have the appearance of a helical screw standing out from the boss. One half of the beater is given a right-hand screw effect, and the other half a left-hand screw effect.

When the cotton is fed into the cylinder space, it comes into contact with the ends of the quickly revolving beater fingers, and is subjected to a regular beating or buffeting action. In its heavy and unopened condition, it is constantly falling into contact with the beater arms, but the beating it thus receives quickly but gradually opens it out into a free, fluffy condition, which permits it to float in the space above the beater. When this open stage of the cotton is reached, it comes within the influence of a current of air, which drives it out of the cylindrical space into an outlet pipe, and from this point the opened and cleaned cotton is conducted to the scutcher. The whole of the beating action on the cotton has been performed while it is in the free condition in the air, and no other resistance than air is found necessary, by this method, to open thoroughly the mass of fibres. The open process, by its mere vibratory action on the fibres, shakes out practically every particle of dirt, which falls away by gravity into a suitable receptacle below the machine. No long fibres mix with this dirt, so a larger quantity of impurities is taken out, and the waste of good fibres is considerably reduced, and in most cases completely stopped.

Two unusually valuable results are thereby attained. First, the cotton is thoroughly opened by a rapid vibration beating action given to the fibres, while free in an air space, thus completely eliminating any possible damage to the delicate fibres. Secondly, the cotton is so completely opened that practically all the dirt is shaken out, and falls away freely, without the accompanying fibres.

Out of these two chief factors arise important considerations. The waste from the blowing room of a cotton mill consists of dirt and fibres; the dirt is useless, the fibres are valuable. By preventing waste of fibres, and increasing the extraction of dirt, great financial gains will be realized. One per cent. of waste fibres saved will amount to an enormous amount in Lancashire mills alone. If the dirt is thoroughly taken out in the blowing room, the carding machines will work better, produce a better product, and, moreover, the waste from the cards being free from dirt, will be considerably enhanced in value. The whole arrangement of the machine is compact, occupying less room than an opener, and requires very little power. It is devoid of setting or adjusting devices. The production is over 30,000 pounds cleaned cotton per week. In the opinion of the writer, who has had an opportunity of seeing the machine at work, and examining the results, a new era of improvement in our cotton mills may be expected. The dust problem of the card room will be solved, and considerable economies will undoubtedly be effected in operative costs. The machine is in no sense in an experimental stage; this has long been passed. Numbers are at work, and giving a degree of satisfaction greater even than the brief sketch would lead one to expect.—(North Cheshire Herald.)

SOME MISTAKES FOUND IN THE BADLY MANAGED COTTON MILL AND THE REMEDIES

By WILLIAM SHAW.

(Written specially for the Canadian Textile Journal).

As I previously stated in one of my articles, I have had the pleasure to visit most mills in the north and southern states. In most of the mills visited, I found the yarn from both the ring frames and mules full of thin places. Thin places in any yarn will show up more by wetting the fore-finger and thumb and passing them over the body of the yarn. There are of course a great number of causes for light places in the yarn, which can as a rule, be traced to a heavy strand in the preceding processes.

A few years ago, the writer was placed in charge of a cotton mill, and if the deplorable condition of this mill had appeared in print, it would have made very discouraging reading for its stock holders. I will now describe the conditions found in this mill, which will explain the ill-managed mill.

The card sliver weighed on an average seventy grains to the yard, with a doffer speed of eleven turns per minute. There were three processes of drawing, the finished sliver at each process wiegh-ing on an average 75 grains to the yard, with a front roll speed of 354 revloutions per minute. The rolls on the drawings were not properly spaced, even the saddles, instead of being made to hang at the back of the rolls, were hung on the front side of the back rolls the same as the front roll. An average hank roving of 47 was made on the slubber, 125 hank on the intermediate, and 440 hank on the fine frames. The treasurer seemed to be much worried over the condition and the light places in the yarn seemed to trouble him most.

I was in charge only a couple of days, when the treasurer called my attention to the defective yarn, and inquired if I could remedy the trouble.

My first move was to reduce the card sliver from 70 grains to 50 grains per yard, and the doffer speed from eleven revolutions per minute to sixteen revolutions per minute, so as to obtain the same production. I next reduced all the drawing slivers from 75 grains per yard to 50 grains per yard, and increased the speed of the front rolls from 354 revolutions per minute to 450, which was necessary to balance the production. The reader may notice that the proportional increase in speed on the cards is greater than on the drawings, the reason for the above is, that I found that the drawings were often obliged to stop for drawing, while the drawings had to stop also for empty cans from the slubbers. I next reduced the hank roving on the slubber from 47 to 62 and increased the speed of the spindle from 500 to 600 which is the proper speed for a 12 x 6 slubber. I next reduced the intermediate hank roving from 1.25 to 1.60, and also reduced the speed of the spindle from 1003 to 800, which is the proper speed for a 10 x 5 intermediate. There was an abundance of intermediate spindles, as one pair of frames had not been in operation for months, and to my surprise, the carder in charge, boasted of running the mill with a less number of spindles, than any other of his predecessors. The five frames were of a 7 x 3 gauge, and running at about 1100 spindle speed. They were the only machines running at the proper speed. I reduced the hank on all the fine frames from 4.40 hank to 4.60 hank.

With the above hang-up, and with the rolls properly spaced, the defective yarn soon disappeared, I do not mean by the above, that the yarn was perfect, but the yarn was more uniform and not as uneven in spots as before the changes were made.

The lighetr the strand in the preceding processes the more freedom is given to the front top leather roll to revolve freely. There is not one mill man that can be found that would argue against the latter statement. Why, then, do the majority of cotton mills run heavy card and drawing slivers?

In order to make an even yarn, you must make the action of the front top leather roll gradual instead of intermittent, and if there is any better way than by reducing the weight of the card and drawing sliver, no one in the cotton industry has discovered it.

A great many mill men conceive the idea, that by running a heavy card and drawing sliver, and then adding another process known as second intermediates to help gradually draw down the bulky sliver, that no harm results. That belief is erroneous, because it should be borne in mind, that in order to reduce a bulky sliver, the number of fibers in every inch must be pulled past one another a certain number of inches, whether it is drawn by one process or a dozen processes. Again, it should be borne in mind that the more processes the stock is made to pass, the more fluffy the stock becomes. If any manufacturer will put into practice what I point out in this article, the work will be found in every process more compact.

The bobbins of roving and yarn will be much harder even though not a gear is changed, which goes to prove, that a heavy strand will make the work fluffy. With the above hang-up, yarn will of course, have better spinning, which means more work of a better quality. The looms can be driven much faster, because the yarn being much more uniform, in stronger and will stand the severe treatment of the weaving operation a great deal better, and here is where the dividend for the stockholders is made.

How often do we see the following question appear in different textile journals: Why can English spinners make yarn freer from irregularities than the the spinners of Canada and the United States.?

The answer is easy. In England, more attention is paid in blending the stock, and also in constructing the cotton thread. It is branded a crime to throw a portion of good stock on the floor. In most mills of the United States, one is obliged to roll the bottom of his trousers to walk through the alleys of the card and spinning rooms. The Englishman believes in paying close attention to the preceding processes in order to form a good strong uniform thread, and then drive the looms at a high speed.

The production turned off in the mill in question averaged about 33,000 pounds per week. The writer was in charge only seven weeks when the production reached 41,500 pounds. The increase in production was not altogether due to the changes described above, but to management instead.

The equipment of the carding department, consisted of six slubbers, ten intermediates, and twenty-four fine frames. There was only three doffers to do the doffing.

Here is another point that is misunderstood by most mill managers, as many seem to think, that having only a few doffers that the cost per pound is reduced. But let me say, that a reduction in the number of doffers to a certain extent will increase the cost per pound more than anything else. Instead of having only three doffers I put on nine with the result that the production was increased to the proportion stated and the cost per pound reduced from 1.33 to .096. What I state above can be tried easily by any manufacturer, and it should be clear, that if the writer had not found the above to be true he would not dare make such a statement.

Another defect that can be laid to the management is having bobbins of different diameters running on the same frame. This causes a great loss in production, cbeause the surface speed of the front roll and the excess surface speed of the bobbin over the flyer should be euqla, and if bobbins of a different diameter are used, the relationship of the surface speed of the bobbin, and the surface speed of the font roll is destroyed on all bobbins and having a proper diameter, thus causing some ends to become too tight, or too slack, making waste, and in many cases the bobblin is removed, thus losing production. If the reader is at the helm of a cotton mill, let him caliper the bobbins in use, and a surprise many be in store for him. Of course, it is expensive to burn or destroy all such bobbins, but it will be found economy in the end.

When ordering bobbins, care should be taken to obtain the proper size of the bobbin in use by using califers. Also see that the top of the bobbin fits the bolster and spindle properly because is the inside of the bobbin is too large, it will shake and raise on the spindle breaking the end or strand of roving. On the other hand, if the inside of the bobbin fits the bolster and sprindle too snugly, it will also raise on the spindle. Thi is proved by the fact that when a small piece of foreign matter lodges inside the bobbin, it will raise the bobbin and braek the end in every case, from experience the enter will remove the bobbin from the spindle and blow into the bobbin so as to force the matter out.

When you get all the bobbins to nearly the same diameter, the next thing is to have a system so as prevent them from being broken. There is too much bobbin breaking in most mills and the cause in every case can be laid to the management. In some mills the tender is allowed ,when creeling, to put all empty bobbins on the creel, the vibration of the mill will in a short time cause them or many of them to fall to the floor. This evil is not as great on the fine frames as it is on the intermediates, for the reason, that the intermediates creel is much higher and the slbber bobbin much heavier although the bobbins will not break in every instance, every fall aids in them finding their way to the fire-room. The best way to preserve bobbins, is to have bobbin voxes at the back of each creel, with a handle for the hand at each end of the box, so they can be fitted and dumpted into a truck.

You will never find dirty under steel rolls in any well-managed mill simply because those placed in charge of such a mill generally know the evils dirty under steel rolls will cause. When a frame is scoured in any ill-managed mill, notice the amount of fly, dirt, etc., on the steel rolls. Much of this matter can be found on many bosses of the two back rolls, which prevents the top leather roll coming into close contact with the bottom steel roll, therefore, dirty under steel roolls effects the grip of many of the back rolls on the stock, which means irregular drafting.

NEW UNDERWEAR CONCERN PROPOSED.

The promoters of the company being organized in Charlottetown, P. E. I., to manufacture underwear and knit goods are having difficulty in inducing the investors to withdraw their attentions from fox and oyster propositions long enough to get interested in a purely industrial concern. However, we understand that a considerable portion of the stock has already been subscribed and that the promoters are quite optimistic regarding the success of the undertaking. In the event of the company completing its organization and securing the desired capital, it is the intention to start the manufacture of all-wool unshrinkable men's underwear as soon as possible.

The Windsor Pearl Button Company, Limited, Windsor, Ont., wish the trade the season's compliments, with a very attractive calendar, the kind with the large numerals. The reproduction is of the well-known painting by Drake, entitled "The Sunset Glow," the ruins of an old mill and waterwheel situated at the edge of the creek.

Obituary.

MR. GEORGE HENDERSON DEAD

The death of Mr. George Henderson, manager of the Penman Company's mill at Coaticook, Que., which sad event occured at his home in North Coaticook on Dec. 7th last, was a severe shock to the many friends of the deceased, in the woolen industry. The late Mr. Henderson had been ailing for some time but no one realized that the end was so near. He was in his 51st year and up to the last maintained a keen interest in the business and faith that he would soon be able to be on duty again at the mill. He leaves a widow and five children to mourn his loss, as well as a sister, Mrs. Horace Hudson, of Paris, Ont.

The funeral took place on Wednesday, Dec. 10, the remains being conveyed to the English Church Cemetary at Coaticook. The pall-bearers were

THE LATE MR. GEORGE HENDERSON

Mr. J. Bonner, general-manager of the Penman Co.; Mr. H. Barrett, manager of the St. Hyacinthe branch, and Messrs. F. F. Christie, A. A. Hall, L. M. Thomas, and Dr. W. L. Shurtleff, of Coaticooke. Among those who attended the funeral from a distance, were Mrs. Horace Hudson, of Paris, Ont., a sister and Messrs. Hector and Freeman Henderson of Port Dover, Ont., nephews of the deceased. The floral tributes were many and beautiful and showed, in a measure, the high esteem in which Mr. Henderson was held by all who knew him.

The deceased was the youngest son of the late George Henderson and was born at Ancaster, Ont. While a boy he moved to Paris, Ont., with his parents; afterwards served his apprenticeship with his brother, the late J. B. Henderson, at Streetsville, Ont. He next worked at Paris, for Mr. John Penman, going from Paris to Merriton when his brother purchased a mill there. After about two years in Merriton they moved to Thorold in 1892, where the late Mr. Henderson remained for some years, moving to Coaticook in 1900 to become superintendent of the Penman Manufacturing Company's mill there. On the retirement of Mr. J. J. Fiske in 1907, Mr. Henderson was made manager of this mill, which position he ably filled, and was holding at the time of his death.

The late Mr. Henderson was remarkably well and favorably known in the woolen industry in this country and had attained much success as a manufacturer. His untimely death is much regretted on all sides. The Canadian Textile Journal extends the deepest sympathy of the whole industry of which he was so prominent a member, to the widow and children and relatives of the deceased.

NEW COTTON MILL FOR WELLAND.

The town of Welland, Ont., is rapidly acquiring a very important place in the industrial development of this country and if present plans are carried forward will soon rank as one of the cotton centres of the country. The latest industry to decide to locate there is the Toronto Cotton Company, a company with a capital of $200,000 subscribed.

The company has made a proposition to the town of Welland which will be submitted to the electors at an early date. The agreement which was submitted provides that Welland is to pay 90 per cent. of the cost of the buildings and site and the company 10 per cent., the money expended by the town being paid back in ten equal annual installments with 7 per cent. interest.

The site is to be five acres and the main factory will have a floor space of eighty-two thousand feet, while the floor space of the boiler house will be ten thousand feet. The company agrees to commence the manufacture of cotton cloths in the building on or before the first of October, 1914, and to employ 175 men. They reserve the right to pay off the indebtedness faster than the time specified by purchase of the bonds. The town, according to the agreement, is to give an assessment of twenty thousand dollars for a period of ten years, not including school tax and local improvement. The municipality must keep the buildings insured. The company's books will at all times be open to the inspection of the town.

The agreement is to go into force when approved by the people and the company is to deposit one thousand dollars with the town before the bylaw is submitted to defray election expenses in case it should not carry.

The company has a capital of two hunderd thousand dollars which will be applied to machinery and working capital. The town will have no hold on the machinery or equipment in case the company becomes insolvent.

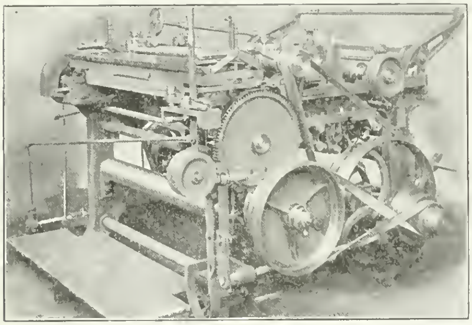
Mr. A. DeCourt of Boston, Mass., who is acting for the Toronto Cotton Company, is connected with the Sovereign Cotton Company, a Toronto corporation which, it is said, will shortly locate in Welland.

Corduroy Cutting Machinery

By Weberei.

The cutting of corduroy may be performed either by hand or by machinery. The band knife onsists of a square steel rod beaten out at one end to form an extremely thin knife edge whilst at the other end is a handle. The knife blade is provided with a pointed sheath and this latter is inserted under the folds that have to be cut and so guides the knife into its proper race. Special guides are of course, required for the different grades of cloth.

The preparation of corduroy for cutting is important. The face of the cloth receives a thin film of lime paste while the back is stiffened up with a coating of flour paste. Once the cloth is prepared it is ready for cutting and this can be done either by hand or machine. These latter are of two types "straight" or "circular" knives. The latter type is in the machine illustrated, which represents the latest European system. By its use all the cords or races across an entire width of cloth are cut simultaneously by a number of thin steel discs placed upon a mandril at intervals, coinciding with the races. As the knife revolves the cloth is drawn over at right angles and at this



edge the floats are directed towards the knives by guide wires. These guides or race openers are advanced at such a rate as is consistent with the speed of the cloth through the machine, there being an adjustable setting motion. The steel shaft that carries the knives is run in eccentric bearings so that by a turn of the bush the knife shaft may be lifted so that the guides may be placed in the races. The machine is provided with an automatic stop motion should the race opener penetrate the underside of the fabric and a further electric stop motion is fitted which instantly stops the machine whether the guide or race opener penetrates the cloth upwards or downwards.

The cutting table is made with three different types of edge suitable for all classes of goods. This three-sided table has a tension roller attachment to prevent the tension on the cloth being relieved. The driving mechanism of the cloth feeding roller and the knife shaft are directly connected to the strap fork and that the control is perfect. Special attention is paid to the tensioning devices for the cloth since so much depends upon their being perfectly adjusted. These machines are largely used on the Continent where the writer has seen them in operation and they are gradually but surely superseding hand cutting.

Notes on Sizing

Much has been said and written about sizing and size products and in placing these few notes and particulars before you no attempt is made to exhaust the subject.

The sizing materials used in the cotton industry are many, and the application of the same requirements of the trade are equally as varied, even in those cases where what it termed a pure weave only is required; and although a large proportion of the manufacturers are open minded enough to entertain an article which will give advantage, either in the saving of labor or steam, in giving a better weave, or a better cloth, or a saving in cost, with a view of improving their business alround, others are extremely prejudiced in favor of their own ideas on the question of sizing, hence there is a good diversity of ideas, and very little in the way of uniformity as regards the products used or the quantities employed in the mixings, even for simple weaving. To a large extent this prejudice has been produced by the introduction of products which have been placed in the market and found in the working to be not suitable. Therefore there is a real opening for a product which can be used by itself without the addition of other ingredients and yet get as good or even better results in the shed, and at the same time be easily adapted to special requirements as "weighting" by being used in conjunction with china clay or flour as well as chlorides.

The sizing department is of the greatest importance in the manufacture of textile goods, because its influence upon the work to be produced is far-reaching and because the success of the whole concern often depends upon the skill and knowledge of the taper; so that when science is brought to his aid with valuable information as to the qualities and composition of the sizing materials, his power for success is considerably increased.

All starches are formed of microscopic granules, which consist of two different substances. The outside or skin of the granule is termed starch cellulose, and the inside, which is the largest and most important part is called granulose, and it is the latter which is the most valuable and useful in the process of making the size.

In heating starch matters up with water, these granules begin to form themselves into thousands of little globules, which swell out to about 120 to 130 Formide, and when the liquid comes to boiling point most of these surrounding skins burst and form a pasty glutenous mass which composes the size.

In some products all these globules, however, do not burst, and it depends to a very great extent upon whether they burst or not as to the strength or quality of the size as such, and the subsequent results of the size. Therefore as ideal size is one which is produced from a product which is operated upon or affected in such a way in the heating up and boiling as to result in all the globules being burst, because the greater proportion there is of burst globules, the better the size, and in the case where all the globules are burst a perfect size is produced. Unburst globules will stay on the outside of the yarn the result is that used in this state, the yarn has a harsh and brittle feel and to obviate this, and make the thread more pliable much tallow or other softeners are used. Another feature which sometimes shows itself from a size of this description is the effect it has upon the healds and reeds to the detriment of the latter.

If however a certain "grip is required in the handle of the cloth or weight needed it ought to be added in such a way as not to interfere with the weaving strength at al'.

Further an ideal size, specially for pure weaving, also for light weighing, should not require softeners such as tallow, glycerine, soft soap or oils of some kind, but should be one which will weave perfectly without such additions and yet at the same time produce a better cloth with a much nicer, smoother and more velvety handle.

Realizing all these differences, facts and uncertainties, and that a size absolutely pure, unvarying in its quality, and simple in the handling is what is wanted and understanding the requirements of the trade Dr. Belart made a research work to produce a size possessing these advantages. This new size called Dr. Belart's Size has been on the market not only in the Cotton Industry of Lancashire and the woolen and worsted industry of Yorkshire, but also in the United States for the last three years, and has been used to the entire satisfaction of the manufacturer.

It claims the following advantages:

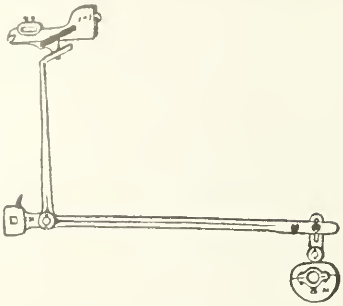
- Increased averages because of better weaving.
- Will not dust off.
- Will not mildew.
- No softener or tallow required.
- Contains no acids or alkaline or anything deleterious.
- Does not vary in quality and is always uniform.
- Givers a nicer handle and better finish to the cloth.
- In the majority of cases more economical.

Weft Cutting Device

The accompanying sketch is of a device, recently patented in England by Alfred Thompson, of Farnworth, which pertains to improvements in weft cutting devices for weft replenishing looms. The device is said to do away with the trouble heretofore experienced in the cutter cutting the filling weft at the wrong time which results in a broken pick.

The device of a heart cam or eccentric "A" fixed on the second motion shaft, which operates a bell crank lever "B", fulcrumed in a suitable position at bracket "D." and at the extreme end of the lever the temple weft cutter "C" is operated alternately. By the adoption of the contrivance many advantages are claimed by the inventor. It will absolutely obviate all broken picks caused by the temple cutter cutting the filling weft, which has always been a great source of trouble to loom men. The reason why the weft is cut is that the weft cutter operates every pick, but by operating the cutter alternately, the loose ends are cut off when the shuttle is at the opposite end of the sley from the cutter, and is heid back for the next pick and vice-versa. Thus it will be seen that under these conditions the cutter on any account is unable to cut the filling weft.

The device also allows the hooks on the cutter to be brought forward, thus making the cutter much more efficient in cutting off the loose ends after a bobbin or cop has been changed, and much neater and better selvedges are obtained. Another advantage is that the temple is prevented from choking up, caused by the loose ends encircling around the temple rollers or rings, and so saving



time and labor by cleaning the temple and also reducing the damage to the cloth. Also the wear and tear of the cutter is reduced by one-half by it only operating alternately.

THE YEAR BOOK OF COLORISTS AND DYERS.

Volume XV. of the Year Book for Colorists and Dyers presenting a review of the year's advances in the bleaching, dyeing, printing and finishing of textiles by Hermean A. Metz, has just come to hand with the compliments of Farbwerke-Hoechst Company of New York, Boston, Philadelphia, etc., and represented in Canada by Pollock Bros. and Co., in Montreal. The volumn contains valuable tables of reference, including all the tables used in the Colorists and Dyers. Several papers that were presented at the Eighth International Congress of Applied Chemistry, held in September, 1912, that were of particular relation to the textile trade, including the "Permanent Fireproofing of Cotton Goods" by Prof. W. H. Perkin, L.L.D., F.R.S. and the "Development of Hydro-sulphites in their relation to Modern Dyestuffs," by Phillip S. Clarkson. Also the principal patents for the year 1912, relating to dye stuffs and color matters, processes of application, chemistry processes and machines. Also notes on processes, new colors, etc., and an article on "Textile Schools in England." Also a list of dyestuffs, makers and methods and a few miscellaneous articles. The book comprehends a thorough resume of the advances made during the year and is a very valuable book of reference for all interested in this branch of the textile trade. A valuable acquisition to any dyer's library.

The Dominion Linen Manufacturing Company, Limited, with its head offices at 80 Wellington Street and factories at Guelph and Bracebridge, has made an assignmint to the Trusts and Guarantee Company of Toronto. The liabilities are estimated at $150,000. A statement of assets is being prepared by the liquidators. The company was incorporated with an authorized share capital of $200,000, its chief promotor being the late Dr. Beattie Nesbitt. Inadequate capital is attributed for the assignment.

THE CONSTRUCTION OF HEAVY WEIGHT CLOTHS

By WILLIAM EARNSHAW.

Written specially for the Canadian Textile Journal.

When heavy weights are required in cloths for winter wear, or special purposes, the chief difficulty is in producing them at a reasonable price without sacrificing the appearance of the fabrics. Weight may be obtained by the use of heavy counts of yarn, by the employment of backing warps, or fillings, or by the construction of double cloths. The simplest method is by the use of heavy counts of yarn on a single cloth. This method of course produces a coarse fabric; but the appearance may be modified by the pattern, coloring, and finish of the cloth. Cloths of this description should be made with a smooth weave (an ordinary twill is best), mixture yarns composed of varied rich colors should be used for the ground, and where pattern or color effects are introduced, the color should be in small quantities, and the contrasts as slight as possible. Bright colored fancies are better used in the form of twist yarns composed in two colors. All these things help to give an appearance of fineness to the cloth.

Cloths made in this way should be fulled, and a fair amount of cover should be left on face and back in order to hide the thickness of the threads.

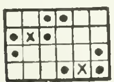


Fig A.

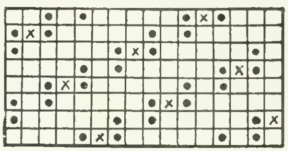


Fig D

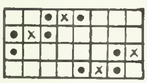


Fig C.

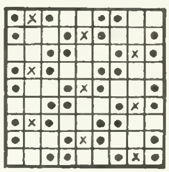


Fig B.

Where weight is required, and at the same time a fine appearance, either backed or double cloths will have to be made.

To increase the weight of a fulled fine woolen cloth of about 25% the addition of a backing warp containing half as many ends as the face warp is very effective. Fig. A. shows the weave plan for this cloth with a four leaved twill face, and fig. B. is the weave plan for the same class of back on a three leaved twill face. On clear finished goods, the weave as fig. A. would be liable to a little imperfection, as the backing warp only tacks on alternate picks. An increase of about 50% may be obtained in the weight of a cloth without interfering with the fineness of the face, by putting on a warp back end and end with the face. Figs. C. and D. are weaving plans for this class of back on a four leaved twill face.

The weave as fig. C. would be suitable for either a worsted or a woolen cloth, as the back has very nearly the appearance of the face. The back produced by weave plan fig. D. would be more suitable for a worsted trousering, as it is a warp satin, and the filling does not show. If more weight

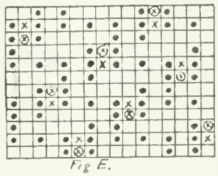


Fig E.

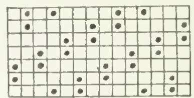


Fig. F.

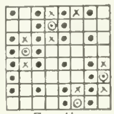


Fig H

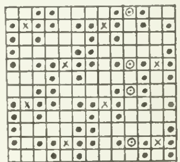


Fig. G.

still were required, it could be added to a worsted cloth backed as fig. D. without increasing the cost proportionately, by inserting a waddling pick of woolen yarn between the face and backing warps, two picks of face to one of wadding. The woolen might be of low quality, or even angola, as it would not shew on either face or back. Fig. E. would be the weave plan for this.

Another cloth of about the same weight as those produced by weave plans figs. C. and D. may be made by using two warps, and working them on both back and face. Fig. F. is a weaving plan for this make of cloth, and if only one color of warp is used, will give a four leaved twill effect on the face. By using two colors of warp end and end, and a different color of filling, a three colored diagonal is produced on the face with alternate warp twill of different colors.

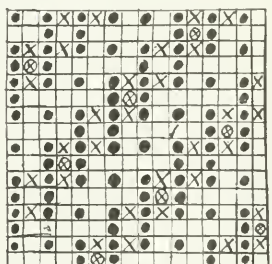


Fig. I.

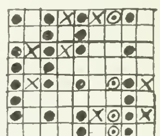


Fig. J

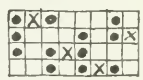


Fig. K.

Heavier cloths still, may be obtained by using cloth construction, that is, by forming two distinct fabrics for face and back, and tacking them together either by interlacing the threads of one with the threads of the other, or by separate tacking threads. If the face and back are of different materials, or colors, the latter method is best.

Fig. G. is the weave plan for a double cloth. The face is a four leaved twill, and the back a plain weave, there are twice as many ends and pick on the face as there are on the back, and the two fabrics are held together by tacking threads. In this class of double cloth, th eyran used on the back may be more than twice the thickness of that used on the face, and consequently lower in quality.

Double cloths having the appearance of single cloths, are made by employing the same weave for both face and back, and warping and weaving with an equal number of ends and picks on each side. Figs. H. and I. are weave plans for cloths of this description, with four leaved twill face and back. They are both tacked by the interlacing of the backing warp with the face filling; but fig. H. is tacked more frequently than fig. I. and would give a firmer cloth.

Fig. J. is the weave plan for a double four leaved twill; but in this a separate tacking thread is employed. This construction of cloth is more suitable where the colors, or pattern of face and back are not alike.

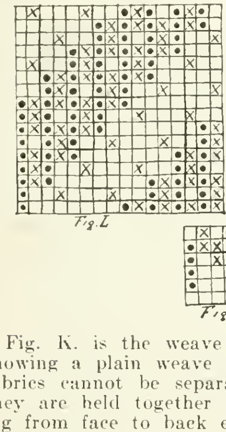


Fig. L

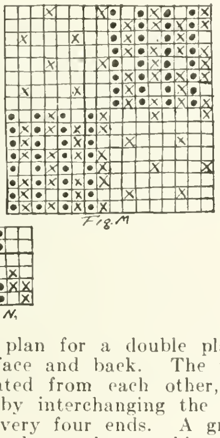


Fig. M

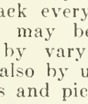


Fig. N.

Fig. K. is the weave plan for a double plain, showing a plain weave face and back. The two fabrics cannot be separated from each other, as they are held together by interchanging the filling from face to back every four ends. A great variety of patterns may be made on this construction of cloth by varying the warping and filling patterns and also by using different methods of charging the ends and picks.

Figs L. and M. are weave plans for cloths which have two warps and two fillings; but one warp and filling forms a plain weave in the centre of the fabric, and does not show on the surface of the cloth on either side; this keeps the surface threads from slipping.

Fig. L. would give the appearance of an eight end twill on face and back, and Fig. M. and eight end hopsack. This method of construction lends itself to the production of cheap makes of cloths, as the centre fabric may be made of inferior qualities of yarn. Fig. N. is a weave plan suitable for a heavy worsted, with a woolen filling on the back. This cloth is constructed with one end of face and two ends of backing in the warp, and two picks of face and two ends of backing in the warp, and two picks of face and one pick of backing in the filling. The color is applied in the backing warp, usually in the form of black and white, or bright twists, and shows in small specks on the face. The bright color on the back of this cloth gives it a very good appearance, although the filling is woolen.

In all these examples of weave plans, the marks represent warp rising, the dots represent face warp, the crosses backing warp, and the rings show the tacking.

Fashioning on Flat Machines

The flat machine has undoubtedly the greatest scope for the production of fashioned work of all knitting machines, as not only can all classes of rib work be narrowed or widened, but it is also capable of allowing circular plain fabrics to be seamlessly shaped, and in this latter respect the flat knitting machine still stands without a rival.

Both flat rib work and seamless plain work may be either narrowed or widened, but in the majority of cases the fabric is widened by totally different means from those adopted when narrowing, and there is no difficulty in telling whether an article has been narrowed or widened.

Narrowing is usually effected by the aid of grooved or holed points, the loops being taken off the selvedge needles and transferred inwards. Both rib and circular plain fabrics may be narrowed by this method.

Widening may also be effected by the aid of points, the loops being transferred one needle outward, and a loop picked up to replace the transferred loop on the empty needle. In the majority of cases, especially on power machines, the widening of both flat selvedged rib fabrics and circular plain fabrics is performed by bringing up the needles individually into knitting position, although this entails the use of extra mechanism as will afterwards be described.

Fashioning on Hand Machines.

On hand machines both flat and circular fabrics are narrowed by hand by means of points fixed to a narrowing finger. The points have holes at the one end which engage with the hooks of the needles and the narrowing is effected as follows: First, open all the latches of the needles concerned with the narrowing operation, and then hook the points on to the selvedge needles. Now pull the needles upwards by means of the points until the loops are below the latches of the needles. Next push the needles down until the loops are off the needles and on the points. Remove the points from the hooks of the needles and move them inwards one or two needles as desired. Again place the points on the needles they now are opposite to and push the loops off the points on to the needles. Remove the points, pull down the empty needles and the transference is complete.

To widen circular fabrics on hand machines it is necessary to use the same points as before, transferring the loops one needle outwards and picking up a loop of the previously made course with the working needle to replace the transferred loop on the empty needle.

To widen rib fabrics the procedure is much simpler, as if one needle on one or each bed is raised by means of its spring to its normal knitting position prior to the return of the yarn guide, it forms a stitch at the succeeding course.

Fashioning on Power Machines.

On the original power Lamb knitting machines the fashioning was still effected by hand, but of recent years machines have been evolved whereby a fabric may be narrowed by the shifting of the loops on one class of machine or widened by the bringing up of the needles on another type of machine. These machines may be classified as follows:

1. Automatic Power Machines for widening rib work.
2. Automatic Power Machines for widening seamless work.
3. Automatic Power Machines for narrowing either rib or plain seamless work.

These machines are now largely used for the manufacture of fully fashioned articles such as sleeves, pant legs, waistcoat backs, fronts and backs of sporting coats, etc., and are usually also supplied with automatice change of rib, i.e., plain, half cardigan, and full cardigan, and automatic racking mechanism, so that a definite design may be obtained in conjunction with the widening. Usually there is also an automatically controlled separating course, so that although the articles are made in a continuous string, each may be obtained separately by the pulling out of the separating thread, and as the latter is usually put in immediately prior to the making of the welt of the next article, the welt is left quite clear.—(Hosiery Trade Journal.—)

CANADIAN COTTONS LACROSSE TEAM CHAMPIONS.

We have much pleasure in reproducing herewith the photograph of the Champion Lacrosse Team of the Stormont Mill, Canadian Cottons, Cornwall, Ont., which won the championship of the Manufacturers' Lacrosse League of Cornwall last summer.

This league was composed of six teams representing the Stormont Cotton Mill, the Canada Cotton Mill, the Ines Modern Bedstead Company, the Beache's Furniture Company, the Toronto Paper Company and the McGill Chairs, Limited. These teams furnished some of the best games seen last summer in the Factory Town, where Lacrosse is so popular. The officers of the champion team included the managing director of the company, the superintendent, the paymaster and every overseer in the mill, and the team was composed solely of Stormont employees. Everybody worked for the good of the team and after many hard fought games the "bacon" or silverware was captured.

The group picture shown herewith is of the members of the team and executive. The players are each wearing the gold championship medal donated by the league. The group includes, top row, left to right: W. A. Nichols, superintendent; James Labonne, master mechanic; William Hanna, overseer roller department; C. H. Bedford, boss weaver; W. V. Boyd, managing director; Walter

STORMONT LACROSSE TEAM—**Champions 1913, Manufacturers' League, Cornwall, Ont.**

Trew, boss finisher; Ed. McGruer, boss dyer; Walter Crites, boss slasher. Second row, left to right, William Fyland, boss carder; F. Burgeon, loom fixer; M. Burgeon, loom fixer; Donald Smith, captain, beamer; John Reynolds, beamer; F. Rivier, 2nd hand card room; Charles G. Jamieson, boss mule spinner. Third row, left to right, John Sugden, boss beamer; F. Malette, mule spinner; A. Rivier, loom fixer; George Hirst, bookkeeper; P. M. Flaharty, boss ring spinner; Leo Burgeon, loom fixer; D. A. McPherson, beamer; A. Carpenter, beamer; A. C. Crigatt, paymaster. Bottom row, left to right, James Hirst, weaver; George Harrington, mule spinner and Percy Poabst, mule spinner.

Our Old Country Letter

If the advent of a new year is the time for taking good resulotions the end of the year is no less a time for taking stock, both in the industrial and other senses. But in these days we do not wait until the end of the year, and if we can do a thing earlier, well, so much the better. Mr. Tattersall, a well-known Manchester man, has been counting up the cotton spinning profits, and although he is not very optimistic as to the immediate future—any more than other cotton people are—he finds the gains on the year very satisfacoryt. Analyzing the stockholding results of 70 spinning companies, which have a paid-up share capital of £2,562,524 and a loan capital of £1,125,294, he shows that the total profits after paying interest on loans and allowing for depreciation, is £343,220, giving an average per company of £4,903. This compares with an average profit in 1912 of £4,688. The profit on share capital is 13.35 per cent per annum, against 12.70 per cent per annum last year, and on share and loan capital combined 9.30, as against 8.65 per cent per annum in 1912. The present value of plant of these mills, including machinery is £2,848,670, and the factories contain 2,476, 914 mule spindles, 268,296 ring spindles and 3,304,860 weft spindles, making a total spindleage of 6,050,070. These figures may be taken for what they are worth, but Mr. Tattersall is never far out in his estimations.

* * * *

The Italian trade organization, the Association Cotoniera Italiana, has been in communication with spinning associations with regard to the advisability of international organized short time in all mills and has now published the replies received. The German spinners are not unanimous on the question; Spain and the Dutch are not agreeable to short time, while the Swiss and Austrians are prepared to consider any proposal which would suit their countries. England's reply is to the effect that spinners are not disposed to agree to the proposal at present. India has also replied in the negative. The French spinners reply that organized short time throughout Europe is desirable and consider that in all probablity curtailed production will shortly be general, even if not organized internationally. They are not disposed to agree to the proposal, however, preferring to await developments in the raw cotton market a little later

As an indication of the increase of the spinning industry in the Failsworth district of Manchester, during the last 20 years some figures recently issued are worth quoting. In 1893, with a population of approximately 11,000, the rateable value of the district was £41,319 and the number of spindles 432,000. Ten years later, with the population about 14,500, the rateable value was £55,645 and the spindles 517,000; and for the present year, with a population of over 16,000 the figures are, rateable value £75,805, spindles 1,337,000. The number of looms on the other hand, which had increased between 1893 and 1903 from 742 to 930, is now down to 908.

* * * *

The circumstance that wool was admitted duty free into the United States from December 1 had no anticipatory effect of encouragement as regards the British product, the quantities sent thither in November for the last five years having been 4,275 bales in 1909; 1,580 in 1910; 1,090 in 1911; 2,051 in 1912; 661 in 1913.

* * * *

The next series of Colonial wool sales open here on January 13, and a lower basis of values having been established since the December series closed for all, except the finest wool, buyers should find prices a small per centage in their favor. It only requires the manufacturers of Yorkshire to operate more freely than they are doing at present. The money market on the Continent is easier and the demand from that source has well worn off, so that if the present rates are not maintained it may be taken for granted that they may fall to a more workable basis. A good many of the wool brokers are of this opinion also. For months past trade has been unsatisfactory owing to high costs and a determined effort is now being made to purchase at a lower level. This movement during the past week or two is meeting with a certain amount of success. The year is closing much quieter than in 1912.

* * * *

A small consignment of wool shipped from Alberta to London was sold the other day at a good price, grading high in quality. The exporter was a farmer who formerly resided in New Zealand and is experienced in the wool trade. J. R. B.

BRANTFORD CORDAGE COMPANY.

In a recent issue the "Financial Post" says: "There is no business of a manufacturing character that has had more ups and downs than that of manufacturing binder twine. One of the factories, perhaps the only one in Canada, to make both ends meet is the Brantford Cordage Company. It is only after very strenuous efforts that this industry has been kept together and those who pay money into it have not as yet seen returns on their investment that could be called satisfactory. At the present time the company is doing fairly well. This by no means is an indication that the binder twine manufacturing business is one that offers much hope for the employment of new capital. The Brantford Cordage Company has the distinction of being the survivor out of many who started and have since disappeared."

STUDIES IN THE DYEING OF WOOL

By J. MERRITT MATTHEWS, Ph.D.

Written specially for the Canadian Textile Journal.

The Chlorination of Wool.

By the chlorination of wool is meant the treatment of the fibre with a solution of hypochlorite in such a manner that the strength and other good qualities are not seriously affected while at the same time the substance of the fibre appears to undergo rather remarkable transformation leading to a considerable alteration in its chemical properties. The general use of solutions of hypochlorites in the textile industry is for the purpose of bleaching cotton or other vegetable fibres. Wool and animal fibres however, when treated with such solutions or with other chlorinating agents do not become bleached but apparently combine either with the chlorine itself or with some chlorine compound so as to furnish a new chemical combination of the wool substance. The action of chlorine and chlorine compounds on wool has been studied and known for a considerable period of time and the process of the chlorination of the wool fibre has been the subject of industrial applications in dyeing and printing. Chlorine itself in the dry state seems to have very little effect on wool provided the wool itself is also dry. This has been demonstrated experimentally by treating wool fibres dried at 212°F. to the action of a current of dry chlorine gas. Very slight change in weight and tensile strength of the fibre is noticed and the affinity of the fibre for coloring matters is not appreciably increased. If, however, the chlorine is allowed to act on the wool in the presence of moisture, energetic combination takes place and large quantities of hydrochloric acid gas are evolved, while the wool fibre soon changes to a gummy translucent mass and loses all of its fibre qualities finally becoming entirely disintegrated. Owing to this vigorous action of moist chlorine on the fibre it is hardly possible to devise a method in practice of chlorinating wool directly with chlorine gas. Recourse must therfore be had to the use of hypochlorite solutions such as those prepared from bleaching powder or consisting of sodium hypochlorite. Under proper conditions of treatment with such hypochlorite solutions the wool undergoes a curious modification in that while apparently retaining its original physical form it becomes highly lustrous, loses to a very large extent its previous felting qualities and also shows a much increased affinity for many dyestuffs. Yarns or cloth treated in this manner show an increased harshness to the feel and some loss of elasticity and strength. This process of chlorination is employed principally in the printing of woolen fabrics so as to prepare a print cloth which will more readily take the dyestuff. It is also used to a considerable extent for the preparation of yarns so as to lessen their felting qualities and at the same time increase their dyeing properties. When yarn treated by the chlorination process is woven into a fabric with untreated yarn so that a pattern effect is produced and the material is then dyed, the chlorinated part of the fabric will dye a much heavier shade than the untreated yarn and thus produce a sharply contrasted effect. Furthermore, if such a fibre is subsequently fulled the untreated yarn will felt together and cause a shrinking of the fabric while the chlorinated yarn having lost its felting qualities will not shrink up, but will remain in the original unfelted condition, thus producing a crepe effect and other novelty effects. The process of chlorinating wool is also used quite extensively in the manufacture of woolen underwear, where it is desired to lessen the shrinking quality of the fibre when it is washed. Nearly all of the unshrinkable or non-shrinkable woolen underwear is prepared from chlorinated wool.

The general method carrying out the chlorinating operation is as follows: A solution of bleaching powder is prepared of such strength that it contains 4–5 per cent of available chlorine which would correspond to a solution standing at about 17°Tw. A solution of sodium carbonate is now added in a slight excess with constant stirring. This will cause a precipitation of the lime as carbonate of lime and on allowing this precipitate or sediment to settle the clear liquor containing sodium hypochlorite in solution may be decanted. The solution will contain about 4 % of available chlorine and should have a specific gravity of about 1.1. It is well to have a slight excess of alkali in the solution so that the subsequent liberation of the chlorine may take place gradually. Solutions of greater strength are liable to form chlorate of soda which has a bad effect on the wool in that it tends to color yellow. For the chlorination proper from ½ to 1 pint of this sodium hypochlorite solution is rquired per pound of wool. Hydrochloric acid is also added to the solution gradually to the extent of about the volume of the hypochlorite solution. The goods are run through this liquor and then well rinsed. After the treatment it will be found that the wool has acquired a somewhat yellowish color. This may be removed by running the goods through a bath containing 100 gallons of water, 1 gallon sodium bisulphite liquor and one pint of previously diluted sulphuric acid. In place of the bisulphite treatment a bath of stannous chloride and hydrochloric acid may be used. After a thorough rinsing the goods are finally soured with soap to which is added a little sodium carbonate. This is added for the purpose of softening the handle or feel of the fibre.

It is a question whether the chlorine or hypochlorite combines directly with any substance in the wool fibre as chlorinated wool apparently contains no chlorine. The reduction of the felting quality of the fibre is probaly due to the fact that the free edges of the epidermal scales with which the surface of the fibre is normally coated are smoothed down by the action of the chlorine so that there is little or no scaly edge protruding and as these scales are the cause of the felting of the fibre the smoothing of the edges very naturally lessens this quality. This also accounts for the increased lustre as the surface of the fibre becomes smoother and consequently is in a better condition to reflect light than when the surface is broken up by the many serrations of the fine scaly coating.

In describing the chlorination of wool most experimenters on this subject have insisted that a prolonged action of chlorine on wool is to be avoided as it imparts to the fibre a yellowish color and a harsh unpleasant feel. It is also generally stated that a chlorine bath which has once been used for the treatment of woolen goods can be again strengthend for further use by the addition of an amount of hypochlorite considerably less than the original quantity. Bullard, however, takes exception to these statements. He points out that while the chlorinating of cotton is a gradual and progressive action the reaction with wool, however, is a very rapid one and the entire amount of the chlorine is absorbed by the wool in a few minutes and consequently the strengthening of old liquors for further use is quite unnecessary. Bullard made experiments showing these conclusions by using a piece of woolen fabric weighing 20 grams which had previously been subjected to the operations of soaping, stoving, washing, etc. A solution was prepared containing 5 grams of sulphuric acid and 12cc. of hypochlorite of soda (corresponding to 0.6 gram of dry bleaching powder of good quality) in one litre of water. One volume of such a solution immediately decolorizes one volume of a solution of indigo in sulphuric acid so diluted that its color is just visible. The wool is steeped in the chlorine bath for one minute and after removing it the bath no longer decolorizes indigo solution, thus showing that all of the chlorine has been removed by the wool. Sometimes indeed half a minute is sufficient for the removal of all the chlorine. A further addition of 12cc. of hypochlorite solution is made to the bath and the wool is re-entered again for a minute and on testing the bath it will be found that all the chlorine has again been abstracted. This may be repeated several times provided care is always had that an excess of acid be present. After three or four of such operations the wool acquires a yellowish tint and a harsh feel. Even when the hypochlorite bath is four times as strong as that given above (that is to say equivalent to 12% of bleaching powder on the weight of the wool) every trace of chlorine will have been removed by the wool in a treatment of two minutes. From this it is to be seen that the essential point for consideration in the chlorination of wool is very evidently the relative proportion of chlorine and wool rather than the time of action. According to Bullard the best proportion is 2 to 5% of bleaching powder on its equivalent in terms of sodium hypochlorite on the weight of the wool being treated. If calcium hypochlorite be used the acid employed must be hydrochloric whereas with the use of sodium hypochlorite either hydrochloric or sulphuric acid may be employed but in any case an excess of acid should always be present in the solution. As hydrochloric acid tends to render the wool yellow when used in this connection the employment of sodium hypochlorite with sulphuric acid is to be preferred. The acid bath may precede or follow the chlorine bath. Preferably the former method of treatment is to be used.

A mechanical difficulty which has to be overcome is that of obtaining as even as possible an absorption of chlorine by the fibre. If treated in the chain-form those portions of the material reaching the liquor first absorb too much chlorine while the latter portions receive little or none. It is better, therefore, in the treatment of cloth to carry out the operation in open width making use of a frame similar to that employed for the dyeing of cloth in the open width in indigo vats. However, the parts of the frame must be constructed of some material capable of resisting the prolonged action of hypochlorite solutions. The rapid removal of the chlorine from the hypochlorite bath might have been attributed to the action of the sulphuric acid present in the stoved wool but this conclusion was shown to be wrong by the results of an experiment carried out with a peice of woolen cloth which had been stoved but not subsequently washed. This piece was steeped in the acid bath and then in the sodium hypochlorite liquor and finally in a second bath containing sulphuric acid. In this last bath a considerable evolution of sulphur dioxide took place but on washing the wool was found to be satisfactorily chlorinated. Evidently the sulphuric acid and hypochlorite reacted to produce chlorine and a certain amount of the liberated soda combined with the sulphurous acid to form sodium sulphide, this being decomposed in a second bath with liberation of sulphur dioxide. The satisfactory result of the chlorination indicates that in the presence of wool and sulphurous acid chlorine is more readily absorbed by the fibre than neutralized and rendered inactive by the sulphuric acid.

Knecht in a series of experiments on the mordanting of wool with chromium has shown that chlorinated wool may well be mordanted with chrome alum without any decomposition being noticeable in the bath. A ten gram sample of ordinary wool was heated with 600 cc. of water and 2 grams of sulphuric acid, then well squeezed and mordanted with 10% of chrome alum and in this case no decomposition in the mordant bath was noticeable. If, after the treatment with acid, the wool is steeped for a quarter of an hour in a cold dilute solution of bleaching powder, then washed and mordanted with chrome alum, no decomposition of the chrome alum occurs in the bath but there is observed an interesting formation of chromic acid. Apart from the effect of the oxidation of the wool possibly the good results obtained on chlorinated wool in the dyeing at least with certain coloring matters may depend to some extent according to Knecht upon the acid absorbed by the wool. In the case of the above test the two samples when dyed with Alizarine have a garnet red color on the non-chlorinated sample, pointing evidently to the effect of the acid absorbed by the wool, whereas the second or chlorinated sample gave a bluish Bordeaux red color due no doubt to the presence of lime in the wool.

Notes on the Chemistry of Mordanting Wool.

A favored mordant in use for the mordanting of wool is a combination of bichromate of potash and sulphuric acid. The amounts which are usually recommended are 3% of the bichromate (ordinarily known as chrome) and 1% of sulphuric acid. Such a bath must contain a large amount of unaltered potassium bichromate, for in order to entirely decompose 3% of potassium bichromate it would be necessary to use 10.5% of sulphuric acid. Now, if the object of mordating is the precipitation on the fibre of chromium oxide Cr_2O_3, this method is little suitable. By this process of mordanting the wool acquires a pale yellowish color which can be entirely removed by washing with water. It is sometimes stated that the wool acts as a reducing agent by virtue of the fact that it contains sulphur, but the proportion of sulphur present in the wool fibre is so small as to render this explanation very doubtful. There have been many attempts seeking to supply sulphur for this purpose to the wool or to the mordant but no process proceeding on this principle has had any practical success owing to multiplicity of methods or cost of materials with the possible exception perhaps of the additon of sulphurous acid to the mordanting bath.

The use of potassium bichromate and tartar as a mordanting combination for the wool is perhpas a more rational process than the preceeding in so far as it effects a partial reduction of the bichromate. If a concentrated solution containing bicromate and tartar be allowed to stand, a reddish gray precipitate of chromium gradually separates. This, however, does not take place in mordanting as the solution is too dilute, but it indicates that in practice reduction is not complete. Indeed, even after 3 hours boiling, if the green liquid be treated with sliver nitrate the characteristic red silver chromate precipitate is obtained. In this process of mordanting it is probable that a tartrate of chromium is produced as an intermediate product in the reaction, and consequently 295 parts of potassium bichromate require 336 parts of tartar, and this will correspond in practice to 3% of potassium bichromate with 3% of pure or 4% of crude tartar. Chromic oxide is not deposited on the wool fibre by this method of mordanting any more than it is in the previous methods.

Oxalic acid has sometimes been used in connection with bichromate for the mordanting of wool. It has been found that potassium bichromate solutions are readily reduced by oxalic acid, although the solution does not become green owing to the fact that the oxalic acid does not reduce the bichromate to the green modification of chromium salt, but the product obtained is a chromium potassium oxalate. Consequently the reaction is not quite analagous to that given for tartar. From the equation representing the reaction it is found that 450 parts of oxalic acid are necessary for the reduction of 295 parts of potassium bichromate. The shades obtained when coloring matters are dyed on a mordant of potassium bichromate and oxalic acid are but slightly different from those obtained when bichromate and tartar are employed. The general effect of oxalic acid as compared with that of tartar is most noticeable when aluminium mordant is used and it appears to influence the shade in the direction of a violet tone. For instance, Logwood extract dyed on an alum and tartar mordant gives a dark grayish blue color. With alum and oxalic acid mordant, however, a bright navy blue is produced. Alizarine orange with alum and tartar mordant gives an orange red color while with the alum and oxalic acid mordant a pure orange color is obtained. It would thus appear that the shades produced by the mordant colors depend not only on the dyestuff and the metallic mordant which is employed to form the color-lake, but also on the acid with which the metal is combined.

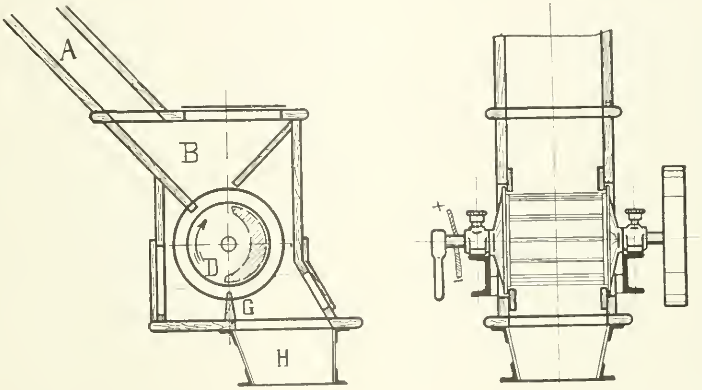
MESSRS. FRIEDERICH ERDMAN, GERA, GERMANY.

The popularity of German machinery in this country is increasing very rapidly and, during the past few years, there has been a considerable importation of textile machinery into the country from that source. The Germans have gained quite an enviable reputation practically all over the world on many classes of textile machines and not the least important among these concerns has been Messrs. Friedrich Erdmann, Gera, Reuss, Germany, builders of dobbies, cutting machines, measuring machines, looms, perforating machines, folding machines, jacquard machines, automatic bordering apparatus, screw presses, warping machines, sizing machines and all sorts of supplies for woolen and cotton mills. This firm was established in 1861

VIEW OF MACHINE SHOP—MESSRS. FREIDRICH ERDMAN under Friedrich Erdmann, the father of the present principals, Max, Karl and Villy Erdmann, who have built up a business of world-wide importance. Each of the principals are practical men, each managing a separate department of the huge works. Friedrich Erdmann, the founder of the firm died about two years ago. The accompanying illustration is a view of one of the large shops belonging to this firm, who are now anxious to obtain the services of some reliable representative in Canada.

Electro Magnets for Textile Machinery

Various efforts have been made to adapt magnetism or magnetic forces for the removal of undesirable small pieces of iron such as nails, wire, etc., from raw materials that had to be passed through machinery. At first permanent magnets were used but as their magnetism was fairly weak and they failed completely after being in use for some time they were discarded. Elector magnets were then introduced and these have been placed upon the market in various forms to meet the requirements of varied industries. These electro magnets have one certain advantage in that their capacity is always the same and they prevent with absolute certainty pieces of metal from passing into the machinery and so causing damage and in many cases originating fire.



The electro magnets for textile machinery are made either square or round and they can be arranged in such a position that the material under treatment is conveyed exactly over the magnet. The pieces of iron that are extracted and remain attached to the magnet are removed from time to time which is easily done by hand.

One type of construction is illustrated and is suitable for tearing machines. From the feeding table, "A," the material passes over the separating drum, "D," being directed on to it by the shape of the chamber, "B," Fixed inside the separating drum is an electro-magnet which contains an exciting coil on one side, the jacket turning round the magnet. The pieces of metal are attracted and stick to the rotating jacket till they reach the non-magnetic side, "G," Then they fall and accumulate in the special receiver, "H." The non-magnetic material passes from the drum right to the tearing or scuthing machine and so the work is absolutely automatic.

The current consumption of these electro-magnets is very small. For a drum of about 24 inches wide, 0.6 amperes at 110 volts is quite satisfactory and such a drum would have a carrying capacity of about 12 cwts. so that it will be seen that even heavy and large pieces of metal are stopped by the device.

AUSTRALIAN WOOL CLIP.

An annual review of Australiasian wool statistics for the year ended on June 30, 1913, issued by expert authorities in Melbourne, shows that shipments oversea amounted to 2,247,265 bales (or 721,821,516 pounds), as against 2,637,127 bales (or 873,549,808 pounds) in 1911-12, or a net decrease in exports of 290,602 bales. The actual production of wool for the past twelve months is given at 2,335,040 bales (or 749,997,291 pounds), as against 2,637,127 bales (or 873,549,808 pounds) for the previous year, thus showing a shortage in the recent clip of 302,087 bales. Against the decrease in quantity is to be set the increase in value, which is calculated to be £13 13s. 1d. per bale, in comparison with £11 15s. 5.d in 1911-12, or an average increase of £1 17s. 8.d per bale. The net gain in wealth in Australia from wool alone in 1912-13 is computed at £30,684,531, which compares with previous years as follows:

1912-13	£30,684,531
1911-12	29,591,874
1910-11	31,588,936
1908-9	25,950,912
1907-8	26,768,952
1906-7	26,685,740

Cause and Remedy of Rolling Selvages

So-called rolling selvages are often not rolling selvages at all, says a writer in a recent issue of the "American Wool & Cotton Reporter." In many cases the cloth would roll if there were no selvage. Where the fault is in the selvage it must be due to its being tighter than the cloth, either at the start or by being made so during the fulling. If either the stock in the selvage or its construction be such as to cause it to shrink faster than the body of the cloth in fulling, the rolling is sure to follow. Sometimes an imperfection in the selvage, such as a wrong draw or a thread out, will produce a floating effect of the filling that by its quick shrinkage will cause it to turn and so start the trouble that would otherwise not occur.

It is too often the case that the overseer of the weaving overlooks the importance of a perfect selvage. Though a single thread defect may not amount to much, the habit of allowing such to pass uncorrected often results in more serious difficulty before a warp is woven out.

As a rule, what is designated as rolling selvages is due to the construction of the cloth, and the tendency can only be overcome by precautionary measures in the finishing department. Any cloth having the warp and filling evenly balanced on the face and back will not roll unless superinduced by the condition of the selvage.

Where the filling predominates upon one side of the cloth there is a tendency for it to roll and always with that side in. Goods constructed for a face or luster finish, such as broadcloths, kerseys and the like, having a distinctly warp face, will nearly always roll unless there is some special stitching down of the filling on the back to avoid it. Goods having a cotton warp are more susceptible to the trouble, because there is no felting tendency in the warp to counteract it. The extent of the trouble caused by the rolling is not always fully realized.

The difficulties in gigging and shearing are not the only things to be considered, although the finisher is often satisfied to get the goods past these operations safely. But there are other things that should be considered. The rolled and extra-felted condition of the sides of the cloth often renders it difficult to remove all the soap in rinsing, and the dyer is bothered to get even shades "from side to center" in consequence; and the difference in the quality of the felt will sometimes result in a difference in shade, without reference to the color, by a variation in the clearness of the pattern, in the case of fancy goods.

By a close examination of such goods it will often be found that samples cut from the side and center will appear like differently constructed cloths, as both the weight and threads per inch will vary quite materially. The excessive compactness and warmth of the sides of the cloth in fulling, on account of the rolling, produce these results.

About the worst case of this trouble I ever ran across was in a mill where I was called to take charge of the finishing some time ago. The goods were of a construction that favored the rolling, and the finisher had not seemed to take proper measures to avoid it, in fact had allowed some things that made the matter worse. When the cloth came to the shear, there was a slack space about fourteen inches wide, a little one side of the center, that would pile up against the blades, while the sides were so tight they would frequently break in the selvage. This slack portion, of course, would clear up in advance of the rest of the cloth, and threaten to become tender before the sides were properly cleared. The finisher had prepared a piece of board of a sort of ox-bow shape, with which he would hold down the slack, to keep it from being cut, while he tried to shear the sides down to his liking. Upon examination of the cloth I found that the slack portion had very little felting, while the sides were very compact and close. I found that the cloth was rolling badly in fulling, and to avoid excessive heat, the upper front doors of the fulling mills were left open. The room was poorly heated and a current of cool air drawn in by the motion of the cloth kept the exposed part of the cloth cool, while that portion which was rolled retained the warmth and fulled more rapidly. The two sides rolled until the cloth was like a rope, and the exposed portion, that kept cool and so refused to full, corresponded with the fourteen inches in width that was slack in shearing. I at once begun tacking the cloth for fulling, that is, sewing the selvages together with the side toward which they rolled outward. By sewing them in this manner they pulled against each other in the tendency to roll, and so kept each from doing so. Then to regulate the temperature in fulling, I opened the back door of the mill sufficiently to allow the excessive heat to pass off. This kept down the temperature without any cold air striking the cloth, as had previously resulted. By this means the whole cloth was kept at a uniform warmth, which induced uniform fulling.

By the method formerly pursued, the portion on the outside of the rolled cloth was constantly subjected to the cold draught of air and never became warm, while the rest retained a warmth, increasing toward the selvages. The reason the slack place in the cloth came on one side of the center was that nearly always one selvage rolls more quickly than the other. There is a reason for this which we will not explain here.

By the simple measures mentioned I was enabled to get the goods out with a uniform finish and with perfect selvages; and I have learned from experience that careful tacking and a uniform temperature in fulling are worth while where there is any tendency to rolling selvages.

Mr. Harry L. Burrage, vice-president of the National Shawmut Bank of Boston, Mass., has been elected president of the Canadian Connecticut Cotton Company of Sherbrooke, Que.

Depressed trade conditions are in a large measure responsible for the special meeting of shareholders of Hewson Pure Wool Textiles, Limited, held in Amherst, N.S., recently to consider the financial position, business, and operation of the company. In the meantime, pending the results of this meeting, the half-yearly bond interest is deferred. A committee of shareholders, consisting of Col. B. A. Weston, G. L. Stairs, W. H. Covert and C. R. Smith, was appointed to consider the financial report and, when ready, present their findings to an adjourned special meeting of the company.

Recent Canadian Patents of Interest to the Textile Trade

No. 148,950.—Tubular ribbed fabric. The Kilbourne Manufacturing Corporation, New Brunswick, N.J., assignee of W. E. Smith, Milltown, N.J., 1st July, 1913; 6 years.

No. 148,951.—Knitting Machine. The Kilbourne Manufacturing Corporation, New Brunswick, N.J., assignee of C. W. Kilbourne, Mabel W. Kilbourne, of New Brunswick, N.J., and E. B. Kilbourne, Relay, Ma., and J. W. Kilbourne and W. E. Smith, of New Brunswick, N.J., 1st July, 1913; 6 years.

No. 148,960.—Knitting Machine. Scott and Williams, Incorporated, Camden, N.J., assignee of Robert W. Scott, Boston, Mass., 1st July, 1913; 6 years.

No. 149,106.—Knitting Machine. The Canadian Knitting Company, Limited, Hamilton, Ont., assignee of Oliver Laroche, Hamilton, Ont., July 8th, 1913; 6 years.

No. 149,033.—Knitting Machine. Jushua Hemphill, Central Falls, R.I., July 1st, 1913; 6 years.

No. 149,111.—Knitting Machine. The Franklin Knitting Mills, New York, assignee of Joseph Kellner, Brooklyn, U.S.A., July 8th, 1913; 6 years.

No. 149,196.—Knitting Machine. Robert C. Gruber, Spring City, Mass., July 8th, 1913; 6 years.

No. 149,247.—Warping Mechanism. The American Warp Drawing Machine Company, Boston, Mass., assignee of Charles Lea, Boston, Mass., July 15th, 1913; 6 years.

No. 149,696.—Loom Mechanism. Spennerei & Weberei, Steinen, Steinene, Germany, assignee of A. G. Koechlin, Basle, Switzerland. August 5th, 1913; 6 years.

No. 149,697.—Loom Mechanism. Spennerei & Weberei, Steinen, Steinen, Germany, assignee of A. G. Koechlin, Basle, Switzerland. August 5th, 1913; 6 years.

No. 149,733.—Device for Threading Loom Shuttles. John T. Brooks, Bolton, Eng. August 5th, 1913; 6 years.

No. 149,745.—Loom. Paul Girard, Lyan, France, August 5th, 1913; 6 years.

No. 149,748.—Loom Mechanism. John Hancq, Jamestown, N.Y., August 5th, 1913; 6 years.

No. 149,781.—Shuttel Mechanism. John F. Pillsbury, Norristown, Pa., August 5th, 1913; 6 years.

No. 149,791.—Carpet Making Machine. Robert W. Silversides, Norton, Eng., August 5th, 1913; 6 years.

No. 150,190.—Flax Pulling Machine. C. H. Vessat and A. G. Mather, both of Ottawa, Canada, co-inventors. September 2nd, 1913; 6 years.

No. 150,241.—Spindle Bearing. Max Muller, Clifton, N.J., September 2nd, 1913; 6 years.

No. 150,514.—Hand Stripping Card. Herbert Midgley, Worcester, Mass., September 16th, 1913; 6 years.

A sad death accured in Almonte on December 2nd, last when James Jardine died suddenly of heart failure. The late Mr. Jardine was fifty-two years old and had been in the employ of the Thoburn Flannel Mills for over twenty-six years as head spinner. He was born at Hawick, Scotland, and came to this country thirty years ago.

CANADIAN-CONNECTICUT BONDS OFFERED.

McCuaig Bros. & Co. and the Nova Scotia Trust Company are offering the unsold balance of an issue of \$350,000 of the first mortgage bonds of the Canadian-Connecticut Cotton Mills. The issued capitalization of the company is \$600,000 of common stock, \$150,000 of 7% preferred stock and \$350,000 6% twnety-year bonds.

The buildings which are of the latest design and construction are completed and the machinery is now being installed. We understand that the annual output will amount to about 1,500,000 of tire duck and that this output has already been contracted for, for a period of five years by the Goodyear Tire & Rubber Dompany, the Dunlop Tire & Rubber Goods Company, the Dominion Tire Company, and the Independent Tire Company.

The Company's plants are at Sherbrooke, Que., and are advantageously situated close to the C. P. R. tracks. It is expected that manufacturing will be commenced in another month.

THE CARPET AND RUG INDUSTRY IN UNITED STATES.

The number of establishments reported in carpet and rug industry in 1909 was 139, employing 33,307 wage earners. Capital invested was \$75,627,000; wages and salaries, \$17,745,000; cost of, materials \$39,563,000; and value of products, \$71,188,000. Total expenses in 1909 were \$62,-311,110, distributed as follows: Coat of materials, \$39,563,004, or 63.5%; wages, \$15,536,050, or 24.9%; salaries, \$2,209,042, or 3.5%. Total quantity of wool used, on the scoured equivalent basis, decreased somewhat between 1899 and 1904, but the increase from 1904 to 1909 was sufficient to make a net increase of 37% for the decade. Practically all the wool used was of foreign origin, domestic wool constituting only four-tenths of 1% of the total consumption of wool (in condition purchased) in 1909, 1.7% in 1904, and two-tenths of 1% in 1899. Total value of carpets and rugs manufactured in all industries was \$67,445,499. Total production of carpets and rugs in the industry in 1909 was 81,218,881 square yards, representing an increase of 6.3% as compared with 1899, but a slight decrease (1.8%) as compared with 1904.

GREETINGS TO THE TRADE.

The Draper Company, Hopedale, Mass., have sent out a very attractive and useful calendar this season, the frontispiece showing the company's works and a reproduction of one of a Northrop loom, in colors.

Messrs. H. V. Andrews of Toronto, Canadian representativs of Messrs. Julius Cohen and Jasephy have sent out a very attractive calendar this year with the season's greeting to the trade. The calendar is tastily arranged and the reproduction of a beautiful pastorial scene makes it one that will be prized.

The Klauder-Meldon Dyeing Machine Company, Amsterdam, New York, are wishing the season's greetings with a very pretty calendar, that should appeal to those loyal to the United States at least. "The First Recognition of the American Flag." is the title of the reproduction which depicts a sea-battle of the olden days.

Duty of the Weaving Overseer

By EDWARD T. DEMPSEY.

It should be the aim of every overseer to excel in his occupation, but success is dependent upon conditions which are often difficult to maintain. These conditions have their effect upon the objects to be attained, which may be classified as follows: first, large production; second, fine quality of production; third, long life of machinery in use; fourth, low cost of maintenance of machinery.

To lose sight of any one of these objects or to sacrifice the last three for the first, indicates incompetence. Intelligent management takes into consideration all four and holds them for an ideal.

With regard to large production I claim every overseer should be on hand five or ten minutes before the regular time for starting up the looms and should take a place at the main entrance or a position where he can view the help as they come into the room and be seen by them. It will not be necessary to mention tardiness of help if this rule is followed out, as when the employes realize an overseer is on the watch for failings of this nature they will make it a point to avoid being late.

It should be the duty of the overseer to give the signal to start work and he should insist upon every weaver being at his loom on time, for coming in late is a serious fault in many mills and few realize what a great loss in production is caused in a week by this negligence on the part of laborers. The overseer should make a trip through the weave shop as soon as possible after starting up, to see that there are no idle looms and should he find any, every effort should be made to get them running. He should insist on keeping the full quota of looms in operation.

Now, my advice to overseers is to plan on laying out your work a day ahead, as I find that by doing this I have considerable time for the general oversight of my room; for instance, if any special piece of goods is wanted for an express order all that is necessary is to consult your layout for the previous day to know whether or not such style is weaving or what style you may cancel in order to convert the less urgent work to the benefit of the rush orders. This form of laying out work helps in keeping looms busy and preventing the waiting for warp which is so apt to occur if one is not on the alert. It is also the duty of an overseer to see that there is sifficient filling to keep the loom busy when new warp is put into it. By keeping warp and filling ahead of the loom, you will find the weavers are more contented and the yardage is bound to be greater.

Special attention should be paid to loom fixers. Under no circumstances should a fixer be allowed to be discourteous to the weavers. Insist upon the fixer responding quickly to any appeal, whether the trouble be the fault of the weaver or not, as the difficulty may be trifling and yet delay the progress in production as much as a greater flaw. It is the duty of the fixer to keep his section of looms in order and the overseer should be persistent in making him investigate and apply the remedy as rapidly as possible. Good discipline is one of the chief assets of an overseer and the greatest aid to production.

Referring to the second of our topics, I would say we have a large field for improvement.

Uneven cloth and shady cloth with thick or thin places are the hardest obstacles with which an overseer has to contend, especially in a room where the humidity is not under control. The friction let-off naturally shows the effect of dampness and in order that it may work properly it must have a smooth surface. This mechanism is certainly the best, taken as a whole; that is, if there is a rope wrapped around the beam head or it may be a chain, an iron band or a piece of rawhide, these give the best results if properly attended. If allowed to go without attention they are the worst forms of let-off. If the rope becomes sticky a little powdered black lead will remedy this defect. French chalk is often used with good results, but is more liable to cake than graphite and it becomes sticky with the change of atmosphere. It sometimes happens that uneven cloth is caused by the arbor in the beam being sprung. This is caused by banging the beam on the floor after the yarn has been drawn from it. The uneven turn of the beam makes an unequal let-off of yarn.

When a rocker shaft bearing is loose there is an uneven movement of the lay when beating up. If the crank arm is loose or one is slightly longer than the other the reed does not beat up evenly. A loose reed gives the same result. It the cloth under the friction is allowed to remain on long, it becomes sticky and causes the beam to let-off in jumps. Occasionally when attaching the friction the knot in the cloth is allowed to remain under the friction band, which will cause an uneven let-off. If the beam head is not bared in the center an uneven friction is sometimes caused on every turn of the beam. Harnesses which are not set level invariably result in shady-dyed cloth, because the sheds being lower on one side than the other, the cloth is a trifle thicker with a consequence of a difference in the absorption of dyestuff.

Sometimes there are distinct cracks in the cloth and in nine cases out of ten, they are caused by four or more harneses. Notice the cloth woven and you will see the defects which occur most regularly, then watch the loom and probably you will note the cause to be loose yarn on one harness which, when the filling is beating up the slack yarn, forms in a rub which prevents the close beating up of the filling. Raise that harness up a little to tighten the yarn and the defect in the cloth will be overcome.

For the third object to be attained, I have to say that in one sense of the word. we are very careless. The overseer should give as much attention to the general running condition of the looms under his charge as he does to securing large production of cloth. Overseers often say, "Get production regardless of cost," I admit all manufacturers want large production, for the greater the output the less cost per yard to manufacturer but if we are to keep the cost down permanently we must take into consideration the wear and tear on machines. If they are not kept in order and neglected the cost of production will be increased, as all overseers must agree that when a loom begins to wear out there is no end to the cost of repairs. However, a loom kept in first-class condition will run for years at a very low cost of maintenance and a large yardage of cloth may be produced by it, each of which are important factors in the qualities or an efficient overseer.

Now we come to the last topic in regard to an overseer's duty, on which a few of our brother overseers may differ. An overseer should have a genial disposition in dealing with his loomfixers and should always bear in mind that a word spoken at the right time will encourage them to do good work and to use the skill that lays in their power. When an overseer knows he has a fixer who does good work he should not be afraid to compliment him when occasion arises, but on the other hand, if an overseer finds he has a fixer of the opposite type he should not be backward in telling him wherein the failure lies when necessary, and if improvement is not forthcoming it is well to dispense with the services of the incompetent one, as much depends upon the work of the fixer.

An overseer should inspect all wornout castings before they are consigned to the scrap heap, also keep a close watch on all supplies and see to it that the fixers do not use them excessively. In regard to replacements and supplies of all kinds for the weave room, always insist upon having the quality of the best, as high-grade supplies, shuttles and loom fixings are always the cheapest in the end for the manufacturer.

By keeping in close contact with your loomfixers and a keen eye on the supplies you will find a decrease in the cost of maintenance. Consult your fixers as to their opinions and ideas regarding the new attachments and improvements that are being made from time to time and ascertain their views as to the advantages over the old types. Where overseers, second hands and fixers work in union there will be a greater production of cloth, and long life and low cost of machinery together with other things being equal a good grade of work will be produced. Furthermore, no business can succeed today without co-operation and loyalty in every branch. All must work for the common end rise rise and fall together. This is the spirit of success today. A happy, contented body of workers is necessary for success. The overseer is responsible for this, and to secure results must select with care all his assistants, each especially adapted for certain places. He must inspire them with his own energy, loyalty and enthusiasm. This same spirit must then pass on down to the humblest employe until it pervades the entire working forces. Without such a corps of overseers, no modern industry, woolen, worsted or industry of any nature can succeed fully. In other words, it is the human constructive, planning, guiding and inspiring mind upon which success of failure depends, and it is my candid opinion that the concern that employs overseers of these accomplishments need have no fear of the keen competition with which they are bound to struggle, either at the present time or at the future.—(Paper read at the last meeting of the Association of Woolen and Worsted Overseers held in Boston)

The "Daily Reminder," compliments of the Dominion Textile Company, Limited, is a useful little book for every man's desk. Something to jog your memory as to daily appointments and doings. Quite a valuable book now-a-days.

RESEARCH IN THE TEXTILE INDUSTRY.

At a meeting of the Institute of Chemistry held at the Imperial College of Science and Technology, South Kensington, Mr. W. P. Dreaper delivered his second lecture on "The Research Chemist in the Works, with Special Reference to the Textile Industry." The importance of a knowledge of theory was illustrated by a reference to the work done in connection with the presence of stains and loss of strength experienced on the storage of certain silk goods. The cause was found to be free sulphuric acid, and only a knowledge of theory has suggested why this substance could be present in cases where the acid had never been used in any process of manufacture. The so-called "neutral salt reaction," offered a solution to this problem and had relieved the dyer from constant blame. The process of bleaching cotton as used today were then described and illustrated by samples; and the principles involved in dyeing, finishing, and printing fabrics were touched on. When the chemist produced results in the laboratory and desired to see them reproduced on a large scale, it was esential that he should be in a position to indicate to the engineer the nature of the machinery required, and better still, to submit a design for it. The method of attack adopted by the chemist was so essentially different, in its direction and nature, from that adopted by the engineer, that this alone justified his presence in any works. It also defined the ralative position of the chemist and engineer. It was sometimes necessary for the chemist to retain control of certain industrial processes which had emanated from the laboratory, especially when these were more dependent upon chemical factors than upon mechanical or electrical ones; thus the chemist became directly involved in working conditions and industrial operations. The lecture was illustrated by examples of machinery used, samples of textile materials in the intermediate stages of manufacture, and actual demonstrations of hand block and spray printing.—(The Textile Manufacturer.)

CANADIAN FLAX NOW VALUABLE.

The fall letter has been received from Messrs. Foster & Co., of Selby, England, in reply to our inquiry regarding a recent report to the effect that a process had been perfected making for the efficient utilization of our flax straw.

"We duly received your letter of November 24, inquiring about our treatment of Canadian flax. The difficulty in the treatment of Canadian flax has been the elimination of the gum in the fibre. Manufacturers do not consider it wise to use fibre in which the gum is still left; in other words, fibre that is unretted. We have been experimenting for a number of years in connection with Mr. Pearson of the Northern Flax Fibre Company, Great Falls, Montana, U.S.A., to find a simple, cheap and effective method of removing the gum, and after many years work, we have at last succeeded. Our process is known as the Pearson-Foster process. We are already building Mills in Great Falls, to deal with the straw grown in the United States, and a company is now in process of formation to deal with Canadian straw. Samples of twines, of almost every kind used by grocers and drapers have already been spun from straw treated by our process, and they are equal to any twines on the market. We trust this information is what you desire."

MILL AND GENERAL TEXTILE NEWS

It is understood that two members of the old board of directors of Belding-Paul, Corticelli, Ltd., will retire and that their places will be filled by Mr. J. M. Mackie, of C. Meredith & Co., Ltd., and Mr. A. O. Dawson of Canadian Cottons, both men of wide experience in industrial affairs. The company has a board of seven directors, made up of Messrs. Frank Paul, William McMaster, Fred Birks, A. Haig Sims, C. A. Reynolds, B. G. Winans and William Hanson.

William Algie, proprietor of the Beaver Mills, Alton, Ont., has purchased the remainder of the knitting, winding and finishing machinery of the defunct Waterloo Knitting Company, at Carleton Place.

The new mill being built at Orangeville, Ont., by John M. Dods of Alton is nearing completion, and it is reported, will be ready for the machinery in another month.

A new company, the Olympic Manufacturing Company, has been formed with headquarters at 64 Colborne Street, Toronto to manufactur sweater coats and novelties.

The annual convention of the Canadian Manufacturers Association, will be held in Montreal this year during the month of June instead of September as has been the custom in past years.

The many friends in Canada of Stephen C. Lowe, of Boston, will be pleased to hear of his marriage to Miss Edith Francis Child of Brookline, Mass., on December 13th last. Mr. Lowe is one of the prominent figures in the cotton manufacturing industry, being American representative of John Hetherington & Sons, Ltd., and president of the S. C. Lowe Supply Company of New Bedford.

George D. Perry, general manager of the G.N.W. Telegraph Company, has been elected vice-president of the Toronto Carpet Manufacturing Company, succeeding the late Dr. C. S. Murray.

The New York offices of the Canadian Textile Journal, have been opened at 206 Broadway, with L. C. Randolph as manager, as previously announced.

William Hanson has been elected to the Board of Directors of the Belding Paul Corticelli, Ltd., filling the vacancy left by the death of Mr. W. M. Doull.

The Empire Cotton Mills, Limited, Welland, Ont. are considering the erection of the new duck mill early next spring. Arrangements for the extension have not yet been definitely settled.

Penman's Limited are installing a new steam boiler in their Almonte mill. The plant is closed down and many improvements are being made.

The new mill of the Sovereign Mitt, Glove and Robe Company at Delhi, Ont., to replace the one destroyed by fire last April, is about completed. The new plant is 100x33 feet, three stories high and is double the size of the old one. The company have been operating in temporary quarters since the fire.

A recent issue of the Ontario Gazette included notices of the incorporation of the R. G. Long & Co., Ltd., of Toronto, with a capital of $150,000 and of the Cobourg Dyeing Company, Limited, of Cobourg, with a capital of $190,000.

The Klauder-Weldon Dyeing Machine Company of Amsterdam, N. Y., have brought suit against John H. Giles, the John H. Giles and the Mason Machine Works for making dyeing machines which are said to infringe upon their Letter Patent No. 999,304, dated August 1, 1911, and No. 1,057,635 dated April 1, 1913.

A new company, the Toronto Cotton Mills, Company, proposes to erect a new cotton mill at Welland, Ont., The company is capitalized at $350,000, of which $200,000 has been paid in and according to reports propose to erect a mani building 108x640 feet, one story high, of brick construction, also a warehouse 82x162 feet and a small office building. It is proposed to manufactured duck and yarn. The Sovereign Cotton Company, Ltd., which was organized last year with a capital of $6000,000, are also negotiating with the town of Welland with a view to locating in that town.

The deal by which the Smart Woods Limited takes over the Empire Cotton Mills, Ltd., of Welland, has been ratified at meetings of shareholders of both companies. Smart-Woods already had a controlling interest of the Empire Company, but now it owns the company outright and the new mills will be operated under the name of the Empire Cotton Mills branch of Smart-Woods, Ltd.

The Victoriaville Bedding Company, Limited, Victoriaville, Que., has been incorporated with a capital of $150,000.

George H. Wilson, superintendent of the the Hochelaga Branch, Dominion Textile Company, returned from the Old Country last month where he has been recuperating from his recent illness. Mr. Wilson feels his old time form once more and has resumed his duties at the mill.

A. C. Marsh, formerly with the Mercury Mills, Limited of Hamilton, has been appointed manager of the Ypsilanti Underwear Company, Ypsilanti, Mich.

The following offices were elected for the coming year at the recent annual meeting of the Montreal Dry Goods Association: President, Alphonse Racine, Jr.; vice-president, George Sumner; treasurer, P. H. Bartlett; directors, R. A. Brock, George B. Fraser, W. E. Cushing and G. R. Martin.

The B. C. Ginnell Glove Company have opened a branch factory at Port Coquitlam, B.C., and are now turning out about 100 dozen pairs a day.

In 1909 the total number of establishments engaged in the shoddy industry in the United States was 88; with 2041 wage earners; capital invested amounted to $6,887,000; wages $907,000; cost of materials $5,000,000; and value of products amounted to $7,146,000.

THE MARKETS

CANADIAN WOOL MARKET.

Things have been very slack in the woolen trade during the past month with many of the mills practically closed down, so that very little business has been doing in the raw material market. In spite of this, however, and of the fact that values were somewhat lower at the last London Sales, Canadian wool prices have been fully maintained. There has been considerable inquiry in the Canadian market from the United States and numerous sample shipments have been made so that it is very doubtful if any decline in values will take place under present conditions. It is expected that a considerable quantity of Canadian wools will be taken up by the United States Mills. Reductions from pullers are almost impossible to obtain and it does not appear that the future will see much easing in this regard as the pullers are paying just as high prices for pelts, of which there is a very small quantity offering.

Domestic wools are selling to the manufacturer at the following prices: Combing, washed, 26¼c. to 26¾c.; clothing, washed, 27½c. to 28c.; washed rejects, 20c. to 20½c.; combing, unwashed, 17c. to 17½c.; clothing, unwashed, 18c. to 18½c.; N. W. fleece, 18c. to 18½c.; pulled extras, 30c. to 31½c.; pulled supers, 26c. to 27½c.; pulled combing, 27c. to 28½c.

THE COTTON MARKET.

We stated in our last month's cotton letter, that prices would remain steady around the 13-cent level, until something new developed to show that the crop was well over fourteen and a half million. This was the case up to the 13th of December, when the government's crop estimate was published. The figures were 13,677,000 bales. With the linters and the usual underestimation, this appeared to the trade as indicating more than fourteen and a half million and the market declined immediately some 60 to 70 points. Then came the ginning report of the 20th, 12,923,000 bales ginned to December 12th Nearly 500,000 more than last year up to the date, and 258,000 more for the same period between November 30th and December 12th.

Such enormous ginnings were a surprise to the most rampant bears as well as to the bulls, who had contended that the country was exhausted and that the ginnings would decrease perpendicularly. The market became almost panicky and prices went down again very rapidly, some 60 points, making the decline about 120 points, from the 13th to the 22nd of December.

December sold at 12.01, January at 11.74 and March at 11.99.

A reaction of 40 points followed this drastic decline, during the last days of December, but prices did not hold and the December option closed at 12 cents on the 31st of that month.

After due consideration of the above figures, some conservative people believe that the next ginning, to be published on the 10th of January, may show a decrease from last year, in which case the crop could not reach the large total indicated by the previous ginning.

Moreover the bad quality of this year's cotton and the very large proportion of low, unspinable bales will certainly offset the surplus of this crop over last year. In 1911-1912, with a crop of sixteen millions, we have seen prices rise rapidly during the spring just for the same reason. Low grades were very plentiful, but enormous prices had to be paid for good cotton, which in some cases could not be obtained at any price. We underststand that, right now, good middling white can not be bought under the price which was ruling when New York juters sold at 13 cents; this means that the basis on that quality is today a full cent higher than a month ago, in spite of the decline in futures. Of course, against any advance in price and even in favor of a further decline, the poor state of the textile trade is a strong argument. Consumers are not buying except from hand to mouth. Cotton is accumulating in the South and if the invisible stocks were to turn out larger than expected, there may be a heavy pressure on the market, later on.

But so far this is not in evidence. The South does not show any sign of depression and no distressed cotton is offered from any point. It is pretty certain that the mills' consumption will be considerably under last year, when they took 14,900,000 bales. But the South knows that a larger qunatity of cotton has still to be bought by the world's manufacturers and stocks are still firmly held, especially when they consist of good grades.

Even with a crop of 14,500,000 bales the statistics do not warrant an extreme decline from present prices.

The takings of the mills to January 2nd are 5,835,000 bales. Supposing the decrease from last year's total is 900,000 bales, they will take in all 14,000,000. Deducting the takings to date as above, they still need 8,200,000 bales.

The visible supply of American cotton is 4,600,000. If the crop is to be 14,500,000, there are still to come 4,900,000 which added to the visible supply of 4,600,000 makes a total supply of 9,500,000 bales. If we deduct from this, the 8,200,000 still to be taken by the mills, there will be left on September 1st only 1,300,000 bales.

Taking into consideration the experience of past years, this surplus is far from being excessive, especially when we know what a large quantity of low unavailable stuff will be contained in that amount.

Of course, the crop may be larger than fourteen and a half million bales, but, on the other hand, consumption may be larger than 34,000,000.

At any rate, after such a heavy decline, nearly 2 cents in two months, and with the constant firmness of the Southern markets, it would be unwise to expect the market to go much lower than the present level. On any further dip, it is very likely that consumers will buy more freely, while, on any sign of decrease in the ginnings, we may see another period of bullish activity.

—"An Old Romance," is the title of the very beautiful reproduction on this year's calendar sent out by the Grosser Knitting Machine Company of New York. The picture will undoubtedly obtain the unstinting admiration of many a tired knit goods man during the coming year. A subject that will appeal to all.

BRADFORD WOOL MARKET.

(Special to the Canadian Textile Journal.)

Bradford, December 26, 1913.

In respect to actual business at Bradford, there is very little to report which shows that trade is improving. The effect of the London Wool sales has, however, taken the strength out of prices, which is reflected upon, and consequently lower offers are being accepted in some classes; 40s prepared tops have exchanged hands at 28 to 28½ cents, while 46s were rated at 31 cents. The "bear" tendency, however, is still very pronounced and prices of the raw material have not come down to the level on which the trade in Bradford would like to see it. Users are buying just what they barely want and no more, and throughout the trade production is restricted. To what extent business is being done on a low basis it is very difficult to say, but considering how completely the market is given over to "bear," sentiment rumors of heavy sales may be discounted pretty liberally, especially when formed contracts are concerned. As regards present consumption spinners are working from hand to mouth and yarn orders are scarce. Speculation is entirely wanting and so strong is the faith of lower values in the future that users can not be induced to pay any extra percentage. The amount of business done in crossbred tops has improved during the past week, but the scarceness of low crossbred tops is noticeable. Taking the market as a whole there appears to be a considerable amount of business being held back awaiting the establishment of a more reliable basis of prices, but up to the time of writing there does not appear to be anything to show that values will depreciate many degrees below present ones. The conditions in manufacturing centres are not showing the slightest improvement. The Colonial wool sales in London, on January 13, may level out things. In English wools there is no change in prices or inquiry.

In yarns business is quiet. There is inquiry for hosiery yarns and also a little for alpacas, but the staple lines in worsteds and mohairs are neglected lately and are likely to continue so until the new year. For the past two weeks quotations are very irregular and for such things as twofold 40s and single 30s, it is difficult to say what the price is. Botany spinners find it possible to get business by accepting very low rates, but some of them are standing a day and a half a week.

DUNDEE JUTE MARKET.

(Special to the Canadian Textile Journal.)

December 26th, 1913.

The quietness of the raw jute market in Dundee is very pronounced. Some of the prices which might have formerly tempted buyers while sellers were requiring higher rates, are of little interest when within their reach. Only small purchases for the past two weeks are to be recorded. First marks are offered at £35 for singles and at £34 17s. 6d. for groups December with Daisee available in middle numbers from £35 5s in the same period of shipment and single red S.C.C. assortment available at £30 5s. There is some weak spots in Calcutta hessians. For 10 oz. 40 in., 24s. 4d. is accepted, c.i.f. January-March shipment. The mill rate, however, is very much harder, but some of the cheap prices have been holding the market. The extent of dealings in all makes of cloth is very limited. A shade under 6⅝d could be easily arranged for 36-inch, 14-porter, 18 oz tarpauling. Yarns are not brisk in sal.e At 2s 11d business is done in common 8lb. cops which is still the lowest market figure, and spools at 3s 0½ to 3s 1d. In Rio yarns there is no change. Spinners rates of 3s 1d for 7 lb. warp and 3s 5d to 3s 5½d for 8lb. warp is obtained.

London Jute.

Jute remains dull and native first marks December-January. Steamers quoted £35 2s. 6d. sellers and £35 buyers c.i.f. Manilla hemp is fairly active at irregular prices, but the tendency generally is in buyers' favor. Fair current January-March shipment is quoted £23 7s 6d c.i.f.; good brown January March at £21 c.i.f. New Zealand, March-May shipment may be quoted at £26 5s, April-June and May-July shipments at £26 10s, high point fair quality January-March at £25 5s and fair quality January-March at £24 5s c.i.f. One of the principal brokers report: "Operations by the Calcutta Mills, abnormally small shipments and unsatisfactory quality reports have been important factors in the situation, but the advance in prices lately, has also been maintained by the willingness of consumers to pay full prices for anything offering in Native First marks and better grades. Lower qualities, which offer more liberally, show little improvement in prices. M in double triangle group at £35 10s, Lightnings at £30 5s to £30, Heart SCC group at £23 10s, Cuttings down to £8 per ton."

RECENT INCORPORATIONS.

The Cobourg Dyeing Company, Limited, Cobourg, Ont., Capital $190,000.

R. G. Lang & Co., Limited, Toronto, Ont.; capital $150,000. Sweaters and knitted novelties.

The Shaw-Wood Knitting Mills, Limited, Woodstock, Ont.; capital $50,000. To construct, lease, purchase, sell and operate cotton and woolen manufactories of every description.

The Cambridge Knitting Mills, Limited, Three Rivers, Que.; capital $50,000. To construct, purchase, sell, lease, and operate cotton and woolen manufacturies of every description.

Fogarty-Patterson, Limited, Montreal, Que.;capital $50,000. Dry goods commission merchants.

Victoriaville Bedding Company, Limited, Victoriaville, Que.; capital $150,000. Mattress manufacturers.

John M. Garland, Son & Co., Limited, Ottawa, Ont.; capital $500,000. To take over the business of John M. Garland, Son & Co.

J. E. McDonald, Limited, Toronto, Ont.; capital $40,000. Clothiers and outfitters. Provincial directors are J. E. McDonald, Tom Brown and J. C. M. McBeth.

J. W. Willis, proprietor of the New Brunswick Woolen Mill at Golden Grove, N.B., has installed several sock machines supplied by the Harley-Kay Knitting Machine Company of Georgetown, Ont., and intends manufacturing stockingettes.

THE USE OF AMMONIA IN FINISHING WOOLEN FABRICS.

The action of ammonia as an alkali for the neutralizing of fatty acids is strong. It emulsifies these much better than potash or soda, and it also combines very readily with the fatty acids to form a soap, a process known as soaponification. On account of its high volatility, however, it is not suitable for the manufacture of soaps for textile purposes. It is largely used, however, as an agent for the emulsification of fatty matters in combination with other alkalies. For instance, its addition increases very materially the efficiency of other alkalies in scouring, and it may be also employed for the same purpose in connection with soap. When ammonia is used on cloth charged with soap, there is at the begining of the scouring process a much larger volume of foam formed, while the dirt will rise better and quicker, and consequently the cloth will be cleansed more effectively. Ammonia is not only useful in that it causes the dirt to become detached more readily, but it also expedites the after rinsing out of the soap, an important feature in connection with goods which have to be subsequently dyed.

It is well known that traces of soap will nearly always remain in cloth in spite of the most thorough and careful rinsing, and all dyers are aware that when these residues are brought into contact with acid, they are at once split up into free fats which act as a resist on the cloth, giving rise to subsequent streaks and stains. The addition of a little ammonia just before the final rinse will cause this soap residue to become loosened up and detached from the fiber so that it is readily cleared away with the wash waters. So important is this that some dyers, in dyeing scoured material, always give a preliminary boil out with a weak ammonia bath in order to make sure of a perfectly clean cloth.

When added to the washer, the ammonia should be diluted with about three times its bulk of water. One-half of this solution should be added at the beginning of the washing operation in order to help raise the dirt from the cloth, and then when the worst of the dirty lather has been carried away, the rest of the ammonia should be added. This latter portion will cause a strong lather to form again, carrying away with it the last traces of soap. If fullers earth is employed, a little ammonia is also a very beneficial addition.

There is also but little danger of modifying the colors of dyed goods by using ammonia in the wash waters, as the solution is a very dilute one. Alkali blues, however, will not stand the ammonia treatment, without having a final acid bath given to bring back the color to its original depth. With respect to the handle or feel of the goods, ammonia has the least effect of any of the alkalies, and it was on this account that many of the old time scourers continually employed stale urine which was known as "old wash" or "lant."

In the use of ammonia, however, it is necessary to maintain one precaution; it should not be allowed to come in contact for any length of time with copper or brass fittings. Under these conditions the metal is acted upon by the ammonia to form a soluble copper ammonium compound. In the case of white cloth the stain at first produced by this compound will scarcely be noticeable, but as soon as the goods are dyed, the stain shows up in a marked degree. It is probably due to the fact that the copper ammonium salt increases the affinity of the cloth for the dye, after the manner of a mordant.—(Textile Manufacturer's Journal.)

SMART-WOODS BOND ISSUE AUTHORIZED.

At a special meeting of the shareholders of the Smart-Woods, Limited, held in Montreal recently authorization was voted for an issue of $2,500,000 six per cent. bonds, of which it is the intention to issue only $1,500,000 now. By the issue the Smart-Woods Company places itself in an exceptionally strong position, as it secured ample working capital, not only to handle the requirements of its growing business throughout the Dominion, but also to operate as its own cotton department, the Empire Cotton Company, which it now owns outright. In addition the company will pay for large extensions recently carried out, which include the erection of a new factory building in Winnipeg at a cost, including land, of about $250,000, also an important extension to the Montreal plant on Mullin street, at a cost of $150,000.

The business of the Smart-Woods Company has shown steady and consistent growth, and its sales for 1913, it was announced at the meeting, show an increase over the previous year, notwithstanding the unfavorable industrial conditions that have prevailed.

With its chain of plants in the principal centres of Canada, the company is in a favorable position to meet the growing demand from the trade, and also gives it a very valuable holding in the commercial sections of the different cities. In Montreal the company has extensive plants on Mullin street, with one of the best siding facilities in the city; the Toronto plant is located on Logan Avenue, from which there is access to all railways; the Winnipeg plant is located within one block of the main street, and three blocks from the Royal Alexandra Hotel; the Ottawa plant is located in the city of Hull, where there is plenty of good labor. The company's new cotton plant is located in the town of Welland, Ontario, on the main line of the Grand Trunk Railway, possessing special shipping facilities by rail and water to all parts of Canada.

DOCKHAM'S TEXTILE, CLOTHING AND CUTTING-UP TRADE DIRECTORY OF CANADA.

The 1913-14 edition of this directory just to hand published by the Dockham Publishing Company, Boston, Mass., is very complete and should be of much value to mill owners and suppliers here and elsewhere. The directory includes the textile, cutting-up and departments embracing all the manufacturers in Canada of cottons, woolens, silks, jute, hosiery, knit-goods, etc., with full detailed reports, as well as dry goods commercial and manufacturers' agents, yarn ,cotton and wool dealers, manufacturers of clothing of every kind and supplies, jobbers and department stores. The directory is very complete and can be had for $1, postpaid.

TABLE SHOWING THE IMPORTS OF RAW AND MANUFACTURED TEXTILES INTO CANADA FOR THE MONTH OF SEPT., ACCORDING TO THE LATEST FIGURES COMPILED BY THE DEPARTMENT OF TRADE AND COMMERCE

	Imports for Sept. 1913	Imports for 6 mos. ending Sept., 1913	Imports for Fiscal Year Ending March 31 1913	Imports for Fiscal Year Ending March 31 1912
Imports of wool and manufactures of, into Canada:				
Blankets, pure wool	23,842	105,303	141,342	65,015
Cassimeres, cloths and doeskins	144,180	1,200,277	3,221,612	3,449,001
Coatings and overcoatings	99,269	769,949	1,216,752	1,314,945
Tweeds	82,742	762,051	1,473,463	1,514,097
Felt cloth, N.O.P	6,012	23,473	31,920	27,276
Flannels, plain	18,742	91,836	126,141	93,142
Knitted Goods, N.O.P	198,182	885,754	1,507,032	973,264
Bed comforters	21	6,044	3,674	593
Railway rugs	7,775	50,232	64,141	57,228
Shawls	15,687	65,667	131,576	87,389
Shirts	7,658	43,421	61,652	38,875
Socks and stockings	230,978	956,957	1,664,825	1,247,047
Undershirts and drawers, N.O.P	92,443	205,806	82,567	122 931
Yarns, 30c. lb. and over	147,052	1,362,671	2,240,973	1,886,268
Yarns, N.O.P	22,034	166,570	305,328	252,745
All fabrics and manufactures, N.O.P	862,146	5,646,292	10,435,013	7,069,152
Lustres, mohairs, alpacas and Italian linings	91,313	720,338	1,324,483	1,191,246
Women's and children's dress goods	18,202	107,593	221,287	197,722
Clothing, women's and children's outer garments	126,704	353,793	528,130	492,375
Clothing, ready-made, N.O.P	342,393	1,240,197	2,418,111	1,754,223
Carpets, mats and rugs	265,691	1,360,995	2,987,748	2,282,370
Felts, pressed	28,601	264,468	389,382	299,435
Worsted tops—dutiable	......	1,928	445	2,676
Noils and worsted tops, N.O.P. free	104,533	570,857	980,432	689,304
Wool, not further prepared than washed, free	143,879	1,001,772	2,068,028	1,555,395
Yarns, free	....	7,044	19,358	10,932
Imports of Cotton and manufactures of Cotton, into Canada:				
Cotton cordage	2,719	16,234	37,192	63,349
Duck, over 8 ozs., per sq. yd., N.O.P	47,675	490,779	1,131,705	609,467
Embroideries	55,931	410,980	1,549,711	1,482,746
Gray, unbleached cotton fabrics	97,538	850,481	1,061,683	626,806
White or bleached cotton fabrics	249,927	1,619,880	3,003,130	2,393,633
Tailors' hollands of cotton and towelings in the web	20,290	111,103	267,492	167,641
Fabrics, printed, dyed or colored, N.O.P	434,324	3,031,754	7,042,249	5,829,166
Jeans, coutilles and sateens for use in corset manufacture	17,616	105,407	301,365	269,697
Handkerchiefs	91,306	375,042	832,652	620,048
Batts, batting and sheet wadding	3,075	14,457	33,701	24,789
Bobbinet plain, in the web	5,751	26,153	55,895	49,272
Knitting yarn, N.O.P	12,905	158,461	207,008	144,558
Warps	245	2,457	6,099	4,666
Seamless bags	1,740	16,633	63,699	26,643
Sheets, bed quilts, pillow cases and damask of cotton in the piece, uncolored table cloths or napkins of cotton	128,762	667,281	1,109,557	290,800
Shirts of cotton	37,045	275,001	655,976	468,456
Sewing thread	54,530	312,067	700,290	705,881
Crochet and knitting cotton	12,132	34,377	39,964	33,890
Other thread, N.O.P	4,499	98,043	102,264	49,681
Clothing N.O.P	245,128	1,602,303	3,044,538	2,435,746
Blouses and shirt waists	12,041	95,141	232,067	168,606
Cotton bags, N.O.P	23,300	102,874	151,966	197,609
Lace	91,396	496,056	1,685,532	1,328,024
Shawls	103	3,268	2,583	3,091
Socks and stockings	47,327	551,626	842,518	789,453
Tape, uncolored and colored	6,320	35,782	13,123	8,201
Towels	40,414	243,196	472,801	316,088
Undershirts and drawers	6,307	62,969	115,440	61,467
Uncolored cotton fabrics, bleached	3,306	23,427	37,851	38,169
Velvets, velveteens and plush fabrics	113,047	683,263	996,310	765,559
Other manufactures of cotton, N.O.P	123,135	656,204	1,270,788	788,810
Raw cotton, free	227,237	2,440,389	8,735,191	7,932,467
Yarn No. 40 and finer, free	73,286	561,023	1,231,953	1,138,306
Yarn, polished or glazed for manufacture of shoe laces, free	....	1,126	1,435	2,824
Imports of Silk and manufactures of Silk, into Canada:				
Fabrics, N.O.P	604,172	3,110,314	5,762,223	4,782,372
Fabrics, for manufactures of neckties	16,116	97,710	170,625	....
Handkerchiefs	20,896	85,381	114,231	83,300
Blouses and shirt waists	11,980	32,947	90,140	36,691
Clothing	173,254	544,489	1,021,134	814,549
Silk, spun, N.O.P. and in the gum not more advanced than single team or thrown organzine, not colored	3,735	44,023	53,605	60,640
Silk, in gum or spun for manufacture of ribbons and shoe laces	....	294	1,595	2,168
Sewing and embroidery silk	10,955	61,978	145,815	51,861
Shawls	926	3,194	13,647	16,840
Shirts	1,943	6,720	13,824	7,712
Silks—N.O.P	44,572	208,064	568,090	310,167
Socks and stockings	18,088	129,410	280,940	182,016
Underwear and drawers	2,948	5,728	4,304	2,824
Velvets and plush fabrics	110,202	437,960	555,434	738,956
Artificial silk, free	14,249	101,437	....	....
Imports of Jute, Fax, Hemp, and manufactures of same into Cana				
Bags or sacks	37,970	194,779	294,495	289,052
Carpetings, rugs, mats	4,898	36,116	85,119	71,695
Uncolored damask of linen in the piece, stair linen, diaper, doylies, tray cloths, table napkins and cloths, quilts and sheets	94,690	543,141	1,192,979	1,056,113
Handkerchiefs	33,710	112,974	303,517	242,346
Towels	18,798	112,541	225,697	215,227
Fabrics, brown or bleached	7,308	62,772	175,201	123,720
Fabrics of flax, unbleached N.O.P	29,430	216,669	457,573	282,148
Tailors hollands of linen and towelling in the web	14,477	100,419	231,257	182,956
Linen clothing N.O.P	2,269	15,852	18,713	19,150
Linen blouses and shirt waists	140	1,244	301	550
Linen thread, N.O.P	19,836	125,214	273,059	231,169
Linen shirts	41	926	4,714	3,410
Tapestry, jute	171	468	683	273
Jute cloth, uncolored, not finished	2,661	3,104	21,326	1,215,702
Fabrics of flax, printed, dyed or colored	2,223	19,436	45,198	32,891
Other manufactures of flax, or hemp, N.O.P	4,261	23,443	92,160	73,425
Manufactures of jute, N.O.P	23,476	188,068	359,250	261,035
Linen yarn, free	3,013	13,823	58,825	62,489
Jute cloth as taken from loom, free	158,306	1,481,697	2,601,785	1,062,173
Jute or hemp yarns, free	21,092	171,676	481,747	248,285
Jute canvas, uncolored, free	145,927	1,282,643	1,424,011	366,977
Miscellaneous Imports:				
Knitted goods of every description, N.O.P	15,428	98,544	118,536	34,449
Binder twine, free	201,107	2,778,744	2,320,351	2,136,841

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

New York Office, 206 Broadway.

Published on the second Tuesday of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI — MONTREAL, FEBRUARY, 1914 — No. 2

CONTENTS.

EDUCATION IN THE TEXTILE INDUSTRY

An address on this subject, delivered by Mr. Oscar Hall, of Bury, England, at the Manchester School of Technology, brings out several points that are of special interest. He advocated the establishment of a faculty of textile art and science in the English universities, which feature has often been given prominence in this country by those interested in the development of the textile industry and furtherance of textile art and science in this country.

The speaker said he believed that the United Kingdom now possessed far more textile schools than Germany, but many of the details of our system of technical education needed perfecting. The number of day students—students drawn from the class which provided the present owners and managers of mills—was not satisfactory. It was true that our textile industry first achieved greatness through its practical men, but other countries, desiring to be our competitors, made our practical achievements the starting-point for their teaching theory. After a period of panic we too began technical education, and it had achieved great results, though with great waste. The waste was largely due to the education being first applied to the lower instead of the higher ranks of the industry. The managing class did not trouble to obtain it, and the artisans had not the opportunity to put their knowledge into practice. For all that, the desired object had been attained, at least in part, and there had resulted a general recognition that technical and higher education was required in all departments of the industry.

At the same time many of the cleverest of the workers had pushed their way into the managing class, in spite of opposing prejudice, and had demonstrated the advantage of technical knowledge, combined with practical experience. If the apathy of the managing class could be broken down and the doubt of the usefulness of older but better educated young men removed the progress of the industry would be faster. Europe had seen in the Middles Ages the supremacy of brute force, and to-day we saw the supremacy of capital. The next ascendancy would be that of the trained brains in industry. He foresaw the possibility at some future time of the fixing of a legal rate of profit and special taxation, upon any excess profits, but it would take a super-Lloyd George to snatch away the fruits of an ascendancy of trained brains.

For a thorough grasp of all the departments of the textile industry a man required as much knowledge as a doctor or a lawyer, and the modern universities of the North should make the same provision for the training of textile experts as they did for the training of medical men and lawyers.

The Development of Our Sheep Industry

The reports of the convention of United States wool growers held recently at Salt Lake City contains much valuable information and many suggestions that might well be applied to existing conditions in this country. Wool growers in the United States are now facing a situation that will demand a somewhat radical change in the methods that have been followed in the sheep-raising industry in that country in order that they might conserve and develop the industry along profitable lines, for under the late United States tariff domestic wool had fallen into very bad repute and for that reason the wool growers were carrying on the industry as a losing proposition as far as the wool end is concerned.

In the Western States the merino sheep is one of the principal breeds, and one conclusion reached by the convention was that the merino sheep must give way to the larger bodied mutton sheep. One prominent sheep-raiser held that the merino wool grower will be eliminated from the ranks of United States farmers, and he advised the growers to devote every attention possible to proper breeding methods, to better preparation of wool and mutton for market, and to improved methods of marketing.

A similar situation exists in Canada. The mutton end of the business must be regarded as the principal feature in the sheep-raising business, and in that case wool is a net gain to the industry, the mutton bringing a sufficient income to take care of the expense of raising the sheep and the interest on capital. Such being the case, Canadian sheep-raisers have little to fear. The demand for mutton is far in excess of the domestic supply, although this condition is to be deplored. The farmer will have to make the business a primary one instead of an incident to general farming, save in so far as a few sheep may serve to consume spare fodder, and to furnish a desirable outlet for some labor not otherwise applicable. Instead of paying only sporadic attention to breeds the grower will have to apply the methods resorted to in Australia and in other countries where the business of sheep-raising for both mutton and wool has been scientifically carried on.

Tariff has but little to do with the success of the wool-raising business. In the United States, even under the very high rates of duty that have existed, the industry has declined and the importation of foreign wool has rapidly increased during recent years. The prices received by the wool growers in the Western States for their clips have in many cases been lower than those paid in Canada, where wool is on a practically free basis, and in few cases have the prices been higher. The United States Tariff Board appointed under President Taft, clearly indicated in its report the decadent state into which the wool business had slipped under the high duty of the past, and the indifference with which the producers in general regarded the whole situation. This was emphasized at the recent convention at Salt Lake City and the consensus of opinion was that if the sheep industry was to be made a success in the United States, the proper steps must be taken by those engaged in the business to put it on an efficient basis by showing an intelligent interest and putting into effect and carrying out the proper methods of breeding, preparing for market, and marketing.

The industry is growing in favor in Western Canada and the attempts that are being made to put it on a successful basis are meeting with some encouraging results. That the business can be successfully carried on in practically all the Provinces and made to pay a fair profit to those engaged in it is never in doubt. Past performances and recent investigations confirm this statement and emphasize the foregoing statements on the subject.

The Parcels Post in Canada

The announcement made by the Postmaster-General that the parcels post system would go into effect in this country on the tenth of this month has been received with a considerable amount of satisfaction by manufacturers and businessmen alike. For many years industrial concerns, distributors, merchants and in fact all those who make or receive shipments have been held up and charged exorbitant rates by the express companies, and although the parcels post system only gives relief to a partial extent, that is, on the small parcels, it is none the less welcome.

As far as textile mills are concerned, the benefits that will accrue from this new system will be comparatively small. However, the aggregate saving will no doubt mean considerable. Practically all the mills are continually sending out samples of their products and in most cases these samples have had to be sent by express on which the rate charged has been somewhat exorbitant. Under the new system a great deal of the unpleasantness and difficulties experienced will be overcome. The small shipments will be made much more satisfactorily and be a saving to the manufacturer. Another feature, which is ever present under old conditions, is in the matter of securing repairs and parts. Much inconvenience is sometimes caused by the unsatisfactory methods of the express companies, and in many cases the loss that accrues from having the machines stopped, when under proper conditions such is unnecessary, will undoubtedly appeal to many of the machinists and departmental heads who usually are blamed for such stoppages, and the consequent falling off in production .

There are, of course, many features of the system, as announced, that will have to be improved upon in order that it may work to the best advantage of the people, but we must not be too prone to criticize until the system is put into working order, and the initial difficulties are overcome. The efforts that have been made to avoid red tape regulations are to be commended for the more simple the regulations are, the greater are the chances for the proper success of the system.

The success of the parcels-post system in the United States and Great Britain has given our legislators good working models. In the United States it has been instrumental in making for the reduction of express rates, the new system of interstate express rates on a scale sixteen per cent. lower than those formerly prevailing, going into effect on February 2nd. It is to be hoped that the system will have a somewhat similar effect here and that it might soon be enlarged to cover a much larger field than the present plans embraces.

Standardize our Wool Clip

A plan to standardize the United States wool clip that was proposed at the Convention of the National Wool Growers Association held in Salt Lake City a few weeks ago might well be given serious consideration by all those interested in the Canadian wool clip. The plan proposed was to standardize the United States clip so that it will be eligible not only for Chicago, Boston, and other cities in the United States, but for the great London markets as well. The proposition was to import Australian shearers and graders, who are expert in taking off, grading and packing clips, so that they will meet any competition. Under the present methods, United States wool cannot find a market outside of the United States to any extent without first being graded at Boston or Philadelphia.

This plan has often been advocated by Canadians, who have the interests of the wool growers and the wool manufacturers at heart. No attempt has been made in the East at even the provision of shearing stations, let alone the provision of expert graders and packers, and the instruction of wool growers, which would save them thousands of dollars annually even with the small flocks they now have. Last year in Southern Alberta a shearing station was equipped near Lethbridge at Chincoulee and the number of sheep sheared was over 50,000. This year it is expected that upwards of 100,000 sheep will be sheared at this station so that an excellent chance will be provided for the trying out of some system of export grading and packing. There is a market in Canada for every ounce of wool grown in Canada at the present time and, even if such was not the case, if our wools were properly graded and packed there would be no difficulty in disposing of them on the great wool markets in Great Britain. Our clips, when properly marketed obtain a good reputation and if manufacturers in other countries could depend on getting Canadian wools season after season in good condition, the Canadian wool grower would have little to fear regarding the disposing of his clip. What is needed in this country is, first the instruction of the wool growers in the proper methods of sheep raising, the provision of efficient grading and marketing methods and latterly more sheep.

Editorial Comment

In the death of Mr. William Algie the woollen industry has suffered a severe loss. Mr. Algie was always one of the most active members of the industry, and had a great belief in Canada and the capabilities of Canadians. A most pleasant man to meet and a worthy friend or adversary on most questions of either general or local interest. His very sudden death is much regretted and the Canadian Textile Journal wishes to give expression to the genuine sorrow felt by the entire industry.

* * * *

The present trade depression is being felt rather severely by the majority of our woolen and worsted mills, and the stringency is being aggravated by the fact that the English mills, feeling the effects of the reversion of the general trade depression, are rushing Canada with a great deal of vigour, taking up what little trade there is passing. In such times as these the English mills are fearless of competition, and do not hesitate to cut prices or take orders they would turn down in good times. It is regrettable that our fiscal policy allows this dumping to go on to the detriment of legitimate domestic industry, for the present condition is none other than an evasion of our Dumping Clause in the Customs Act. Of course, this goes on at all times, and is particularly flaring in the case of woollens and worsteds, but under conditions such as they now exist, it is more prevalent than ever. It is about time that the Country was waking up to this state of affairs and for steps to be taken to enforce the already low tariff on woollens or worsteds to the farthest proper extent. In such cases the Country is always the loser, only a very small proportion being either directly or indirectly benefitted.

CARD CLOTHING

By E. INGHAM, of Cleckheaton

Paper Read at the 10th session 1912-1913, of the Huddersfield Technical School Textile Society

I propose, in dealing with this subject, to commence with the raw materials from which Card Clothing is made, describing the different processes of manufacture, to the finished Card Clothing. I have with me samples of all the raw materials mentioned, in all stages of manufacture—and I have also prepared a few lantern slides which will serve to show you striking features that could not well be described to your satisfaction—also I have a card setting machine which will, during the evening, be running so as to give you a practical demonstration of the making of Card Clothing.

Hardened and Tempered Steel Card Wire.

We will first deal with hardened and tempered steel card wire.

This wire is specially prepared for the purpose—the percentage of carbon that is mixed with the metal is generally specified—and the steel is delivered to the rolling mills in billets, a billet being about 3ft. 6in. long by 3 in. square. This is heated in a coke furnace, and while at one heat is passed through a series of rollers which reduce the size of the billet to what is known as the card wire rod—this on the card wire gauge being equal to No. 5 or 7-32in. diameter.

It is in this state that the card wire rod is delivered to our works, and the first process to which these rods are submitted is that of cleansing, as they are sometimes coated with a hard scale, also with rust and dirt. This is done by an acid which eats away the scale, leaving a perfectly clean rod which is so necessary for the successful drawing of wire. After cleaning the rod, the process of drawing the wire commences. I ought at this juncture to make it perfectly clear to you that in drawing the wire no waste takes place—the wire being simply elongated. The drawing of the wire through a few holes has the effect of making it very hard and it is imperative that at this stage it should be annealed or softened, so as to give back to it the softness that will permit of its being still further drawn down to any finer or smaller size. During the process of annealing the most extreme care has to be taken to protect the surface of the wire, which must be kept as smooth and bright as possible, and, with this end in view, cold air must be prevented from attacking the wire whilst it is under the high temperature which is necessary in annealing. The process of annealing and drawing goes on time after time, as I have described, until the required size of the wire has been obtained, when it is then ready for hardening and tempering.

This is a very interesting and important process, as the life of the Card Clothing and the efficiency of the carding which is done in your mills depends very largely on the hardening and tempering being properly done. The wire is run at a suitable speed through a Bunsen flame, the speed of the wire and the temperature of the flame being regulated according to the thickness of the wire, so as to attain the proper temperature. After the necessary heat has been obtained the wire is instantly plunged into a bath of oil, on emerging from which it is in a very brittle state—too hard for the purpose of card making. To reduce this hardness the wire is passed through a heating agent, for instance a bath of lead, which also gives it a suitable temper so that it can be bent into card teeth. The wire is then ready for taking to the card setting machine.

Foundations.

The foundations used principally in your trade are leather, a cloth foundation with a vulcanised india rubber face, and a felted foundation. The hides from which card leather is obtained are specially tanned and prepared for the card trade.

There are several ways of tanning hides, ranging from the crude methods as practised by the native Indians, to the up-to-date scientific and chemical methods of the laboratory. The most common processes, however, are by chemical tannage, a mixed tannage, and the oak bark tannage. The only reliable method for tanning the hides for Card Clothing is the oak bark process, and this you will more easily understand when you know the difference in the time taken for the tanning fluid to penetrate into the pores of the hide. A chemically taned hide can be procured in a few weeks, whereas an oak bark tanned hide takes eight or nine months to prepare.

When the tanner gets the green hide from the market it is in a very dirty condition—the hair is matted together with flesh and animal refuse. Therefore, the first thing to do is to clear all this refuse away. The hide is put in a lime pit where the lime loosens the hair and causes all objectionable matter to stand loose on the pelt, after which both hair and flesh are carefully shaved away. The hide is then put into what is known as the "bates," which is prepared from the dung of fowls, etc. This is to delime the hide and prepare the pores for receiving the bark solution. This is started weak, the hide being transferred from one tan pit to another at intervals, each succeeding pit being stronger than the previous one.

The hide being thoroughly filled with the tanning solution is put to dry and is then ready for the currier. So you will see that the old adage still holds good, that "There is nothing like Leather" (if it is only "good" leather).

Only the best portions of the hide are suitable for this purpose, and quite one half is cut away as being unsuitable for card leather. After this waste has been cut away from the hide it has then to pass through the process of currying. In tanning the hide, the bark leaves a residue in the leather which is objectionable and which has to be removed. This objectionable residue is known as "bloom" and to remove it the hide is first of all thoroughly soaked in water and then scoured by scouring machinery which removes all the objectionable matter.

The leather is then dried and prepared for a dressing of cod oil and tallow which feed the leather, giving it that substance and flexibility which is required in leather for card making. This grease is made, by machinery, to thoroughly permeate the leather—then a considerable length of time is allowed for it to soak naturally into the leather—after this the leather is passed through machinery for solidification.

Cloth Foundations.

The vulcanized foundation used is made up of different plies of cotton and linen with a ply of india rubber. The cottons most generally used are woven with a two-fold warp and a single weft, and the yarns used in the linen are a single linen warp and a single cotton weft. These plies are attached to each other by means of natural india rubber. The rubber used is "para rubber" and is of the very best quality that is grown—it is grown in Para in North Brazil.

Whilst speaking on the subject of rubber I should like to enter into it most fully, as india rubber is one of the most wonderful products in the whole world, and is also one which, in its natural state, is very little known, so with your indulgence I will describe all the stages through which rubber has to pass from its growth to its final use in the foundation of Card Clothing.

The para rubber which is used for this purpose is of virgin growth and is obtained from the large forests in the country I have previously mentioned. The rubber trees grow to a height of about 60 to 80 feet and the rubber itself is taken from just underneath the bark of the tree. Along the whole length of the trunk of the tree a narrow groove is made in the bark, just deep enough to reach to the sappy wood of the tree. At the bottom of this groove and fastened to the tree is a small vessel. This vessel collects the rubber which exudes from the tree in what is called the latex, which is a thick fluid of a pale yellow clour.

The next process is the coagulation of the latex, and the curing of the rubber. This curing process is carried out by the aid of palm nuts. A conical structure is used with an aperture at the top—the palm nuts are burnt at the bottom of the cone and the smoke from these pours in thick volumes through the opening at the top.

An instrument is inserted into the latex so as to become coated with rubber — this is then held in the smoke for a few moments — only this short time is necessary for the thin layer of rubber to become cured. This is done successively until what is known as a biscuit of rubber is obtained. I have here a biscuit of rubber exactly as it has been received from the rubber forests and in this state it is imported into England and into rubber works which use this class of rubber.

The first thing to be done is the cleansing of the rubber, as during its collection and curing a quantity of bits of bark, grit, and other impurities become mixed with it. To effect a proper cleansing of the rubber it has to be passed through a series of heavy crushing rollers which break it up, and at the same time a stream of water is run on to it to wash away all dirt and foreign matter wheih may be in the rubber. When it has been thoroughly cleansed it is rolled out into sheets and then placed in a stove. The stoving of the rubber answers a two-fold purpose—it removes all moisture that remains after washing, and makes it slightly of a sticky nature. The rubber is then absolutely pure and is ready for any purpose for which it may be required.

One purpose for which it is required is to make the rubber cement, which is used to attach the separate plies of the foundation, and in order to do this it has to be dissolved. A given weight of rubber is placed in a large vessel or mill along with a given weight of rubber solvent such as naphtha, benzine or other volatile spirit. The vessel must have a stirring or mixing appliance so as to get a homogeneous mass of dissolved rubber. The dissolved rubber is then spread by a suitable arrangement on to the separate pieces of cotton or linen, giving them a thin coat of cement. After this has been done the naphtha which still remains in the rubber must be removed and to do this the cemented cloth is passed over hot plates — the spirit, which is very volatile, evaporates, leaving a very thin coat of para rubber on the cotton.

This process is carried out successively on the different pieces of cotton, the required number of which are then put together, passed through heavy rollers, and by pressure, made to unite by means of the rubber cement, giving the solid foundation with which you are familiar.

Vulcanized Face.

In making a vulcanized face a different method has to be adopted. The rubber, however, is spread on to the cotton in a similar manner to the cement, but before doing so a percentage of sulphur is thoroughly mixed with it to prepare it for the process of vulcanization, which has to take place when the proper thickness of the face has been obtained — the required thickness is obtained by means of a succession of coats of the mixture of rubber and sulphur. This vulcanization is one of the most wonderful discoveries that has ever been made in connection with india-rubber, as it completely alters its nature. The process consists of thoroughly fusing the sulphur with the rubber.

The cotton, coated with rubber and sulphur to the desired thickness, is placed in a vulcanizing pan and completely immersed in water, steam is then turned into the pan and the temperature gradually raised to about 270 deg. The cotton and rubber are allowed to remain in the pan at this temperature for three or four hours, after which time the rubber and sulphur will have become thoroughly mixed.

This process creates an entire chemical change in the rubber, rendering it impervious to heat and oil, and also giving it greater elasticity. For example, if you take a strip of natural rubber and stretch it out to any given length, then apply heat, the rubber will retain the length to which it has been elongated, whereas if the same treatment be applied to vulcanized rubber it will go back to its original length, thus proving what a valuable property vulcanization has given the rubber. After vulcanization has taken place, the face is ready for attaching to the cotton back or foundation, and this is done as I have previously described.

Action of Oils on Rubber.

While dealing with the question of india-rubber, I should like to trespass a little longer on your time and explain the action of different kinds of oil on same.

As I have previously pointed out, india-rubber is of vegetable growth, and it is a most singular thing that an oil of a similar origin has no injurious effect upon it—whereas an oil of a foreign nature, such as a mineral or fish oil, will instantly set up decomposition of the natural rubber, and will ultimately destroy it completely. The vulcanization of the rubber prevents decomposition, and neither a mineral oil or a fish oil has the slightest effect on the rubber whatever.

Cotton and Felt Foundation.

Where a cotton and felt foundation is used the method of attaching the different plies is the same, viz., by india rubber. The felt used is not a woven material with a felted surface but is a material entirely felted together which gives a uniform and regular support to the teeth of the Card Clothing. This felted ply is attached to the cotton and linen back by rubber cement.

There is another kind of cement which is used in place of natural rubber and that is a special cement made of glue. This glue cement I would strong ly advise to be always used for felt foundation, because the oil that is present in the wool you are carding in course of time permeates the felt and gets on to the cement. If it is a rubber cement, decomposition is instantly set up, as I have previously mentioned—whereas if a glue cement has been used no oil whatever has any effect upon it.

Card Making.

I now propose to deal with the actual making of the cards, but do not intend spending much time on this subject as I have a card making machine here which will give you a much greater and better idea of the process than any description of mine, and you will all be at liberty to examine the machine. I will, however, give you the outlines of the process so that when you see the machine running you will be able to understand the working of same much better.

The hardened and tempered steel wire is put on the machine, a feed motion takes hold of the end of the wire and feeds it into the machine evenly. This feed motion is capable of adjustment so that any desired length of wire has been fed, it is gripped by the tongue and the crown—the crown forms the base of the tooth —two grooved fingers to which is attached a cutter then come forward, the cutter severs the given length of wire, and the fingers, moving forward while the crown is stationary, form a small staple. While this is taking place the pricker blades, which are exactly the same width as the crown, pierce the foundation, into which the crown and fingers, moving forward, insert the staple. The tongue and crown still retain their hold upon the base of the tooth and before being released, the wire is passed through crokers or small hooks on the other side of the foundation, which by a backward movement gives the bend and suitable angle to the tooth.

The process of card making has undergone great improvements during the last 20 or 30 years, but the fundamental principles remain exactly the same as when the card setting machine was first made 60 or 70 years ago. The most up-to-date machinery maintains a speed of 400 to 450 revolutions per minute, meaning that the teeth are inserted into the foundation at this rate.

Grinding.

There are three most essential things which are necessary to obtain the best results in grinding, viz., extreme care, the proper surface speed of the grinding roller, and good emery.

I think after my description of the whole process of card making, you will agree that a card is delicate material and requires delicate treatment. This is why I mention that extreme care is required in the grinding, which should not be too heavy. In order to get good grinding, the emery fillet should cut away the metal from the point of the wire so as to leave it clear and sharp—this clear sharp point cannot be obtained unless the proper speed and suitable emery are used. I would reccommend a speed of 600 feet per minute, and the counts of the emery should be 14's for the Breast part, and 16's for the 1st and 2nd Swift parts of the Scribbler also 1st Swift on the Carder, and 18's for Last Swift and Condenser.

With reference to the fit and angle of the teeth, this is very largely, of course, a matter subject to individual requirements—as you are aware that what is suitable for one class of trade is not suitable for all. I should like, however, to say a few words about the angle of the wire

The one that is most suitable for this district is pricked at an angle of 68 deg. and also bent to the same degree. When these angles are adhered to the point of the tooth extends beyond the base. This means that when actual carding is taking place the tooth is pulled back owing to the strain of the materials, and whilst the tooth is kept in this position it stands higher than when at rest.

This is a point to which I would particularly draw your attention, when setting the Card Clothing, for instance, the tooth can be lifted quite 6-1000'', and if the same is taking place on the Swift and Doffer a difference of 12-1000'' will be made at the setting point. This is a complex matter which I would specially recommend for your consideration.

In conclusion, I would like to emphasize two points which are of great importance to you who have to deal with Card Clothing, and these are—careful and efficient regarding of all the clothing under your care, and always bear in mind the effect of different kinds of oil on cloth foundation which contains natural rubber cement. It is also important when you are setting the Cards are being ground, that you always bear in mind the position of the tooth when working as compared to the position when at rest.

HEWSON'S PURE WOOL IN DIFFICULTY.

The reports that have gained publicity regarding the present standing of the Hewson's Pure Wool Textiles, Limited, Amherst, N.S., have attracted some interest among the trade. This company was organized some two or three years ago under its present name, the control being in the hands of the Stanfield's Limited, of Truro, N.S., Mr. Frank Stanfield being president. The company's authorized 6 per cent bonds are $500,000, and the issued $350,000. The capital consists of $500,000 authorized and subscribed 7 per cent. preferred stock and $250,000 of common.

At the special general meeting of the shareholders held in Amherst on January 9th, the financial statement submitted showed a loss during the past year of $57,835.20, although the manufacturing end of the business made a profit of $25,000, which was eaten up by the heavy overhead charges, the bond interest and other fixed charges, leaving the large deficit stated. At this meeting the directors submitted a lengthy report dealing with the past history and with the general condition of the industry, which report as well as the financial statement, came up for much discussion. A committee was appointed to investigate the position of the company and to report on the advisability of continuing the company in active operation and to suggest ways and means whereby it would be possible to do so.

A later meeting was held on January 25th, at which the resignation of one of the members of this committee, Mr. B. A. Weston, of the Eastern Trust Co., was accepted and Mayor F. P. Bligh, of Halifax, was appointed in his place. The meeting, which was fairly well attended, was adjourned until such time as the committee may be able to file their report, a copy of which is to be sent to each shareholder. It is understood that the president, Mr. Stanfield, came in for some sharp and adverse criticism by a number of the stockholders present, who are not at all satisfied with the manner in which the business of the company has been conducted, nor with the present outlook.

SETTINGS FOR HEAVY WEIGHT CLOTHS

By WILLIAM EARNSHAW

Specially written for the Canadian Textile Journal.

In my article on the construction of heavy weight cloths I did not enter into the setting of them, and in this, I propose to give approximate settings for the different constructions of cloths described in that article. All these settings are intended for a finished width of 56 inches, within lists, but of course they are subject to variation caused by the quality of material used, and as stated above, are only approximate.

A cloth weighing 28 ounces per yard, on a four-leaved twill weave, can be produced by using 1 run yarn for warp and filling, in a 7½ reed 3 ends in a reed, 68 inches wide in loom, with 22 picks per inch; to lose in scouring and fulling 20 per cent with a shrinkage of 5 per cent.

The same weight on a six-leaved twill weave, may be made with 1¼ run yarn in a 6½ reed, 4 ends in a reed, 70 inches wide in loom, 28 picks per inch, and the same loss and shrinkage as above.

An eight-leaved twill made with 1⅜ run yarn, in a 7½ reed, 4 ends in a reed, 70 inches wide in loom, 30 picks per inch, and the same loss and shrinkage, would give a slightly heavier cloth.

A 20 ounce worsted cloth, with a four-leaved twill weave, may be made from 2-18s yarn in a 9½ reed, 4 ends in a reed, 72 inches wide in loom, with 42 picks per inch; to lose 8 per cent in scouring and fulling, and shrink 8 per cent. This fabric should have a natural serge finish.

Weave plan figure A. is suitable for a woollen fabric, and a cloth weighing 18 ounces per yard may be obtained by using 3½ run yarn in an 8½ reed, 6 ends in a reed, 72 inches wide in loom, with 38 picks per

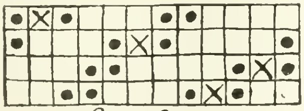


Fig. O.

Construction of heavyweight cloths

inch, a loss in scouring and fulling of 15 per cent, and a shrinkage of 6 per cent. This will be warped 1 face, 1 back, 1 face. If a worsted cloth were required constructed in this manner, it would be better to use weaving plan fig. O., and warp 1 face, 1 back, 3 face, 1 back, 2 face, 1 back, 1 face, 1 back, 1 face. In this plan the backing warp lifts over every face pick, thus making a more perfect fabric on the face, though the back will not be quite so smart as if plan fig A. were used. A cloth weighing 19 ounces per yard made in this way, may be obtained by using 2-24s worsted in a 10½ reed, 6 ends in a reed, 72 inches wide in loom, 42 picks per inch, to lose 8 per cent in scouring, and shrink 5 per cent.

An 18-ounce cloth constructed at Fig. B. may be made with 2⅞ run yarn in a 7½ reed 6 ends in a reed, 68 inches wide in loom, and 32 picks per inch, a loss in scouring and fulling of 15 per cent, and a shrinkage of 5 per cent. Warped 1 face, 1 back, 1 face.

An 18¾ ounce worsted constructed as Figs. C. and D. may be made by using 2-32s yarn in an 11.½ reed, 8 ends in a reed, 70 inches wide in loom, with 50 picks per inch, and a loss in scouring and finishing of 8 per cent, and 5 per cent shrinkage. Warp 1 face, 1 back. A woollen cloth weighing 18¾ ounces per yard can be produced by employing weave plan Fig. C., with 4 run yarn in a 9 reed, 8 ends in a reed, 68 inches wide in loom, 40 picks per inch; to lose 15 per cent in scouring and fulling, and shrink 5 per cent. This will be warped 1 face, 1 back.

A 25 ounce woollen cloth may be made, by using the same weave plan with 1½ run yarn in a 10 reed, 4 ends in a reed, 68 inches wide in loom, 20 picks per inch, a loss of 20 per cent in scouring and fulling, and a shrinkage of 5 per cent.

A worsted cloth weighing 15 ounces per yard may be produced by employing weave plan Fig. D. and using 2-48s yarn in a 14 reed, 8 ends in a reed, 70 inches wide in loom, and 56 picks per inch, to lose in scouring and finishing 8per cent, and shrinkage 5 per cent.

The cloth constructed with weave plan Fig E. will be warped 1 face, 1 back, and woven 1 pick face, 1 pick wadding, 1 pick face, and for a fabric weighing 24 ounces per yard, 2-48s worsted may be used for the warp and face filling, and a 2-run woollen yarn for the wadding pick in a 14 reed 8 ends in a reed, 68 inches wide in loom, 84 picks per inch, the worsted to lose 8 per cent, and the woollen 15 per cent in scouring and finishing, and the cloth to shrink 6 per cent.

For cloths made with weave plan Fig F. the yarns and settings may be the same as those used with weave plan Fig C.

Weave plan Fig G. may be used for a cloth weighing 30 ounces per yard, with 2½ run face warp and filling, 1 run backing warp and filling, and a 2-20s cotton tacking thread. Warped 1 face, 1 back, 2 face, 1 back, 2 face, 1 back, 1 face, 1 tacking, 1 face, 1 back, 1 face, and woven 1 pick face, 1 pick backing, 1 pick face, in a 6½ reed, 6 and 7 ends in a reed, 72 inches wide in loom, 42 picks per inch, to lose 20 per cent in scouring and scouring and fulling, and shrink 5 per cent.

With weave plans, Figs. H. and I., a woollen cloth weighing 29 ounces per yard may be made, by using 2½ run warp and filling, in a 6½ reed 8 ends in a reed, 72 inches wide in loom, with 52 picks per inch, a loss in scouring and fulling of 16 per cent, and a shrinkage of 5 per cent.

A worsted cloth weighing 20 ounces per yard, may be produced by using the same weave plans as above, with 2-48s yarn in a 14 reed, 8 ends in a reed, 70 inches wide in loom, 112 picks per inch, a loss in scouring and finishing of 8 per cent, and a shrinkage of 6 per cent. These plans will be warped and woven 1 face, 1 back.

The same settings would be suitable for weave plan Fig J., with the addition of the tacking thread, and would be woven the same, but warped 1 face, 1 back, 1 face, 1 back, 1 face, 1 back, 1 tacking, 1 face, 1 back, the tacking would make 9 ends in a reed, and of course the cloth would be a little heavier.

With the double plain weave Fig. K., a woollen cloth weighing 19 ounces per yard may be constructed with a 4 run yarn, in a 13 reed, 4 ends in a reed, 72 inches wide in loom, 52 picks per inch, a loss of

15 per cent in scouring and fulling and a shrinkage of 9 per cent.

A 15½ ounce worsted cloth can be made by employing the same weave paln with 2-48s yarn, in an 11 reed, 8 ends in a reed, 70 inches wide in loom, 88 picks per inch, 8 per cent loss in scouring and finishing, and 5 per cent shrinkage.

By using weave plans Figs. L. and M., and a 2¼ run yarn, a woollen cloth weighing 22¼ ounces per yard may be made, set in a 10 reed 4 ends in a reed, 68 inches wide in loom, 40 picks per inch; to lose 20 per cent in scouring and fulling and shrink 5 per cent.

With Fig. N., as weave plan, and 2-40s worsted for warp and face filling, and a 2-run woollen backing filling, a cloth weighing 18 ounces per yard would be produced, set 11 reeds, 6 ends in a reed, 68 inches wide in loom, 66 picks per inch, a loss of 13½ per cent in scouring and finishing, and a shrinkage of 5 per cent. This would be warped 1 dark 2 twist, and woven 1 pick dark worsted, 1 pick woollen, 1 pick dark worsted. 1 run yarn contains 100 yards to the ounce.

The Spinning Value of Mohair

By S. B. HOLLINGS.

In buying any class of raw material the purchaser always has in view the purpose for which it is fitted, and this principle holds true in the wool and mohair spheres alike. Neither industry has yet degenerated so much that men are satisfied to engage therein for the fun of it and it will be a dark day indeed when producer, merchant or user allows that to be the dominating factor in his operations. It may be safely said that this will never obtain so long as business is done, for the purpose of all trade is to make money. Unfortunately, the buying and selling of mohair during the past ten years has been a very profitless operation, but this cannot be said to be the fault of those engaged in the industry, it being rather the result of a lessened call on the part of the consuming world for the various classes of goods made from this article.

As already said, when buying either wool or mohair every user has to ask what purpose the raw material is best fitted for, and this principle is always brought into play when users go forth to secure fresh supplies.

Blending Turkey and Cape.

It may not be generally known, but when the qualities are sufficiently uniform to obtain a good result, it is a very common practice in the Bradford district to blend Turkey and Cape together. In the wool trade, those making tops often mix Australian and New Zealand, or South African and South American together, the object being to cheapen the combed article. I cannot say that this improves the spinning capacity of the top, but it serves the purpose for which the topmaker and spinner intend it, and so long as that is achieved everybody appears to be satisfied. The same principle applies to a large extent to mohair. Turkey and Cape are often blended to abtain a cheaper top, and it is very significant that during the past ten years the gap between the price of Turkey average and Cape firsts has been gradually widening. The time may be remembered when the difference in the value per pound of the two descriptions was one or two cents, but this is the case no longer. We see a difference of 3d (six cents), this being greater than has been known for a decade, if not in the whole history of the mohair industry. Without doubt Turkey mohair still ranks as the best spinning article, but users say that Cape is so much cheaper, that if it serves their purpose they are going to use it instead of the former. All spinners know the better spinning property which Turkey mohair possesses, and in making their blends they prefer to mix a certain proportion of Turkey and Cape together, and no doubt where this is done somewhat better results are achieved.

What Determines the Spinning Value.

The reader may perhaps ask what determines the spinning value of mohair, and the answer is, its quality. It may surprise some to know that it is possible to spin down fine hair to a thicker count, but impossible to spin coarse mohair up to a fine count. This is the reason why, during the past few years, Bradford spinners have been urging growers in South Africa to produce a finer fleece. Users here know from experience that in the great rage for producing bulky fleeces, Cape Angora goat breeders have been sacrificing quality too much, the result being that spinners have not been able to make as good yarns as those they used to produce out of the Cape article. It is quite true that a fair proportion of the South African mohair grown to-day is still of the strong type, but such low prices have been paid for it and such a difficulty is encountered in getting rid of the same, that the majority of South African farmers have seen the wisdom of altering their tactics and producing a finer class of mohair. In the combing, drawing and spinning operations quality counts, this being particularly so in the two latter processes. Mohair itself is such a slippery article that unless the fibres are fairly fine it is impossible to spin a nice small yarn. There is no doubt that quality is most wanted when a big mohair dress trade is being done. It is unfortunate that the English climate offers little encouragement for the gentler sex to appear in these lustrous fabrics, for nothing looks smarter or more dressy. Every class of raw material has to be spun to its desired length, and as already said, if mohair is coarse and strong it is impossible to procure nice, acceptable yarns for producing even medium quality goods.

I say candidly that we have here the chief thing which can contribute to an improved business in mohair yarns and fabrics, and until the middle class of Europe is enriched with more spending power the mohair trade will continue to be conducted on a hand-to-mouth principle.—Ex.

BRITISH COTTON EXPORTS LOWER.

Exports of cotton yarns and cloths from Great Britain for December shows a decline in both cases, compared with December, 1912. That month's outgoing trade of cloth of 532,000,000 yards compared with 554,370,000 yards in December, 1912. For the year, however, cloth exports were 7,077,278,900 against 6,912,800 in 1912. Yarn exports also fell behind for the year. December's outgoing trade was only 17,000,000 pounds in comparison with 18,314,300 pounds in preceding year. For the entire year 1913 209,761,700 pounds were exported, compared with 243,954,300 a year ago. Great Britain has not taken so large a total of American cotton as last season. The total from September 1, 1913, to January 6, 1914, was 1,963,589 bales, compared with 2,471,600 bales in preceding season, a decrease of nearly 500,000 bales.

CAUSES OF WEAK YARNS

Some Details Which Are Very Often Overlooked.

By WILLIAM SHAW.

(Special to the Canadian Textile Journal.)

The art of drafting is the basis of the success of every cotton mill and too often it receives very little consideration. For instance, most literature pertaining to textile points out the importance of a worn saddle, rolls not being properly weighted, dirty rolls, and rolls not properly oiled as causes of friction, but this has appeared in print so often that very few mill men can be found but what know the importance of these points. Now, why is so much attention given to the drawing rolls at every process in every cotton mill? Simply, in order to have the draft between the drawing rolls as gradual as possible, and the only way this can be obtained is to have the rolls properly spaced and the top rolls free to revolve. Most mill men know how the drawing rolls should be spaced, and in what condition they should be kept, but there are very few who consider the stretching of the strand before entering and after leaving the drawing rolls. In former articles in the Canadian Textile Journal, I pointed out the amount of stretch that exists in the strand before entering the drawing rolls of all drawing frames. Also the amount of stretch that exists between drawing rolls and the surface of the remedy for same in every article. In this article I want to point out the AMOUNT OF STRETCH THAT TAKES PLACE BETWEEN THE FRONT ROLLS AND CALENDAR ROLLS OF EVERY DRAWING FRAME.

If the reader is a carder or in charge of a cotton mill, after reading this article, go to any drawing in the mill and stop it, and at the same time notice how the web between the front rolls and calender rolls has a tendency to separate on the side. Now, please stop here and consider the importance of having any stretch at this point. Why give so much attention to the drawing rolls to have a gradual draft so as to have the same number of fibres in the cross section of the strand and allow a draft to exist between the front rolls and calender rolls? Of course, it is proper to give all attnetion possible to the draft between the drawing rolls, but the same attention should be given between the point stated above. I need not point out here that when a stretch exists between the front rolls and calender rolls on any drawing frame, the evil is much worse than having rolls not properly spaced or rolls in a bad condition, because the space is so great.

All mill men agree to a man that rolls not properly spaced or rolls in bad condition will affect the strength of the yarn, and at the same time they will tell you the reason, which is that the intermittent draft causes more fibers to exist in a certain number of inches more than in others. Again, they will tell you that the twist will run to the part of the strand where the least number of fibers exist in the cross section, and little has been done by manufacturers and builders to overcome this evil.

There are some mill men who conceive the idea that because they get the same market price for cloth, whether composed of strong or weak yarn, that little benefit is gained by making the yarn stronger. In fact, I have been told so by a few. What does it mean to the success of any cotton mill to have a strand of cotton composed of the same number of fibers in the cross section of the strand? Will it not improve the running of the work on the slubbers, intermediates, fine and jack frames in the card room? Will it not improve the running of the work in all proceeding processes throughout the mill? Will it not make pieeing at every process with the result of a better and cleaner cloth?

Greater Production and Improved Quality.

The stronger the strand the greater the production, and on this point there cannot be any argument. Therefore, to destroy as much as possible, the stretch that exists between the front rolls and calender rolls on all drawing frames means a stronger yarn that will enable a greater production in the proceeding processes, with the production of a better quality of cloth. To yarn mills, this would prove most valuable, as many orders are lost by these mills in not keeping up the strength of the yarn.

I find that the whole trouble is in the pitch of the gears forming the train between the front rolls and calender rolls. Take for instance, the Howard and Bullough drawing frame equipped with metallic rolls, and in most cases you will find a 16 front roll gear, and a 32 back calender roll gear. If a 33 calender gear is put on the calender roll, the web will sag too much. Even when both gears are changed to obtain a draft equal to the difference in ratio of the two gears the proper draft cannot be obtained. Try it! With leather rolls, I find an 18 gear on the front roll and a 30 gear on the calender roll. Change these gears as you will and you will find it impossible to obtain the proper draft. The only remedy is to change the pitch of every gear in the train. Make the front roll gear 32 and the calender roll gear 64 when using metallic rolls. This can easily be done by changing the pitch of the gears. Have two front roll gears made, say 32 and 31, and three calender roll gears so as to be able to change between.

I need not point out here that atmospheric conditions affect the tension of web, and for this reason it becomes necessary to change the gears as weather conditions demand, in order to have a perfect draft at this point, and destroy the stretch that exists at the present time on all drawing frames.

The writer has changed the train of gears between the front rolls and calender rolls on all his drawing frames long ago, and with the same stock and under the same atmospheric conditions, I found that a perfect draft between the points stated made the yarn from 5 to 8 pounds stronger.

Weak Filling and Waste.

Of late, we hear much complaining from different mill men (especially from print cloth mill) about weak filling, and the amount of waste made from this cause. What I have pointed out above is one cause, and the changing of the stock is another. It has been the vogue in most mills making print cloth to use one kind of stock for both warp and filling. In the mills where weak filling is found, the strong, harsh fibers are now used for the warp yarn, and for the filling only soft, pliable fibers are chosen.

No mill manager should expect as much production from the mule room or from the filling ring frames when such a radical change is made in the stock, because a greater amount of twist must be inserted in the yarn. I find in these mills that the management demands the same amount of production, and this is where the mistake is made. All practical mill men know that when the filling yarn lacks the necessary amount of twist the spinners will take off a certain number of weights from the presser fallers in order to ease upon the yarn. This, of course, prevents many ends from coming down, which makes it easier for the mule spinner, besides enabling him to take off a greater weight of yarn, which means more pay for less work. But under such conditions, the weaving suffers, which causes the very trouble noted above.

When the necessary amount of weight is removed from the presser fallers, to save the breaking of ends, the coils are not laid as close to one another, consequently, the diameter of the cap is larger and the cop softer. Moreover, owing to the lack of weight on the ends, the coils do not lock themselves at the nose of the cop, and the result is the production of a soft nose cop. Soft twisted yarn is more affected than yarn having the necessary amount of turns to the inch when steamed, and the diameter of the cop is again increased. I find that in the very mills that are now crying about too much waste being made in the weaving room, the filling is given to the weavers before it is allowed to cool off, and when yarn is heated to any degree it is weaker. Besides, it is very difficult to shuttle a cop that is not allowed to dry.

The resistance that the blade of the shuttle offers to the wet tube is chiefly the reason for the stabbing of the cops. Very few weavers will spend any time with a cop after it is stabbed, but instead, the cop is pulled off the spindle and thrown into the waste box.

In some mills the mule spinners play the game of removing weights from the presser fallers to the limit, and the only way for the overseer to prevent such a practice is to keep an account of the number of weights on the fallers on every pair of mules, and they should be removed only by the permission of the overseer. However, it is admissable where a great amount of waste is made in the weaving room to insert more twist in the yarn and increase the weight on the presser fallers.

In some mills the filling is given to the weavers from the steam chest, because the number of filling boxes is very limited, and the filling is given to the weavers in the above condition so that the filling boxes will be emptied quickly and the mules will not have to wait for boxes at drafting time. This is a very poor practice and a very common one, too, for there is no doubt that many readers have often noticed weavers around the steam chest waiting for filling. If the management knew how much it cost them they would soon order the necessary amount of filling boxes to give ample time for the cooling of the filling. If the reader is at the helm of a cotton mill and a bit skeptical about the statement of a wet tube offering resistance to the blade of the shuttle spindle, let him go immediately to the mule room and pull a cop from one of the spindles, wet the spindle, and it will be found impossible to position the cop as low down on the spindle as in the first case.

Construction of Spindle Band.

Like yarn, a spindle band should have the same number of fibres in the cross section. But in most mills you will find bands made by an automatic band machine. The bobbins are laid on the floor and the yarn or roving is inserted into a slot and fed automatically.

If one or more ends break, the machine continues to run of course, when by chance the broken ends are discovered and pieced again, but here a great length of handling has been made. Many mill men conceive the idea that the smaller the diameter of the band the higher the speed of the spindle as they argue that owing to the band being smaller in diameter it runs on the smallest diameter of the whorl.

They seem to forget that a spindle band should weigh 15 grains to the yard for a ring spindle band, and 20 grains for spooling, but how many ever take this into consideration? If a band lacks the necessary number of fibers in the cross section, it will, of course, fit the smallest part of the whorl as claimed, but owing to the lack of the necessary number of grains to the yard it is weaker, and only a question of a day or two before it becomes slack or breaks.

Simple Method of Making Banding.

One of the most simple methods of making banding is to have a rack on the wall in back of the slubber frame. The rack should be large enough to accommodate bobbins enough to make spooler banding. Figure from the weight of the yarn used how many bobbins will be required to make a band 15 and 20 grains to the yard. Then have a long wire rod hanging from the ceiling and directly over one of the slubber spindles. At the lower end of the rod, have two eyes, so that one-half the ends from the spools will pass through one eye and the other one-half through the other. Draw all the ends down to the flyer at doffing time and thread it and wind on the bobbin. Then instruct the slubber tender to keep watch on the bobbins, and if any found to be broken, to pull off the defective part. Doff the banding bobbin at each doff and lay one side, and when enough material for banding has been made, tie the ends around the eyes at the lower end of the rod until required to make more material for banding. I find that very few ends break when run on a slubber spindle, and I judge the reason for the ends not breaking is because the pull on the bobbins is gradual instead of intermittent as in the case of the banding machine. From this it can be seen that only one slubber bobbin is placed at the side of the banding machine, and the strand never breaks. This method has been used by the writer for years and has given the best results.

Another method is to have the spool rack on the wall near the ball warper and balls are made. The warper tender is also instructed to watch the spools and to pull off all the defective places. At first sight, this may appear to be a great deal of trouble, but such is not the case, for as stated, the pull being gradual, it is seldom an end breaks.

This subject may be more important than regarded by many, and to prove that it is important, make the following test. Take any driving belt on any fly frame, spinning frame or loom, have one-half the length of the belt of double belting and the other one-half of single belting, and you will find it almost impossible to run the machine.

In case of the loom, it is impossible.

So the same can be applied to a band, and let me say that when you find a sizing of yarn that will size exactly alike and break about one-half in difference, the trouble is in the band.

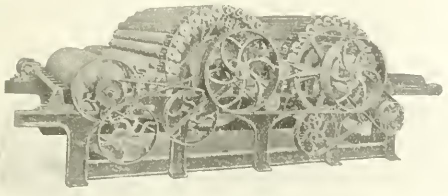
If the reader will put into practice the above remedies for the causes of weak yarn outlined in this article, I am sure he will be benefitted.

BLENDING AND PREPARATORY PROCESSES OF WOOLEN SPINNING---IX.

DESCRIPTION OF THE IMPROVED GARNETT MACHINE.

By JOHN W. RADCLIFFE.

Although the rag industry furnishes the woollen ma nufacturer with a considerable quantity of recovered or re-manufactured materials, a large amount of pulled waste is derived from the pulling up of hard wastes, resulting from the waste yarns produced in various processes of the textile trades. In the spinning and twisting of worsted yarns for example, a fair amount of waste is created, wheih although not suitable for re-manufacturing into worsted yarn, is a valuable class of material for the woollen manufacturer when properly pulled. Waste in yarn form is also created in the weaving processes, and coming as it does from the warps or wefts, it is essential that it should be pulled up into a fibrous material before being put into a woollen blend.



No. 16

The machine by which this is most adequately accomplished is that shown at Fig 16, and is known as the improved "Garnett machine."

In arrangement, it is somewhat similar to a small scribbling machine, being similarly composed.

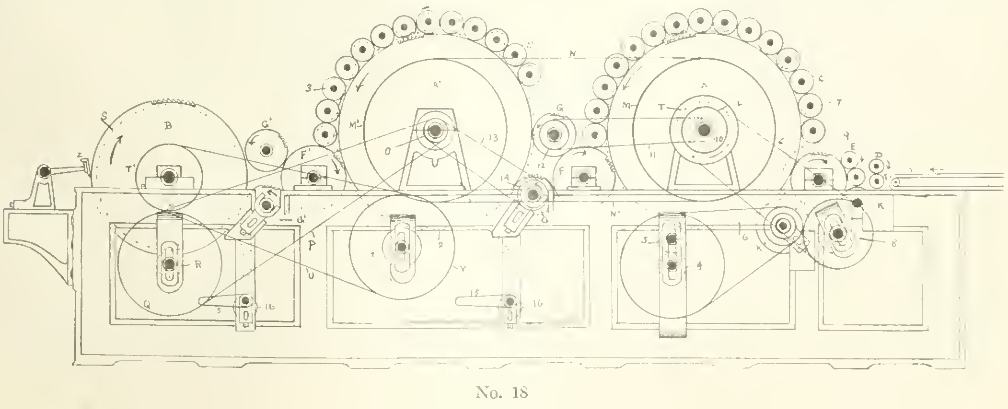
Those who are acquainted with the old type of Garnett machine will notice that the one described in this article possesses certain differences which are a distinct advantage over those which previously existed on the older type of "Garnett machine," shown at Fig. 17. Fig. 18 is a diagram showing a side elevation on the driving side of a two cylinder Garnett of the improved type, and gives in a clear manner the relative positions of the altered parts.

The point of difference most readily noticed is the removal of the doffers, and the disposing of the fancies F and F to work below the centres of the swifts A and A. By placing the fancies in these positions, it will be noted, also, that a large number of workers can be distributed over the upper surfaces of the swifts employed, and thus increasing the opening power of the machine, or, in other words, putting about the same opening power in a two-swift machine of this type, as there is in one of the original style having three cylinders. In the former, as shown in Fig. 18, there are fifteen and thirteen workers over the respective cylinders or swifts, whilst in the latter there are ten workers respectively placed upon the three consecutive swifts. The altered portions already

No 17

mentioned and their functions, will be best understood by considering them in conjunction with Figs. 19 and 20. In Fig. 19 is given a sectional drawing, showing only the two swifts A and A', along with the fancy F and strippers G G, which are placed between them; whilst in Fig 20 is a similar drawing giving a section of the swift A' and the doffer B, along with their adjoining fancy F' and strippers G G.

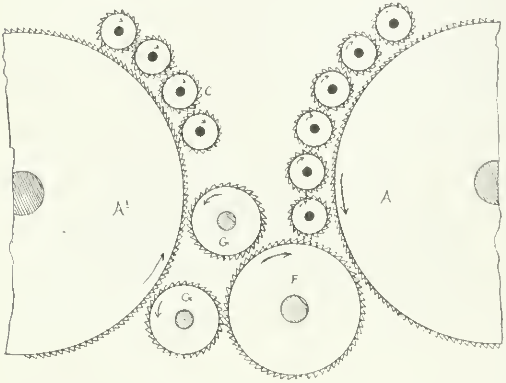
In each of these figures the clothing is shown on all the different cylinders, viz., swifts, workers, fancies, strippers, and doffer, and also the directions of their respective points on the wire, as well as the direction each cylinder is revolving, and indicated by its arrow. The action which takes place in these parts is



No. 18

as follows: The material which has been partially opened by the wire points on the rapid revolving swift A and the wire points on the slowly receding workers C, is lifted and taken out of the teeth of the clothing on the swift A by the points on the fancy F which has a higher velocity than that of the swift A.

It will be seen that the points on the fancy F oppose the back of the points on the swift, hence its taking the material. The fancy F subsequently deposits part of its material upon the first stripper G that it comes into contact with, and practically the remainder upon the second stripper G. The strippers G G having a much reduced speed or surface velocity from that of the fancy F, they present the points of their clothing wire to those upon the fancy, and thus receive the material from it, which they convey forward, and present it to the second swift A', and the latter takes it



No. 19

from them in the same manner as the fancy F from the preceding swift A, and carries it forward, to be further operated upon the subsequent parts of the machine. The action is almost identically the same with the parts given in Fig. 19, except that of the doffer B, which, unlike the swift A', receives the material from the two strippers G G, owing to the latter having a much higher circumferential speed over that of the former, and depositing the material upon it, to be finally removed in a fibrous web by means of the doffing knife Z.

It is, of course, essential that if any new invention is to be of any commercial success, it must possess features that are distinctly evidenced in the improved results that are thereby obtained.

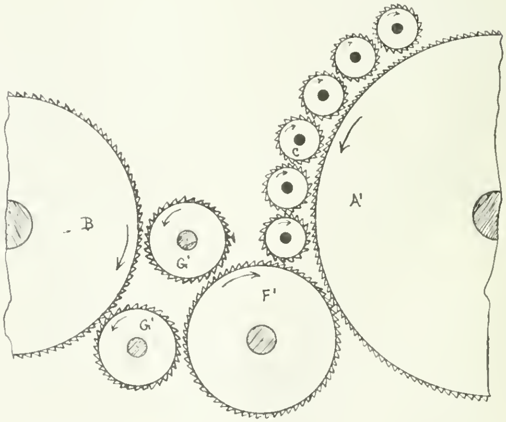
That this has been achieved in the new type of the "Garnett" machine is clearly proved by the perusal of the following table of results obtained in the treating of different classes of materials upon a two-swift machine exactly as the one shown in Fig. 15, and after allowing a margin of 15 per cent of time for the cleaning of the machine.

Kind of Material.	Amount per day, 10 hours.
1. Angola Rags	495 lbs.
2. Botany waste (hard)	468 "
3. Cotton and mohair waste (hard)	532 "
4. Irish woollen carpet yarn waste	536 "
5. Vigogne	542 "
6. Fine worsted thrums	583 "
7. Cotton and silk (Fellmongers waste and chiefly cotton)	431 "

These results need no elaboration, but show, in a forcible manner, the increase in the productive capacity of the machine that has been obtained. Not only has this been accomplished, but there is also a marked improvement in the quality of the material that has been treated. The fibre possesses a greater length of staple, and has fewer unopened bits of threads. The obtaining of these results in the production and quality of material, i.e., perfect opening and length, are chiefly due to two causes—firstly, the well clearing of the swift by the fancies, which reduces to a minimum the possibilities of the material being subjected again to the keen opening processes that take place in the earlier stages of its passing through the machines; and, secondly, to the gentler action of the swift and workers which are over the upper surface of the second swift. The workers have differential speeds imparted to them, the first worker having the slowest, and a gradual increase being made upon each subsequent one throughout the series.

This differentiation of the speed in the workers gradually reduces the severity of the opening process at a stage when the partially opened material is most in need of this gentler treatment; also it assists greatly in getting the material through the later stages of the machine when the material is in a lofty state, and thus reducing the possibilities of choking taking place in it.

At this stage it will be necessary to deal at full length with the manner in which the component parts of the "Garnett" are driven, and to enable the reader to follow the description of the different parts with as little difficulty as possible, diagrams will be introduced which show both sides of the machines, indicating the driving ararngements for the respective parts. Fig. 18 illustrates one side of the machine and the let-



No. 20

terings with which the component parts are marked will be subsequently referred to in connection with the methods of operating and driving the machine, when the diagram illustrating the opposite side of the machine is introduced.

The Finishing of Knit Goods

Looping Machines—Forms, Uses and Methods of Operation.

For convenience in handling the various classes of undergarments during the looping process, looping machines are made in two forms. One is made with a straight bed on which a row of work-holding points is mounted to protect along one of its sides, and has the stitch-making group of parts assembled on a travelling carriage. This form of machine holds the work stationary while the needle looper, etc., are automatically moved along the bed from point to point after each stitch is completed.

The other form of machine is the circular one, in which the work-holding points are mounted to project from the periphery of a disc about eighteen inches in diameter. In operation this disc is given an automatic rotary feeding motion on its axis after the completion of each stitch. Thus it will be seen that the operating functions of the process in the two forms of machine are exactly in reverse order, one holding the work in position, while the stitches are inserted progressively along the erppared edge of the material and the other proceeding reversely to carry the prepared edge to, and by, a stationary group of stitch-forming implements. The first, or straight-bed form, is more peculiarly adapted for use on what is called "full-fashioned" garments, and the circular form is most generally used for "cut goods."

In both forms of machines the stitching functions are practically alike, and produce the same finished result. By different arrangements of these parts in their relation to each other, and to the automatic feed, as to time, etc., several styles of stitch may be obtained, such as the "single stitch," "under and over" and "through and through," or "double stitch," and may use one or two threads, each style of stitch having its peculiar advantage for the work in hand. In some makes of machine the needle (always a curved one), works from the inside or butt end of the points outward, and in others in the reverse direction.

In setting up the circular looping or "turning-off" machine it must be fastened securely to a good table, similar in construction to the ones used for sewing machines. It need not be as wide, however, as it is never required for holding the work during the operation, and also because the full diameter of the disc, and several inches more, must overhang the table's edge so as to be sure to provide ample space for the work to revolve while depending from the feed points.

The two pieces to be looped or sewed together are fastened to the disc, so that one of the points shall pass through each of two courses of loops near the raw edges of the fabrics which are in position with their faces together.

The rotation of this disc will then bring each pair of loops in succession to a point of exact registration with the needle, which travels in the arc of a circle directly over and parallel with each point when in this position. A groove or depression in the top of the points will allow the thread-carrying needle to enter each pair of loops, and in conjunction with a properly shaped looper which operates in time to meet the needle's thread, the two fabric lops are securely and almost imperceptibly joined.

In order that the machine may operate successfully and perfectly, it is necessary to trim the raw edges of the material down to the loops that are impaled up on the points, and unless this is done and all the ravelled threads, or loose waste, are removed before passing under the needle, the seam will be made with an unsightly welt.

The speed of the machine in limited to the ability of the operator in putting the loops of fabrics on the points, and with those who are most expert it can never be run faster than three or four hundred stitches per minute.

If the machine skips stitches, examine the needle. If it is broken or damaged beyond repair, replace with a new one. If the point is dull make it over with an oil stone, taking care to have the lower side as low as possible, so as to ensure its entering the loop. See that the point of the needle registers exactly over the center of each point. Skipping is also often due to the hook or looper getting out of adjustment. When taking the loop from the needle the looper must slightly rub the needle when passing over it. The needle may move too quickly or too slowly and thus be out of time with the looper. When properly timed, the needle's point in entering the loop on the hook should be one-sixteenth of an inch from the hook, and just clear the heel of the looper. The hook, after passing away from the needle, will again move forward and pass under the needle, just touching it. The hook will be about one-eighth of an inch from the point brass when it is at its lowest drop. It is very essential to have the hook perfectly smooth and of such a shape as to keep the loop of thread from dropping off easily before the needle enters the new loop. Keep the thread taut during the time the needle is passing through the loop.

Have the thread rather too fine than too coarse for the needle.

In order to replace a point remove the brass section that covers the base of the imperfect one, and remove it with a quick pull upward, thus preparing the groove for the new point. Place the new point in position, and with a small staking tool drive it to its seat. Then with a hammer smooth the brass down around it, and finaly replace and secure the covering brass in position.

The sewing mechanism must be timed with the points on the large disc, and if not exactly right their relative position may be changed by loosening the set screws in the main arm of the machine, and moving the disc to its proper position.—The Textile American.

HARLEY-KAY COMPANY'S SUCCESSFUL YEAR.

The Harley-Kay Knitting Machine Co., Limited, of Georgetown, Ontario, held their annual meeting on the 24th inst. re-electing the officers and directors of the past year. The Annual Report was very gratifying showing the best year in the history of the company. Although the trade generally experienced a considerable depression during the latter half of 1913, business continues brisk with the Harley-Kay Co., and they have orders in at the end of the year to keep them busy until the warm weather. The company found it necessary to work considerable overtime during the fall and winter. After allowing a liberal depreciation on plant and paying the stockholders an 8 per cent dividend, a substantial profit was carried forward. During the year just closed the company added new equipment extensively, and have taken up the manufacture of other lines.

English Woollen and Worsted Trades

(By Our London Representative.)

The outlook at the present time of the wool and textile trades convinces me that great things may not be expected in the immediate future. There has been a material decline in the requirements of the home trade, large stocks of almost everything into which wool enters being on hand, and the top and trade has not sufficiently recovered from the European political crisis, financial stringency in most countries, and a general decline in trade. At present the outlook is none too bright, but mill owners are trusting to a speedy recovery from the Balkan crisis and good trade across the Atlantic to make 1914 yield an average business. Before prices take an upward turn there must be renewed confidence in values and, above all, more activity on the part of the home trade.

Canadian merchants are making inquiries in Dewsbury about new fancy, stout wearing tweeds, and seeking some concessions in prices. These, however, manufacturers do not feel very much disposed to grant, for the prices of wool suited to that trade and the rates that have to be paid for other raw materials stand in the way. Serges in navy and royal blues are the subject of inquiry also, both for men's and women's wear. Heavier cloths are dull of sale just now. Taking the whole of the Dewsbury district, there is a dullness in trade and many woollen cloths operatives are out of work. The blanket trade in Dewsbury had a good year in 1913, owing partly to the good orders that arrived from Canada. But the new year has opened with very little response from the Dominion and the home demand is a good deal below the average. On the other hand, best and medium rugs are selling well and prices are good. The Spen Valley makers are still engaged on Brussels and tapestry carpets for Canadian and other colonial centres and prices are very firm. Stockings and other fine softs are still mai ntaining their value. Leeds is just settling down after a big strike amongst the municipal workers which cast a gloom over the city. Although some manufacturers are engaged in making lower and medium qualities, and running their mills at full capacity, the majority complain that they have been working for a small margin of profit for some time past, as labor as well as material is dearer. The woollen merchants have been slightly busier lately dealing with repeat orders. Trade with Canada is reported to be showing a slight improvement. At present trade is of a hand-to-mouth character and the best that can be said of the wholesale clothing trade is that it is no worse, and if anything, the special departments are a turn the busier. There are inactive conditions in the cloth trade at Huddersfield. Manufacturers are showing patterns for next winter, but of actual business there is very little. Forward business is hindered by the heavy stocks and the continuance of high prices demanded, especially for fine worsteds. The price factor is operating adversely at Huddersfield. Both in worsteds and woollens, trade has grown considerably in volume and the future is viewed very hopefully. The consumption of fancy worsteds is still below the average. There is not much briskness in the Canadian demand for tweeds and the enquiry for the fall trade is disappointing to most of the Huddersfield mills. Trade with the States is good and the developments anticipated by the introduction of the revised tariff have at last set in. As to the Border woollen trade, I am informed by one of the Hawick manufacturers that the tone of business is good and that some of the heavy stocks of overcoatings and underwear have been reduced lately. From the States a demand for Scotch cheviots for spring wear is keen, but the Canadian demand is dull. Dyers and spinners have a fair volume of work in hand and the same may be said of the hosiery trade. Most firms in the Kidderminster carpet trade are busy with the orders on hand, but the yarn trade is featureless. Spinners are not inclined to commit themselves to any extent, and on the whole the market wears a stronger appearance. In Halifax and Leicester business is not very bright. The Leicester yarn trade continues slow all round, and contracts placed some months ago are slowly working down. Offers of yarn below cost have been withdrawn, but very little new business is coming forward. The hosiery trade is dull on home account, but some good orders from Canada and the colonies are in hand. In most of the other woollen and worsted centres mill men say they could do with more business and complaints are being made against the high costs of production.

I hear that in Leicester the manufacturers are experiencing a good demand, just lately sprung up, for dyed mercerised fine cotton counts. A good deal of this yarn has been used in making a cheap class of women's sports coats. Also, there is very little spun silk or pure silk turned out at Leicester now, but lately a new branch of trade has developed in what are known as real cashmeres, angoras, and like hairs, making very expensive grades, which have found outlets in underwear, women's and men's vests, gloves, etc. I also learn that generally the Canadian demand for medium and cheap tweeds was slacker in 1913 than for several years past, but the enquiry for next season is looked upon with hopeful results.

NEW SHUTTLE THREADER.

Vacuum Device Successfully Tried Out.

In connection with the question of shuttle-kissing which has been up for so much discussion in Great Britain of late, a new invention, recently patented in the Old Country, for threading the shuttles, is of interest. The inventors claim it to be at once simple, effective and of comparatively small cost, and it is said to have worked with great success in several mills in which it has been tried out.

In the invention a vacuum chamber is employed, connected by a system of main and branch pipes with looms in the weaving shed. The vacuum is made and maintained by any convenient and available means of appliance. The branch pipes are placed to the hand of the weaver at the loom. The free end of the pipe terminates in a mouth, which is closed by a valve, preferably a spring valve, placed transversely across the branch pipe near the mouth, and actuated by a press button against the resistance of a spring, which tends to keep the valve normally closed. In operation the attendant places the eye of the shuttle against the branch pipe, and opens the valve sufficiently to allow the inrushing air to suck the thread through the eye. The mouth of the branch pipe is fitted with rubber lips. The only part of the device which will need renewal in the very long period of years is the rubber lips.

A Novel Repp Motion

(Special to the Canadian Textile Journal.)

In order that repp borders or bars of solid colors could be cheapily introduced into plain cloth many ingenious motions have been devised with the object of doing away with dobby motions. As is well known, only four shafts, or heddles, are required to weave plain cloths and if a repp bar has to be produced as well and a dobby is used the working parts of these latter motions quickly wear out, thus spoiling the whole machine. One of the simplest and most effective motions that has found extensive use in Lancashire is illustrated herewith and it will be seen that the heddles are worked, positively no springs being used.

Before describing the motion a description of the weave actually required and the drafting adopted will be given. The weave is shown at A, Fig. 1, section B, showing the weave of the body of the clothe whilst section C shows the solid color bar or repp portion. The drafting is illustrated at D, and it will be seen that the threads weave in groups of four, but the groups can consist of six or eight or even more by drafting them in similar groups, one group being in the first and third heddles and the other group on the second and fourth heddles.

The mechanism for working the motion is shown in Fig 2, from which it will be seen that some little addition is made to the ordinary plain loom roller top motion. The straps 2 and 3 are carried by the ordinary heddle roller of the loom, number 2 being attached to the second heddle and number 3 to the third heddle. These two heddles, numbers 2 and 3 are attached below to the threads of the ordinary, plain tappet motion in the usual way. The front and back heddles, Nos. 1 and 4, are carried above by the large rollers on shaft A and below they are attached to leather straps which pass around the rollers K1 and K2 that are pivotted on brackets that are fixed to the binders as shown.

The top shaft A is driven from the ordinary heddle roller shaft B by means of the fixed bosses C1 and C2.

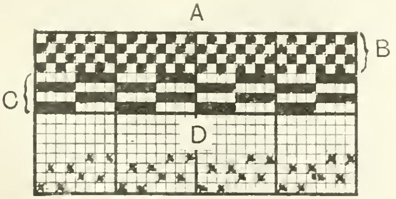


Fig. 1

and the bosses D1 and D2. The boss D2 is driven from the bosses C2 by cross straps and the boss D1 from the bosses C1 by straight strap. These bosses, D1 and D2, are free to revolve upon the shaft A except when engaged by the latch E, which is pivotted upon the bracket F, this being fixed on the shaft A. A notched rim is provided on the rollers D1 and D2 into either of which the latch E may be engaged as desired.

In the illustration the latch E is engaged with the roller D2 the latch having been deflected to the right, and the heddles are lifted for weaving repp—that is, heddles 1 and 3 and 2 and 4 are lifted alternately when the latch is turned over to the other side to engage with the roller D1, which is driven by straight straps, the heddles are lifted 1 and 2 and 3 and 4 alternately, to make plain weave. From this it will be seen that

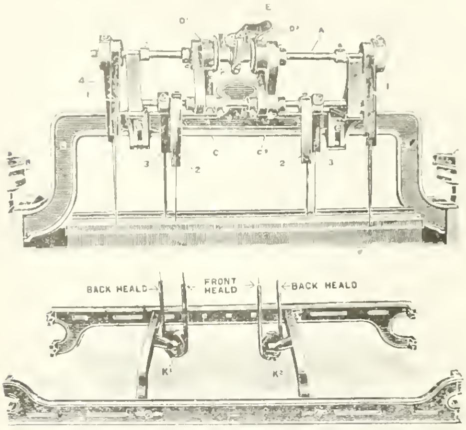


Fig. 2

repp bars can be readily produced on a plain loom, a problem that has puzzled many an elementary, and not a few advanced students of the subject of weaving.

SMYRNA'S WOOL INDUSTRY.

The wool that comes into Smyrna is of two different kinds, the Yerli, which comes from the hardy lowland sheep, having small horns and narrow tail, and the Anatolian, which comes from the Caraman sheep of the plateau, which have a flat heavy tail weighing up to 22 pounds. The Anatolian is longer and coarser than the Yerli, and is the kind of which the United States is the chief foreign buyer. None of these wools is as fine and soft as those of England and Australia.

About 2,500,000 pounds of Yerli wool is the annual production, and this is the kind used in Smyrna for making army cloth, blankets, carpets, and common cloth. Prices range from 10 1-2 to 11 cents a pound delivered at buyers' stores in Smyrna, and must not contain more than three per cent extraneous matter nor more than six per cent black wool.

The Anatolian wool is produced in greater quantities, as a large part of the land is used for sheep grazing, but only about 2,250,000 pounds reach the Smyrna market. Much of this wool is consumed locally in the manufacture of hand-tufted carpets. This local consumption is growing, but so is the foreign demand, and the extensive pastures will probably be used in meeting this demand with greater flocks. Prices for Anatolian wool range from 12 to 13½ cents a pound delivered at buyers' stores in Smyrna, and must not have more than five per cent. extraneous matter nor more than 12 per cent black wool.

Germany, France and Italy follow the United States as buyers of Smyrna wool; and a considerable amount goes to Constantinople.—Fibre and Fabric.

Charles R. Blake has lately been appointed superintendent of the St. Annes Branch, Dominion Textile Company, Montreal, succeeding Richard Toas, who has resigned.

Grey Weft Winding

Weft Wound From Mule-Spun Cops Into Paper Tubes or Wooden Pirns.

A feature that comes up for considerable discussion among mill men is the relative efficiency of the two methods, viz., the common practice of placing the mule-spun cop of gray weft direct into the shuttle or the use of weft wound from these cops on to paper tubes or wooden pirns. Pirn-winding machinery has been in use for a considerable number of years and proposition to wind gray weft is by no means new, whilst colored wefts have always been largely dealt with in this way. Gray weft winding, however, has never become very popular in this country or in Great Britain, although the American machinery for this purpose has long been on the market and in the United States are in quite common use.

There are many factors in favor of using the pirn-wound cop, one of which is the growing scarcity of efficient weavers. The fact that considerable more yarn can be placed in one shuttle when wound in this manner than with the mule-spun cop, thereby lengthening the time which each shuttle runs and decreasing the number of weavers required, will work for a considerable saving in the weaving department, especially where the automatic looms have not been installed. The

Machines Employed in the Process.

of pirn winding are comparatively simple in design and construction. Naturally differing in constructional details, they can be divided into two broad types—those in which the winding spindle has a rotary movement only, the yarn being laid on to the pirn through a reciprocating traverse guide, and those in which the spindle both rotates and reciprocates while the guide eye is stationary. The object sought by all the newer-type machines is to wind on a tube or pirn a considerable length of material in well-laid layers of yarn which will unwind regularly, and, further, to so build up the pirn that for the length of material it contains it is comparatively small and compact. In a shuttle containing an ordinary pin cop the whole of the recess available for weft is not occupied. When a wound pirn is inserted the full shuttle capacity is utilised, and, moreover, longer shuttles are being employed in which from two to four times the amount of weft to be found in an ordinary pin cop is placed on a pirn.

The Advantages Accruing

from this method are numerous and valuable. It is a curious fact that in the Huddersfield district, and in the worsted trade of Yorkshire, the new system of pirn winding has been more largely adopted than is at present the case in the cotton trade. It is, of course, undeniable that the weaver can shuttle a pirn much more quickly than she can shuttle a pin cop, and also there is no fear that the material will be "stabbed," which is an ever-present possibility with the pin cop. The reduction of waste is very considerable, and there should be practically none in the weaving shed, as the yarn will wind off the pirn until the last layer. The quality of the yarn on the pirn is better throughout its length than it is in the cop, as in the winding process all thick, weak, or bad places are detected and removed. A very marked difference can be observed between pieces of cloth woven from pin cop weft and wound weft; and if the wefts are used in the same length of warp, succeeding one another, the dividing line is very marked. So excellent have the results been in the worsted manufacturing industry that the work of the cloth overlookers has been materially reduced and a greater output per person secured. Besides improving the body of the fabric, the selvedges produced are remarkably regular, even, and straight; and a further qualification is that the width of the fabric is better maintained.

The greatest asset to the manufacturer is, however, the

Increase in Production.

Obviously a shuttle containing three times as much weft as formerly will enable the loom to run three times as long without it having to be stopped for weft replenishment. A further factor to this end is the ease with which the pirns can be placed on the shuttle tongue. Moreover, the fewer stops a loom is subject to the less strain is put on the warp threads, and consequently few warp breakages are often to be noted in automatic looms which run over long periods without stopping. These advantages make it possible for a weaver to attend to six looms as easily as she can attend to four, and in sheds where helpers are provided—who fetch full pirns to the loom, take away the empty ones, and remove the cloth, leaving the weaver nothing to do but tend her looms—the labour is often less on six looms under the new conditions than it was on four under the old. The weaver naturally receives higher wages, and the helpers are paid by the mill.

EFFICIENCY OF THE NORTHROP LOOM.

In the December "Cotton Chats" published by the Draper Company of Hopedale, Mass., special attention is called to the economy accomplished by the use of the Northrop looms, from the mill standpoint. It is claimed that the "Northrop loom easily produces ten per cent more cloth per loom per week, with a corresponding saving in the interest, depreciation, repairs and other general expense; also in the original cost of looms, weave room and fixtures!

"In addition to the increased product per loom per hour due to the automatic filling changer, it is possible to run the looms in the weave room through the noon hour and at night for a certain length of time without any weavers at all. During this period no weaver should be allowed to work on the looms. Under this condition the machinery alone would run; no operative would work overtime, and yet each one could earn more money; the manufacturer would obtain greater efficiency from his machinery; no law in regard to hours of labor or operatives would be broken; and no labor union could properly object to machinery running more than a given number of hours a day.

"In general construction for every day work these looms are heavier than common looms and aside from the filling changer contain a large number of improvements not found in common looms, so that purchasers may depend upon having the best machine in every respect to meet any kind of competition if they order Northrop looms either for new mills or to replace equipment in old mills.

"When the Northrop loom was introduced it was designed for the easiest possible fabric, viz: narrow print cloth. At that time weavers could tend about six common looms each, the best having eight in a set. Doubling the number of looms per weaver seemed a great advance and we recommended the early purchasers to establish sixteen looms as a proper number per weaver. Since that time the Northrop loom has proved to be so much easier for the weaver that mills on these goods average twenty-four looms per weaver, and numerous individual operatives run from twenty-eight to thirty-six looms each.

THE THOROUGH PREPARATION OF DOMESTIC WOOLS

REMOVING VEGETABLE AND OTHER EXTRANEOUS MATTER

By Harry Twigg.

(Specially Written for the Canadian Textile Journal.)

No matter how well the stock has been washed, it will be found that the removal of the grease and dirt has brought into prominence odd bits of twine, and skin, burry pieces, discolored locks, and the like, which noticeably mar the desirable character of the batch. What are we to do with these, allow them to pass or eliminate them? If they are permitted to pass through with the rest their influence will remain continously for harm. There are two ways of dealing with the question and each has its own advocates. It may be said that there isn't enough of that sort of admixture to make any material difference, the majority, however, would distinctly favor removal if it can be accomplished economically. The man in charge of the scouring will hardly have time to attend to so much. The wool sorter may not be conveniently situated. His time, too, and that of the packer who sacks up your clean wools may already be fully occupied. Why not rig up a neat bench and stool,, and set some reliable middle-aged woman at the job. It is a clean one and suited to dexterous feminine fingers, while the wages would not be a large item and the advantages more than worth their cost. Certainly the mass of wool will come moist from the squeeze rolls, or hydro extractor, but not wet enough to be disagreeable at all, or unhealthy. It follows that our lady's work bench, and all about it must be kept scrupulously clean, otherwise the damp fibres will surely gather dust and soil in their handling. All the sorting that many small Canadian mills require could be done by such means and done vastly better than it is at present. Just try it, and see. The idea may seem a novel one, but has been in our mind for many years, as we have noted the numerous defects of our woollen manufacturing.

Our stock is now ready for drying and when it comes to this stage please impress upon your help that it is sheep's wool and not metal scrap they are to get dry. Keep the heat down to the lowest point consistent with successful work. If your dryer is of the old-fashioned stationary type, let the stock be turned and shaken up occasionally to facilitate matters. Use an automatic drying machine by all means if possible—the gain in quantity and quality of output, will be found considerable. Exhaust steam can be utilized in either case. After the stock comes from the driers it should be passed through a good cone duster in order to beat the greater part of the chaff and hard dirt out of it for the removal of which the mere wash- is scarcely sufficient. If the wool has had a preliminary dusting before scouring this subsequent dusting is not so essential. But little will probably be found which requires shaking out in that case.

In place of using a duster after drying it is an excellent plan, when dealing with long fleece wools, to employ a short compact garnetting machine. This will not only open out the fibres, but will also break the longest of them; and at the same time separate much of the vegetable and other trash. On cotted fleeces and other matted wools a machine of this kind is of great value. It is to be admitted that Canadian fleeces passed through any sort of carding arrangement are difficult to color afterwards unless they are torn apart out of their closely arranged formation, especially after pressure in baling has been applied. There is the same difficulty of penetration by liquids in the dyeroom which is noticed in baled cotton—only, of course, in lesser degree. Apart from that the carded mass is easy to work up all the way through.

But possibly you would prefer to carbonise your wools and so get rid of all extraneous vegetable substances, so prone to turn up as specks and burrs in the finished cloth. Some use a "dry process" for carbonising, i.e., they use an acid gas to burn them out. When this is the intention the stock is first dried after being washed. The more common practice is, however, "the wet process"; and for that the wool is treated after washing also, but before drying or dusting. The method is simple enough, relying upon the well known fact that saturation with a strong mineral acid burns up, or carbonises, cotton and other textile fibers. In order to protect the wool portion a dilute acid bath is used, and accelerate the final destruction of the vegetable matters intense heat is applied after drying. As handy a way to proceed as any is to use a square wooden tank sunk in the floor a level convenient to stand by, and work over. The tank should be of good thickness, and well made and bolted. Use square joints for the sides and bottom and the tank will last much longer than if tongued and grooved. A fitting size for a small mill might be six feet square by three and a half to four feet deep. If a second, and much lighter, but still strong box is made to fit loosely inside the tank with perforations throughout all the bottom and lower portion of the sides, and having a stout transverse piece across the top you may raise and lower it by means of a small block and chain, or windlass, and find it of much practical advantage. Make up a bath of clean water at about 60 deg. F., and add a quantity of sulphuric acid—commercial oil of vitriol—until the specific gravity registers about 6 deg. on a number one Twaddle hydrometer. Let down your inside box and fill it with wool direct from the squeeze rolls of the washing machine. Poke it all under the surface and let it soak for an hour—more or less, as experience shall teach you for your particular class of work. Now raise it out to drain for a little while, and if you have provided a hinged door on one side of your inside box it will be an easy matter to pull the wool all out into a truck with a manure hoe. Then extract the wool and dry it thoroughly. When dry, close up all openings and get enough steam in the drier to run the heat up to 200 deg. to 215 deg. F.

Keep it at that for about half an hour, more or less, and if you find that the chaff and straw and strings now crumble easily to powder on rubbing them in your palms, the stock may be taken out. Cover it up with old sheets to keep it warm, and pass immediately through a good duster to finish the work. While this has been proceeding, the bath in your tank may be tested, replenished with acid if necessary, and another lot of wool put in to soak, and so on. The procedure is not difficult but requires that constant watchfulness in orders to completely remove all vegetable trash. If you don't wish to build an inside perforated shell for the steeping tank, you can build a joint-tight slanting scray or rack at one end and pitch your stock out on that to drain. In that case buy your workman a pair of rubber gloves, and caution him to be careful to treat the acid bath with the utmost respect unless he wants to get into trouble. Should an accident befall someone, remember that it is of small good to wash off a slash of acid from person or clothing. First of all, apply soda or ammonia in order to kill the acid, and then wash all you will. Guard your eyes. In dusting carbonised stock to beat out the burned residue see that it receives adequate crushing at the duster feed. When the wool has been thus cleansed see that it is kept clean, and not permitted to gather dirt again off the floors.

The acid left in the stock after carbonising will not likely do any appreciable harm in the after processes. Tons of carbonised shoddy passes through Canadian mills daily and nothing is thought of it, no detriment to the machinery being thought of. Why then call for neutralising of the wool, which has been carbonised? It makes a lot of extra handling and expense. You must take the wool from the final dusting and wash it in an alkali bath strong enough to get the best of the acid left in the stock. The washing bath quickly becomes stained and requires constant removal. The wool becomes more or less yellowed in color, and must be subjected again to heat in drying. The dryer can neutralise it if necessary before dyeing. It can be neutralized also in the cloth form by the finisher. Notwithstanding "you pays your money; an' you takes your choice."

Underwear Company's Successful Year

The second annual report of the Nova Scotia Underwear Company, Limited, covering operations from December 1, 1912, to November 30, 1913, which was issued recently, shows a very satisfactory year's business. The report shows net profits for the fiscal year of $22,161. This with a balance of $4,143 carried forward from 1912 gives a total credit of $26,304. After deducting quarterly dividends at 7 per cent for 1913, $5,000 written off for depreciation and $1,000 set aside for contingent account, a balance of $9,572 was carried forward into the new year. Reserve and contingent accounts now amount to $10,572.

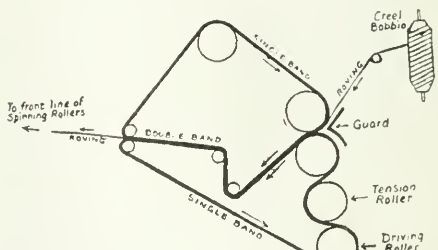
In his report to shareholders, President N. B. Smith, spoke encouragingly of the outlook and in reference to the temporary trade depression, general throughout the Dominion, said, in part:—

"The year 1913 has been one of world wide financial stringency, which has been particularly felt in the Canadian West, which is the largest market for our products. Consequently a number of our customers found it necessary to curtail their orders so as to adjust themselves to existing conditions, and our output for the year, although much in excess of the previous year, was smaller, especially during the last half of the year, than it would have been, had normal business conditions prevailed."

Novel Cotton Spinning Device

There has been applied to a 48-spindle ring spinning machine at Sabadell, in Spain, a remarkable spinning attachment which may prove to be the most important improvement in spinning during recent years. On the small scale mentioned it is reported to have demonstrated that the intermediate and roving frames of a mill can be dispensed with without disadvantage. The inventor is Senor Casablancas, a Catalonian, and the company working his patents is the Sociedad Anonima Patente Casablancas. About 400 spinners and other persons interested recently attended a demonstration of Senor Casablancas' apparatus, during which the 48-spindle ring spinner was spinning on one side 70s yarn from 1.00 hank slubbing of Egyptian cotton and on the other side 60s yarn from 1.36 hank slubbing of low American cotton. The draughts were, therefore, respectively 70 and about 45.

The mechanism is simple. Taking the whole machine, the differences entailed by the Casablancas arrangement are these. The back and intermediate lines of drawing rollers are absent, and instead of them there are two endless leather bands, similar to those in waste or woollen carding engines, running over guide rollers in such a way that they come into running contact with each other during part of their travel and carry the roving along between them from the creel bobbin to the front line of spinning rollers. From this point the operations proceed as usual. The arrangement is shown in the accompanying diagram.



A COTTON SPINNING DEVICE

With regard to the performance of the apparatus, it is stated that with a draft of 40 to 50 obtained in this novel way the resultant yarn is strong. With drafys above this it is said, on the authority of one spinner, to be weaker than yarn spun in the ordinary way. It is claimed that if the sliver is unequal, the natural tendency of the apparatus is to make it more regular, the leather bands pressing more heavily on the thicker sections. It is said, but without any qualifying reference to the drafts employed, that there is a general increase in strength of 5 per cent over yarn spun in the usual way.—The Manchester Guardian.

OUR OLD COUNTRY LETTER

(From Our Special Correspondent.)

The British Association of Wool Buyers have prepared a scheme by which they propose to revert back to the old method of shipping wool from Australia to Hull, London and other ports by means of sailing vessels. An arrangement has already been made for the chartering of one vessel which will return with 10,000 bales. Mr. Alfred Ayton, of Bradford, says that the difficulty Bradford had to cope with was that so much wool reached England all at once that the warehouses became choked. Many top makers bought their wool in the colonies or in South Amereia or London and sent it all to the establishments at which it was combed. The sailing ship had one drawback—one never knew when it would arrive. That might mean buying wool in London at a ruling price, sometimes having to pay "through the nose" for it. Of late years, he added, offerings at the sales in Australia had increased enormously, because, in the first place, generally speaking, the growers found they got better prices than in London, and, in the second, the growers naturally wished to dispose of their wool as quickly as possible. An extension was also required in regard to the sales. As to the alternative, Mr. Ayton said at present storage accommodation was cheaper in some railway companies' warehouses in London and Hull than it was in Bradford. A large public warehouse was badly needed in Bradford to store wool in. This was done on the Continent and why should it not be done in Bradford. Many wool buyers believe that by sending wool by sailers it will be distributed over a longer period and warehouse expenses will be saved. It sometimes happens that 80 steamers are afloat between England and Australia with wool.

* * * *

Seeing that electricity is now being largely adopted in textile machinery and modern mills, an interesting question has been addressed to an expert on the application of electrical power to the textile trades. He has been asked to say what were the chances of an electrical loom in the future. It is to be remembered that in 1884 there was an invention for propelling the shuttle by means of a powerful magnet. At present there are jacquards in which the thread is selected electrically. An electrical loom might, therefore, tend to less complication in fancy weaving. The reply of the expert was to the effect, that we were some distance off any big development. There was a big opening for anyone who could devise a better mechanism than the present loom, which was anything but a good mechanism. The idea of propelling a shuttle by means of a magnet was not workable. The shuttle needed to be dealt with, however. "It would amaze those," he adds, "who did not know it when he said the shuttle took the biggest bulk of the power used in driving a loom. Electrieal jacquards had not so far proved a great success, but from what I know I believe we should, before many years, see a good electrical jacquard." Those in Canada who are studying the methods of up-to-date mills should not lose sight of the foregoing comments, as it is quite evident some of the experts will spring a surprise on us within the near future.

* * * *

Professor Barker, of the Bradford Technical College, has asked the question: Is the problem of twist a spinner's or a cloth constructor's problem? In answer to this, he points out that although the spinner by ageing and conditioning, might cover up the natural tendencies of the wool, yet in the final finishing processes those tendencies would assert themselves, to the detriment or otherwise of the resulting fabrics. He, therefore, contended that the problem was more truly a cloth constructor's problem, due allowance being made for the limitations under which the spinner worked. Professor Barker also strongly advocates the defining of twist by twist-angle rather than by terms per inch. He points out that if the cloth constructor and spinner thought of the twist in their single and two-fold yarns in terms of the angle they would see more clearly in their mind's eye what was happening, or what was likely to happen in both yarn and fabric. In this connection, he draws particular attention to what is termed a balanced twist, as against the ordinary square twist of the trade, it being clearly demonstrated by examples that a balanced twist straight from the frame would lie inert and workable, while a square twist would be most difficult to deal with under similar conditions.

* * * *

The East India Wool Sales concluded at Liverpool on the 17th inst. Home and continental buyers operated freely in suitable lots, which ruled steady at par to 5 per cent decline for whites and 5 per cent for yellows, while colored wools made steady rates. Defective parcels were up to 10 per cent cheaper. The American demand was good.

* * * *

A propos of the first editorial article in the Canadian Textile Journal for September last on "Textile Technical Education," I should mention that the annual report of the Bradford Technical College has reached me. With this college is amalgamated evening classes for textile workers and students, and the whole is run by a Technical Education Committee. The department of textile industries is controlling or directing the work of 900 day and evening students and year by year the training is being directed on to more scientific lines with the result that the prospects seem very bright. The development would probably be at the expense of real practical insight but for the excellent equipment the college now possesses, which enables this tendency to be corrected; and the courses of instruction now present a most happy combination of theory and practice. "Some years ago," says the report, "the success of a student was measured by the college prizes and certificates, which he won, but to-day it is rather measured by his success in the industry. Notable successes of diplomas and other students have recently been recorded, and there is an urgent demand for well-educated and technically-trained men which is hardly realized by the grammar and other schools." New rooms are now provided for tuition in the mechanical engineering laboratory, and civil enginering, whilst the chemistry department has been increased by the provision of two balance rooms, lecture room and gas and analysis room. There are also rooms for physics, mathematics and biology. Canada might well take a note of what the education authorities are doing in England for Textile Technical Education.

The Colonial trade in the various branches of cotton goods has generally been above the average for the majority of the London and Manchester houses. Orders with manufacturers are, as a rule, placed in the early spring months for the approaching season's trade, and contracts were placed at comparatively low prices. It is stated that the Canadian business has, however, not been up to expectations, the ordinary grey domestic cloths and plain drills being dull all through the season. Some specialities in dyed and fancy goods only sold moderately well for the making-up trade, but ordinary Manchester, it is said in London, have now to compete with the United States as well as Canadian competition. In the Todmorton and Burnley districts grey and striped cotton drill makers complain of the unremunerative business that agents and merchants are now offering them, as the prices submitted are invariably below making rates. The demand is also somewhat irregular.

* * * *

After a conference with representatives of the Federation of Master Cotton Spinners' Associations the Executive Council of the Cardroom Operatives' Association decided to withdraw from what is known as the Brooklands Agreement, under which conferences on labour questions in the cotton industry have hitherto been arranged. The Operative Spinners have taken the same course and the agreement, which has been in use since 1892, now becomes obsolete.

To Smooth Creases in Fulling

One of the greatest difficulties that the finisher has to contend with is in the fulling process through which the cloth undergoes, is in the avoidance of mill rigs which form in the angles of the creases of the material to be fulled owing to the excessive felting. Many machines have been put on the market for this purpose, but not all of the difficulties have yet been overcome. The longitudinal creases formed in front of the cuttling spout due to the pressure of the principal working rollers has always been a serious proposition and, in order to do away with this fault, a corrugated shape was given to the cuttling spout or beaters, or thumping rollers, were provided, but none of these succeeded in altogether doing away with the difficulties that were run up against. In an invention recently patented in the United States the inventor has found that the longitudinal creases can be smoothed out by a frictional crosswise action.

Figure 1, in the accompany sketch, is a side elevation of the apparatus and Fig. 2, a plan of the manner in which the rollers are adjusted. a and b are the principal working rollers of the fulling mill, c and d are the usual doffing plates, while e, f, g and h are the cuttling rollers of such shape and arranged in such manner as to overcome the creasing so often experienced with the ordinary rollers. The axles of these rollers are arranged in different and non-parallel plains relatively to each other and are mounted in ball and socket bearings i, on frames l.

In order to overcome the crease difficulty the material to be fulled is subjected on one or more sides during the cuttling to a diagonal or laterally inclined stroking operation, the direction of this stroking operation, or the frictional component crosswise to the travel, being inclined on oposite sides in opposite directions. A somewhat similar effect can be obtained by moving to and fro the cuttling spout lids or cuttling rollers; this, however, requires a comparatively troublesome motion. It is avoided by replacing the cuttling spout by cuttling rollers, which are arranged in pairs in such manner that one is oblique to the other of the same pair, and by forming the circumferential surfaces of these rollers correspondingly hyperbolical

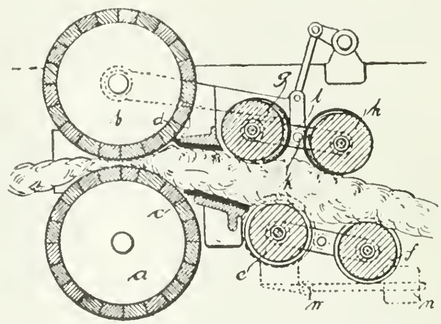


FIG. 1

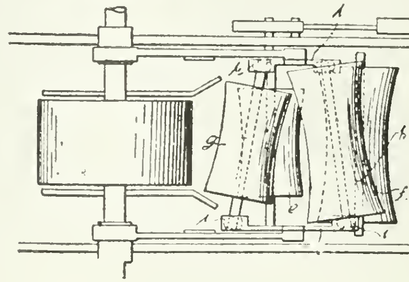


Fig 2

longitudinally. During the passage through a set of these rollers the friction will act partly crosswise, that is to say, the friction of the oblique roller will impart a torsional movement to the longitudinal creases, in one direction crosswise, whereas the friction of the oblique roller of the next pair will impart a torsional movement to the longitudinal creases crosswise in the opposite direction to that of the preceding oblique roller.

WORLD'S COTTON CONSUMPTION.

In its report on supply and distribution of cotton for year ended Aug. 31, 1913, the United States Census Bureau estimates the world's cotton consumption last season at 21,392,000 bales of 500 pounds net and says the consumption this season will probably equal if not exceed that figure.

The report says in part: "The world's commercial production of cotton from the crop of 1912 is estimated at 21,457,000 bales of 500 pounds net. On this basis mill consumption of cotton during the year ending August 31, 1913, was practically the same as the commercial crop of 1912. This, however, does not take into account use of cotton in foreign countries for purposes other than spinning, to which reference has been made. Thus the crop of 1912, while short of the record crop of 1911 by less than 350,000 bales, failed to provide for the increased consumption of the year 1913, and consequently entailed a reduction in the stocks on hand at the end of the year as compared with those carried over from the preceding year."

CLEANLINESS IN THE KNITTING MILL*

The mill operated on the system that makes for success holds cleanliness as a prime necessity

Cleanliness is not only next to godliness, but it is a form of godliness itself. Certainly the manufacturing establishment which is operated on the sort of system that makes for success believes in being clean. The plant where bad housekeping is constantly in evidence can hardly be expected to pay dividends, because this is merely an obvious surface indication of poor management that doubtless has even more serious counterparts elsewhere.

A clean plant, for one thing, is free from fire hazard. Fo r another thing, it is a more pleasant place to work. For a third, it is run as wastelessly as the nature of the business will permit. If only these three points were taken into account, the manufacturer of knit goods would be justified in going to expense and trouble to keep his mill clean. The reduced danger from fire, a more contented and conditioned lot of employees and a reduced waste account would certainly be improvements worth extending a serious effort to bring about.

But, as it happens, they are comparatively minor points. The big thing that the knitter should realize is that a dirty plant is necessarily operating inefficiently, and is producing inferior goods, at increased expense. This is a proposition which brings home to the manufacturer the necessity for cleaning up, as it may not have been brought home to him by the opportunity to make the improvements pointed out above.

It may be conceded, to begin with, that keeping a knitting mill absolutely clean is difficult, if not impossible. But here, as elsewhere, there are degrees of cleanliness, and it is for the manufacturer to say whether his plant shall be reasonably clean, and operating as well as conditions will permit, or whether it shall be allowed to go dirty, without any serious effort being made to prevent it.

There is a lot of difference between tolerating the amount of dirt which experience has shown is inevitable, and in accepting as inevitable whatever amount of dirt happens to accumulate. There is not only an absolute difference, but a decided difference when it comes to the cost of manufacture and the character of the work turned out.

How Yarns Affects Cleanliness.

It is suggested that the character of the yarn has much to do with the amount of waste which is suffered and the amount of lint which flies off. This is undoubtedly true. The concern which is using a well-spun, high-grade yarn has a smaller percentage of short fibers to contend against, and consequently less lint. In this respect it is real economy to buy as good yarn as possible, since it is easier to handle and the loss of poundage from one end of the factory to the other is much less than when a cheap grade of yarn is worked up.

Many knitters deceive themselves in this respect, regarding yarn as yarn, irrespective of quality. Price is the main factor in determining their purchases, and they have never taken occasion to keep track of the amount of waste when a poor lot of yarn is running and that which is suffered when the quality of the material is improved. If this sort of investigation were carried on, it is a safe prediction that more knitters would buy their yarn on a quality rather than a price basis.

But assuming that the manufacturer of knit goods is buying at least reasonably good yarn, he will nevertheless have some waste and consequent dirt. His problem is the same as that of the man with a large percentage of waste, and is different from it only in degree. Both must combat dirt, caused by waste, in a manner that will eliminate it as much as possible.

Piecework vs. Quality.

One of the principal troubles connected with the maintenance of good conditions in the mill is the fact that most of the operatives are on a piece-work basis. This makes for an increased production, but unfortunately it does not conserve quality properly. For instance, a girl who has orders to clean her machine when it becomes dirty will run as long as she possibly can, regardless of the lint which is clogging it, in order not to lose the time which will be required for cleaning.

She does not suffer by the delay. On the contrary, it is the manufacturer who pays for it. The garment which is being knit is rough and uneven on account of foreign particles being carried into the structure of the goods; and in some cases the entire output of a mill gets a bad name among the trade and its opportunity for profitable operations is restricted on account of the defects in its goods, brought about just in the way suggested.

If the operative of a knitting machine considered the interests of the employer as she does her own, she would of course stop her knitting and clean the machine as soon as the dirt accumulated to an extent which interfered with the production of clean, evenly manufactured goods. But unfortunately her problem is not that of making the goods as salable as possible, but turning out as many of them as possible.

She has a valid objection to offer to the waste of time which is necessitated for cleaning, inasmuch as she can point out that the loss should fall on the manufacturer and not on herself. This point is well-taken, from a practical standpoint, at least, since it is the only way to look at it if results are to be secured.

Premium on Quality.

A sufficient premium should be put upon quality to warrant an operative in giving up more of her time the work of keeping her machine in good condition. A plan which might work out satisfactorily would be to pay, in addition to the regular piece-work scale, a bonus for quality above the standard grade, charging at the same time a penalty for work which falls below grade. This would make it possible for the girl whose production, in quantity, was below that of others, on account of time losses due to cleaning her machine, to make up for this by getting added credit for the improved quality for the work which she turned out.

Or, in order to encourage more care on the part of operatives in this connection, it might be provided that a certain amount of time, to be determined by the superintendent, and taking into account the kind of yarn used, the kind of work done and the other factors involved, must be given to cleaning machines. Knowing that the time was at her disposal, and must

* Reprinted from "Knit Goods."

be used, an operative would have comparatively little reason for allowing her machine to be clogged up and to remain dirty. This system, however, might involve a readjustment of the schedule for piece-work, in order to make up to the operatives for the lost time.

The mill proper should be kept as clean as possible, by having the floors swept up and the lint prevented from accumulating unduly. This factor can be attended to without much difficulty, and at comparatively little expense. As pointed out above, the fire hazard is always reduced by better housekeeping methods in this regard; and by the same token it should be remembered that the fire insurance companies, in establishing a rate on a knitting mill or other manufacturing plant, take into account the conditions which prevail. The mill which is unreasonably dirty will have a charge made in its rate, accordingly; while that which is kept as clean as possible will get a lower rate by reason of that particular fact.

Lack of Cleanliness Reduces Profits.

"It is my opinion," said a well known member of the industry, who has made a point of visiting many of the knitting mills of the country, "that lack of cleanliness is the most glaring item on the list of deficiencies which might be made up for the knitting trade. Cleanliness is a simple thing to attain, and a great thing to achieve, since it means improvement in so many different and important ways. The knitter who allows his mill to be dirty, without striving definitely to remedy the condition, is not only a careless manager, but he is disregarding the profits of his stockholders and the intrinsic value of his goods; and that is a condition which cannot continue indefinitely without loss to everybody concerned."

The use of as good yarn as the busines sof the manufacturer will stand; the adoption of a system which will insure proper care of machines by operatives, and the establishment of a "clean-up" force to keep the mill itself as free from dirt caused by lint as possible, will go a long way in the direction of improving conditions in every mill. If these plans have not been adopted in your plant, why not consider them for use in 1914?

Wm. Algie of Alton, Dead

In the death of Mr. William Algie, proprietor of the Beaver Woollen Mills, Alton, Ont., which occurred on February 2nd at his home in Alton, the woollen industry in Canada has lost one of its best known and most respected members. Mr. Algie had been troubled with acute indigestion, following a banquet he attended several days ago at St. Mary's Ont., and this aggravated heart trouble, to which he was subject, and caused his death.

Mr. Algie was born in Ayr, Ont., about 64 years ago, and received his education in the schools there. In 1881 he started a woollen mill at Alton, where he soon built up a good sized business, becoming one of the best known woollen manufacturers in the country. Three years ago his plant was destroyed by fire, but he rebuilt it, on a larger scale, and had just finished the installation of considerable quantity of additional machinery.

The late manufacturer was a strong Liberal and a believer in free trade. In the reciprocity campaign he stumped the country speaking in favor of the issue all through the West. On other occasions he assisted in the campaigns of candidates for the Federal and Provincial Houses. He was one of the best known speakers in the Province, possessed of a quaint, yet pungent, oratorical style, which made him especially popular, he was much sought after as an after-dinner speaker in Toronto. Only last week Mr. Algie attended three dinners, one of which was in Toronto. Wherever a Scotch gathering was held Mr. Algie was in demand. He was a member of the Toronto Burns Club, a great lover of Burns himself, an authority on his poetry, and capable of quoting extensively with fluency and feeling.

Mr. Algie was the originator of the "Drummers' Snack," the name given to a sort of combined concert and picnic held annually for commercial travellers. Mr. Algie established it 25 years ago, and the idea has been kept up in different towns in the Province. It was the custom for travellers to go to Mr. Algie's home on Friday and attend a concert in the evening, followed by a picnic and games the next day.

Mr. Algie was president of the Canadian Secular Association, and a contributor to "Secular Thought" and other periodicals. He was also a personal friend of the late Robert Ingersoll.

Mr. Algie was married to Miss Berta Dale, daughter of H. Dale, Brampton, who survives with two sons and four daughters: William Algie, Toronto; James Algie, Brampton; Mrs. Wm. Dorrington, Mrs. Amos Mason, Miss Algie, of Alton, and Mrs. McIntyre, Oklahoma. Dr. James Algie, of Toronto, is a brother. The funeral took place in Alton on Wednesday, February 4th.

NEW BOOK

WOOLLEN AND WORSTED FABRICS GLOSSARY.

This book, published by Frank P. Bennett & Co., Inc., of Boston, will undoubtedly go a long way to satisfy a want for ready information regarding textiles and textile fabrics that has long been manifest among those engaged in and interested in the manufacture and selling of woollen and worsted fabrics. It contains data regarding, and instructions for, the manufacture of practically every variety of woollen and worsted fabrics, dealing first with the fibres, the preparation of the raw material and finally the construction and finishing of the fabrics made therefrom. It is undoubtedly a valuable book for both the experienced manufacturer or superintendent, and the operative who is anxious to get along. Those interested in the selling end of the game, not thoroughly familiar with the manufacturing processes will also find it a very useful book for reference. Copies may be had from the office of the Canadian Textile Journal. Price $3.00, postpaid.

COMPANY'S CASE GOES TO PRIVY COUNCIL.

Some months ago the Supreme Court handed down a decision in the Companies Case, which, although opinion was divided, upheld the status of provincial incorporations, and maintaining their rights to engage in business not only in the province of incorporation, but in other provinces as well, being subject in the latter case to provincial regulation and taxation. At the Provincial Conference, held last summer, a resolution was passed asking that the case be considered as closed. However, we learn that the case is now being perfected for an appeal to the Privy Council from the judgment delivered in the Supreme Court.

THICKENERS EMPLOYED IN TEXTILE PRINTING

By HERBERT A. CARTER.

(Specially written for the Canadian Textile Journal)

The term thickeners is given by the colour maker to liquids of a viscous nature used as the vehicles for colours, and mordants in textile printing, of which calico printing is that most extensively followed. They are of such a consistency that they keep intact the outlines of the printed patterns, in other words, they prevent the running of the colours, a bad defect when it does occur in these goods, which reduces greatly the prices obtainable for them — in fact, in many cases such materials can only be sold as job lots, or as they are commonly termed "fents." Generally it is assumed that the paste can be removed as soon as the color is well enough fixed to withstand rinsing. Albumen thickener is an exception to this rule, for it is itself a mordant. Discretion has to be exercised by the color mixer in the choice of thickeners. They need, in practice, to be changed to suit circumstances. The choice of the material, which is generally a gum or a paste, and the manner in which the same must be prepared are amongst the most important duties which the color mixer has to perform in the color shop. A thickener paste which will serve its purpose excellently in one case will not suceed in another, then it may be too costly to use in a third case.

Natural starches and gums, egg, and blood albumen were the only thickeners used in textile printing in years gone by, to-day all descriptions of dextrines, soluble starches, British gum, Leiogomme, Gomme, Labiche, Gomme Industrielle, Textile Gum, Tragacanth substitutes, Mineral Thickeners, Special Gums, etc., are to be found in the colour shop. New colours and new styles spring up every day, and with them the necessity for altering the formulae to suit the new circumstances. By simply changing the proportions some difficulties may be surmounted, others call for the introduction of entirely new raw materials. Starches are found in the form of microscopic round or oblong grains of organized structure inside numerous vegetable cells. While not differing chemically, starches of various origins exhibit different physical action. The most characteristic difference in starches is the size of the grain. In colour making it is very seldom that other than potato, corn, wheat, rice, tapico and sago starches are employed. Starch is insoluble in cold water, and no matter how long it is stirred in cold water it will settle if undisturbed. When the water is heated to 130 deg. F. and above, the grains of starch absorb water, swell, and burst open. The higher the water is heated, while stirring in a steady manner, the more the organized structure of the grain becomes broken up, and when boiling heat is applied for some time a thorough penetration has occurred from which no separation takes place on allowing to stand without stirring. A starch paste of this kind is composed of a part, in true solution, in soluble starch, and a part actually insoluble, but in steady suspension, or starch cellulose. Many means have been devised to transform all the starch into soluble starch, and various prepared starches may now be bought under this name.

Gums are such amorphous transparent substances as combine in water in forming a true solution, i.e., Arabic, Senegal Gum, or a slimy paste which cannot be filtered through paper. The following are examples: Gum Tragacanth, Gum Senegal, Gum Arabic, Gum Gezzah. They are gathered in various parts of Central Africa from plants and trees (Acaccias). The artificial gums first manufactured in Alsace, Germany, are much used in calico and textile printing to-day in many large works. They are cheaper than the natural gums, and better than them in many respects. As the solubilization of the vegetable gum proceeds Tannic Acid colouring matetrs, and certain defects, are removed, matters which adhere mechanically, such as minute pieces of wood, leaves, grit, and sand, which are a danger in the use of Arabic gums, are given plenty of time to settle to the bottom of the large settling tank, the manufactured gum is brought to a certain standard of strength while the natural gum picked under greatly varying conditions differs in its condition from bag to bag, the exposure to steam during the process of solubilization sterilizes the gums, and prevents the danger of rapid fermentation to which the natural gum Arabic has a tendency, the thickening qualities are so much enhanced by the refining that one part of the artificial gum will go as far in making a good paste, printing experts are agreed, as three parts of the Gum Arabic.

For Alizarine Red printing on unprepared cloth, another artificial gum may be had. The customary process of preparing Turkey Red Cloth in oil previous to printing Alizarine Red and Pink has been found too costly for some cheap qualities of cotton cloth, on the other hand, the mixing of Turkey Red Oil in print pastes together with Alizarine and Mordant has not produced good results. This special gum makes it possible for the colour mixer to make up a colour which contains oil, alizarine, and mordant keeping quite as satisfactorily, and yielding as bright and brilliant effects on unoiled fabric as can be got on previously prepared goods with common thickness. Mineral matters of an indifferent chemical nature which would not have any chemical affinity either to the fibre or to any of the components of certain print colours have for long been used as admixtures, and no good reason has been adduced for their good effect.

A much larger use for these mineral thickeners is foretold by several experts in textile printing who have studied their properties very closely. Knecht, Molan and Georgieves have demonstrated that charcoal, coal, aluminahydrate, and even fine silicate powders tenaciously retain dyestuffs made from colour solutions, this attraction can only be brought about by mechanical adhesion, and not by any chemical affinity. Such mechanical ahesion is also exercised by organized matter toward solid particles. If a cotton fabric be submerged in chrome acetate solution, for example, a portion of the chrometrydrozyd will be fixed on the fibre, but if a precipation takes place inside of the fibre some of the oxyde will be retained mechanically, even after the most thorough rinsing. Should Starch Tragacanth pastes have been used as carriers for the chrome salts, it will be noted that some of the loose chrometrydroxyd precipitated in the fixing liquor will be detained in the fibre, and will again hold fast to some of the starch. Here is a case, points out one of these experts, bearing in mind what has been said as to the beneficial action of mineral admixtures where admixing of Kaolin to Chrome Mordant pastes has been found very useful. Remembering the above experiment the explanation is easy. Kaolin as a finely divided inorganic but organized substance in intimate contact with fibre has even a stronger power of absorption for the suspended chromehydroxyd than the fibre and carries it into the wash water.

The cells of plants which yield starch are broken up by maceration, or otherwise, and the mass is washed, the starch is washed out and the water is run into tanks, where the starch settles, the water is poured off, and the starch is dried. In this way it is got from potatoes, rice, wheat and many other plants. Very dilute solutions of starch can be filtered, and are quite limpid. Heated to about 150 deg. C. for some time starch darkens in colour, and passes into a soluble body which has the same composition, but which dissolves in water forming a gummy solution. This is called dextrine, or British gum, and is largely used as a substitute for Gum Arabic. Boiled with acids, the change takes place readily. Various other substances produce this, and similar changes, by which the starch is rendered soluble, as, for instance, diatase the active principle of malt saliva, etc. Seeds contain

MR. JAMES KENDRY, Ex.-M.P.; Pres. and Man. Dir. of the Auburn Woolen Co., Limited, Peterboro, Ont., whose name has been mentioned in connection with the vacancy in the Senate caused by the death of the late Senator Cox, of Toronto

starch largely, and when germination begins under the influence of ferments present in the seed the starch is converted into glucose, and other soluble forms, in which it can be assimulated by the growing plant.

The slimy paste which Gum Tragacanth produces by long immersion in many times its weight of water is of great viscosity. The best qualities of "Smyrna" need very little of the solid substance to produce a good print paste, if after a thorough semi-solution of the flakes and ribbons, the paste has been boiled for a certain time. Fabrics printed with Gum Tragacanth thickened, colours will exhibit after drying, and still more so after steaming, a hardly noticeable decrease in pliability, or softness. This causes Tragacanth thickener to be very useful in such cases where the washing of the printed material is to be avoided as, for instance, in silk warp printing, and in some descriptions of cotton napped goods, for instance, cheap qualities of cotton flannels, the nap of which would lose in spring and elasticity by washing. The defects in this otherwise good thickener have been removed in some of the Tragacanth substitutes which had their origin in wholly different materials. They appear in the market in powder form, which mixed with about twenty times their weight of cold water form a clear transparent paste. They cannot be used for basic colours, but most of the silk colours, and direct colours give, it may be remarked, excellent results with these thickeners.

When a mordant is rendered soluble it finds its way into the fibre, and once there undergoes a process of decomposition which renders it insoluble, and receptive of the colouring matter, for which it has an affinity. The mordants are varied almost indefinitely to produce the various shades, and combinations of colour needed. The first process, then, after printing is to get this mordant fixed upon the cloth according to the variety of the pattern. Presume the ground of the fabric is white, and that it must be left so, and two case two gradations of mordants will be employed. The mordant may be almost colourless in appearance. This has to be applied to the cloth through the medium of the engraved pattern on the roller, it cannot be so rollers are used in the printing of a pattern, in this applied in this liquid condition. It has, therefore, to be thickened by adding flour, starch, or some of the other products, named already, to it. These are boiled with it, and then strained. But, as in this condition no very perceptible colour-effect would be shown upon the cloth, in the process of printing a quantity of fugitive colour is added to give distinctness to the outline so that the printer may see that the pattern is being properly produced. This fugitive material is called the "sightening" colour.

When the mordants are thickened, and mixed with the sightening colour they are in an almost pasty condition. Then they go to the printing machine. Pressed against each engraved roller in this is another roller of wood covered with cloth, which is called the furnishing roller, and this transmits the colour, having received it from a colour box placed beneath, and in which it revolves. Upon the engraved roller, and acting upon its surfaces are two sharp blades, called in the trade, "docters," which move with a shaving motion, one called the colour docter removing all superfluous colour from the surface, and leaving only that which is to remain in the engraved parts, and be transmitted to the cloth, and the other called the lint docter, cleaning the roller before it receives the colour again. The origin of this term "docter" is stated to be as follows: Several methods of cleaning the roller had been tried by early experimenters without success, either the cleaning was imperfect, and the cloth was streaked, or the colour was dragged out of the engraving. On one occasion some new devices were tested, but they failed, and the printer looking at the streaks of colour on the roller said, "If you cannot doctor that, the thing is no good." One of the parties present took up a dinner knife lying on the bench, and held the blade to the roller revolving in the colour, he saw the effect at once, and cried, "It is doctored now; this is the docter," and it has been generally called this since.

The Roman author, Pliny, who lived in the first century of the Christian era, states that the Egyptians understood the use of mordants, for he says, they took their white cloth imbued it with certain drugs which have no colour, but which can absorb dyes, and when put, then, in the hot dye bath, it is coloured.

Referring now to Kaolin, Luigi Carbeti has made use of its absorbing power in making a resist paste under Thioindigo Red, and the Thioindigo Red is either printed, or padded, on top of this paste. The unprinted part of the cloth absorbs the Leuko-thioindigo Red, which is temporarily formed, and after resorption of the fibre is again reoxydised. The Bichromate in the resist paste prevents the formation of Leuko colour, or rather reoxidises it, and transforms the dyestuffs into a fine powder, which would be retained by the fibre were it not for the more powerful attraction of the Kaolin upon it. For the same reason Kaolin makes a good addition to discharged pastes, in general.

The importance of the study of all these thickeners stood when it is said that of all the departments which by calico, and textile printers generally, will be undergo to compose a modern print works, none exercises as great an influence for good, or bad, upon the work turned out as the colour shop and the work of mixing the colours carried on therein. Of course, the other processes of calico printing, the engraving of the printing rollers by hand, or pentegraph machine, the bleaching of the grey cloth, if the printer does his own bleaching, which he generally does, the mordanting of the cloth, the carrying out of discharging processes, when this class of work is being done, and the actual printing of the goods on the machines in the printing room are all important, and call for the exercise of considerable care in their performance, but the mixing of the colours and a correct selection of the thickeners, or vehicles for them forms the very basis upon which the industry rests, and if these operations are not efficiently carried out, and carried out in the most up-to-date manner, it is useless to look for a high standard of excellence of production.

Not so very many years ago the colour mixer worked, as the saying is, by "rule of thumb," he did exactly what his father did, and amongst his many colour shop recipes he had recipes handed down to him by his father, and perhaps his grandfather, for in many of the English and European textile printing districts families followed the calling of colour mixers from generation to generation but all this is now changed, the study of chemistry bringing with it new ideas, and competition in the industry have made it essential that colour shop operations should be directed by a practical chemist, and, in fact, that the colour mixing should come in for a very considerable share of personal supervision from him, and if the chemist himself is not conversant with the properties of the various thickening agents which have to be employed, it will, of course, be impossible for him to direct, correctly, the foreman of the shop who works under him, but many foremen, themselves, now make a practice of studying their nature and actions.

Nothing causes more trouble, and, indeed, loss in a calico printing works than a badly mixed colour, one which on printing fails to yield the shade desired, or one which having been incorrectly thickened causes running of the colours, and if the loss experienced from these two causes is considerable in a calico printing works, it is still even greater in a works, the trade of which is the printing of the much more costly material, silk, for large quantities of these expensive textiles may very easily be completely ruined. The colour mixer requires, in fact, to have a good knowledge of colour matching, for goods have often to be printed to sample. This calls for good sight on his part, needless to say, anyone troubled with colour blindness, and there are some people who suffer from this to a greater or less degree, would never make a good colour mixer. Having been furnished with the sample which he is to match, the colour mixer must select the best time of the day in which to match it, before he proceeds with the mixing of his colours. He should not choose a dark and gloomy day to do this, nor seek to match it by artificial light.

Gluten is a sticky residue which is left in the starch bag. It contains about 52.6 per cent, C., 7.2 per cent H., and 15 per cent of N. Flour contains about 10 per cent. of gluten, and 70 per cent of starch.

Guelph Textile Mills Win Suit

Award Given Against the City in Flood Suits.

Judgment in the actions brought by the Guelph Carpet Mills and the Guelph Worsted Spinning Company, Limited, against the City of Guelph, was handed down by Mr. Justice Middleton at Osgoode Hall, Toronto, last month. The suit was brought against the city to recover damages for the flooding of the properties and subsequent loss sustained by the two companies at the time of the serious flods that occurred in Guelph during the Spring freshets of 1912 and 1913. According to the judgment, the city must pay $26,500 damages to riparian owners for loss sustained and injuries to their properties by the floods mentioned.

The suits were tried by his Lordship at Guelph in November last. He finds that the new bridge, which replaced a similar structure that had done duty for 30 years, was built in such a manner that it impeded the flow of the river when swollen by the spring freshets.

The old bridge had two spans of 50 feet width, and its whole floor was over seven feet above low-water mark. The new structure is of two spans, but to make it more artistic in appearance it was built in the form of an arch, and the approaches were lowered at each end, with the result that the spans were narrowed by 10 feet and the head room above low-water mark reduced to about four inches at the and four feet nine inches at the crown.

The plaintiff firms based their claims for damages on the grounds that the new bridge had been constructed in such a manner that it was rendered inadequate to permit the passage of spring freshets.

The city contended that it had exercised reasonable care in the preparation of plans, that its engineers in designing the bridge had made adequate provision for the free flow of the river under normal conditions; that the amount of head room above low-water mark was ample to permit the passage of the spring freshets, or as great a volume as had been experienced at any time within 40 years; that the two floods which caused the damage to the plaintiff's property were of an exceptional nature, and could not have been foreseen. Several engineers gave evidence in support of the respective contentions.

MILL AND GENERAL TEXTILE NEWS

W. H. Moore has resigned his position as manager of the Colonial Knitting Company of Guelph. He is succeeded by Mr. Steebe.

The first annual general meeting of the Smart-Woods, Limited, will be held at 800 Mullins Street, Montreal, February 14th.

Messrs Gordon, Mackay & Co., Limited, of Toronto, have established a branch at Brandon, Man. We understand that the city of Brandon will issue $140,000 worth of 20-year 5½ per cent. debentures, the company paying interest, sinking fund and principal at the end of that period and taking full possession of the building, which has already been erected for them.

J. H. Prescott, formerly with the Kingston Hosiery Company, Kingston, Ont., and latterly with the Allentown Eidertown Company, Allentown, Pa., has accepted the position of knitting forman with the Long Island Knitting Mills Company, Brooklyn, N.Y.

The Riverside Woollen Mills, Cochranedale, Nfld., which were started last spring under the management of Douglas Pickles have had a very successful year, an dcontemplate extensions in the spring. Wool blankets have been the principal product, but the management intend manufacturing tweeds and homespuns when the extensions are made.

The Elora Textile Company, Elora, Ont., T. A. and A. E. Carswell, have commenced operations manufacturing astrachans and fancy knit goods.

William Earnshaw, Almonte, Ont., Canadian agent for Dr. Belart's Size, has recently been appointed agent for Canada for James Holdsworth, Huddersfield, Eng., one of the best known manufacturers of card clothing in Great Britain.

The Avon Hosiery Company, Stratford, Ont., have prepared plans for an addition to cost $10,000. The work on the new addition will be started immediately.

Mr. Robert Henderson, whose firm, R. Henderson & Co., and that of H. L. Smyth & Co., amalgamated and formed a stock company, under the name of Henderson & Smyth, Limited, on the first of this year, has retired from active business. He retains the presidency of the company and some financial interest. Mr. Henderson has been identified with the wholesale dry goods business for forty-eight years.

A. H. McManus has resigned his position as superintendent of the Magog Branch of the Dominion Textile Company, and F. T. Reynolds, lately superintendent of the Hochelaga branch during Mr. Wilson's absence on sick leave, is in charge temporarily.

The Trusts and Guarantee Company, Limited, of Toronto, have asked for tenders on the assets of the Dominion Linen Manufacturing Company, Limited, of Guelph and Bracebridge, Ont. The assets consist of real estate at Guelph, building, machinery and equipment, including cards, patterns and designs and office furniture at Guelph, cloth, yarn and supplies at factory in Guelph, and stock-in-trade at the warehouse of the company at Toronto, as well as furniture, fixtures, etc., in that warehouse, book debts, said to amount to about $20,000.00, and the real estate and buildings at Bracebridge and other assets. No announcement has yet been made as to the purchasers.

Mr. Louis Liss, formerly interested in the Berlin Knitting Mills, Brooklyn, N.Y., has disposed of his interests in that company, and has moved to Toronto, where he is now interested in the Dominion Knitting Mills, started about a year ago by his son, Morris Liss and Julius Seltzer. This company has lately moved into new quarters, and are adding considerable new equipment.

The annual meeting of Penman's Limited, will be held in Montreal on March 2nd.

M. T. Cooney has succeeded the late George Henderson as manager of the Coaticook branch of Penmans Limited.

The Monarch Knitting Company Limited passed the dividend on the common stock of the company payable February 1st. The regular dividend on the preferred at the rate of 7 per cent per annum was paid on that date, however. It was pointed out in explanation of this course, that customers generally are carrying large stocks of goods, and that orders for the moment are slow and the outlook is undetermined, the directors have considered it advisable to omit the common dividend.

At the first series of London sales the net total available amounted to 127,000 bales. Of these about 120,000 bales were sold, the home trade taking 60,000 bales, the Continent 55,000 bales, and America 5,000 bales, something like 7,000 bales being carried forward to the March series, which begin on the 3rd of that month. It is estimated that about 150,000 bales will be available for that series, including the wools held over.

The latest issue of the Canada Gazette contains notice of the incorporation of the Maritime Knitting Company, Limited, Montreal, Que. The capital is $49,000. The company is licensed to carry on business as manufacturers of gloves and mitts of all kinds; of boots, shoes, slippers and larrigans of all kinds; of clothing of all kinds, and every material, overalls, sweaters, and underwear, hosiery and other knit goods.

NEWFOUNDLAND KNITTING MILLS, LIMITED.

New Company at St. John's, Nfld., to Manufacture Underwear.

A new company, the Newfoundland Knitting Mills, Limited, has been formed at St. John's, Newfoundland, with a capital of $250,000—$100,000 preferred and $150,000 common. A somewhat unique feature of this organization is that an agreement has been entered into with the Government of Newfoundland under which the colony guarantees, to the extent of 5 per cent., the preferred dividend for a period of fifteen years. The company's market will be confined exclusively to Newfoundland. This company has purchased the property of the British Woollen Company, organized a few years ago to manufacture underwear and knit goods. This plant is equipped with 2 sets, cards, 672 spindles, 18 knitting and 17 sewing machines. Some new equipment will be added and the product will consist of men's all-wool underwear. The company has started operations, having been organized by F. C. Smythe, formerly connected with the Scotia Underwear Co. at Eureka, N.S.

Scouring by means of Volatile Liquids

By WALTER M. GARDNER, F.C.S.

Yarn Scouring.

During the scouring process the raw wool is deprived of its natural lubricating greasy matter, and in the purified condition is more easily susceptible to mechanical injury, if roughly treated. If, for instance, it were attempted to card and spin the fibre in this dry condition, not only would the resulting thread lack uniformity and cohesion, but much waste would be produced through breakage of the fibre. In order to facilitate these processes, it is therefore, necessary, to add a certain amount of oil to the wool, and if it is desired to dye it in the form of yarn, this added grease, along with any dirt acquired during the carding and spinning, must be removed by a second scouring process. The yarn-scouring process is, therefore, equally as important to the dyer as the scouring of loose wool.

A variety of oils are employed for the purpose indicated above, and they behave very differently when treated with alkaline detergents. Some, such as Gallipoli oil, are very easily emulsified, and, therefore, may be removed by a very gentle treatment. Others, such as linseed oil, are readily removed if the scouring process follows the oiling after a very short interval; but on standing they absorb oxygen from the atmosphere, and become changed into an insoluble sticky substance, which is not easily acted upon by the alkali. Again, mineral oil, when used alone, is not capable of forming an emulsion with alkalies, and is, therefore, not removed by ordinary scouring; in presence of some saponifiable oil, it appears, however, to emulsify and thus the use of a mixture of mineral and vegetable oil in the oiling process, or of soap as a scouring agent, results in the removal of the mineral oil from the wood.

It is, therefore, of great importance that a suitable oil should be selected for oiling the wool, the use of a common cheap oil being a very false economy. A good quality of Gallipoli, olive or neat's foot oil is perhaps the most highly esteemed for the purpose, but any oil possessing the following characteristics may be considered suitable: It must be readily emulsified by alkali; it must not turn rancid or become oxidized by exposure to air; it should, as far as possible, be devoid of color and smell, and must, on no account, contain mineral acid: sulphuric acid being occasionally present as an impurity in some samples of "oleine." It is of course, obvious that mineral acid will quickly attack the wire teeth of the cards, and thereby necessitate frequent grinding.

As a preliminary to the yarn-scouring process, it is necessary, especially in the case of hard, twisted yarns, to remove the tendency of the thread to curl up. This is done by immersing the yarn, in a stretched condition, in a bath of boiling water, and allowing it to cool without relaxing the tension.

To this end a little apparatus, called a "yarn stretching" machine is made use of. It consists of two series of horizontal bars or pegs, one above another, held apart by two powerful screws, by rotating which the upper series can be raised or lowered. After placing the hanks of yarn upon the pegs it is stretched tightly by raising the upper framework, and then the whole apparatus is immersed in boiling water for a few minutes, and, after removal, allow to lie until cold before removing the hanks.

After this treatment, the rationale of which has been explained when speaking of the hygroscopic and elastic nature of the fibre, the yarn remains in a straight condition and is readily handled in the scouring baths.

There are a number of different methods of scouring wool in the form of yarn, but the most usual plan is the very simple one of hanging the hanks side by side on a series of smooth wooden poles which are placed traversely across an oblong wooden vat. The hanks are then individually and systematically worked about by hand in the liquor until clean, and ultimately squeezed, either by hand or, more usually, by means of rollers. Another apparatus in which hand labor is partially done away with has a series of rotating reels to replace the poles and a travelling apron to carry the hanks through the squeezing rollers. The only manual labor required here is that of placing the hanks upon the reels, and afterward removing them from the reels to the travelling apron. A continuous yarn-scouring machine is also employed in which the hanks are deposited by a feeding apron between two broad, endless bands, and by these carried through one or more scouring baths fitted with squeezing rollers.

Any of the alkalies mentioned as scouring agents for loose wool may be employed in yarn scouring, but soap with or without ammonia is most commonly used. If, however, an oil which does not readily emulsify is present, it may be necessary to use some stronger alkali, such as carbonate of soda.

Cloth Scouring.

The substances present as impurities depend upon the character of the cloth. If it has been dyed in the condition of loose wool, the cloth will contain the oil added before carding, the stiffening material used in sizing the warp, and any dirt, contracted during the manufacture. If yarn dyed it may contain only size; but if manufactured in the grey both grease, size and dirt will be present. The method of scouring should therefore, depend upon the nature of the impurities, but the character of the coloring matter with which sideration. Indeed, the scouring of wool in the form the cloth is dyed shall be an equally important conof cloth is so intimately connected with the milling, crabbing and other finishing processes, that it is impossible to discuss them separately in an adequate manner.

Grey cloth (that is, cloth spun and wove in the undyed condition) will, as above noted, contain grease and size as principle impurities, and may be scoured either with soap or soda, or a mixture of the two. In the case of certain classes of cloths, which have a tendency to cockle up during the scouring (e.g., certain union goods), it is usual to introduce previously, the processes of crabbing and steaming. The first mentioned consists in passing the cloth in the open width, and under more or less tension, through one or two baths of boiling water, and finally through a bath of cold water. This treatment, which is equivalent to yarn stretching, gives the material a permanent set, and removes the tendency to pucker or shrivel up. The steaming process which follows consists in wrapping the cloth tightly upon a perforated hollow metal cylinder, by means of which steam is forced through the material. After passing steam for a few minutes, the cloth is rewound on to a second cylinder and again steamed in order to equalize the effect: the original outer and inner ends thus being reversed.

Crabbing and steaming exert an oxidizing effect which, in the case of certain oils, may render them more or less brown in color and very difficult to remove. What appear to be mysterious stains or blotches are not unfrequently produced in this manner.

In the case of wool or yarn dyed cloth the scouring process should be so conducted that no injury to the color results. The process should, therefore, be under the control of the dyer, or, at any rate the method of dyeing which has been adopted should be taken account of by the finisher who usually has charge of the process at this stage. On the other hand, since it is necessary that certain kinds of cloth should be heavily milled, it is equally important that the dyer in selecting his coloring matters, should be aware of, and pay due regard to, the finishing processes to which his colors will be submitted.

In the common form of cloth scouring machine called the "dolly" scouring or washing machine, the cloth passes through in the condition of a loose strand or chain, because, no attempt being made to keep the pieces in an open width, it becomes irregularly folded or pleated longitudinally. The essential parts of the machine are a pair of weighted squeezing rollers, underneath which is a small trough containing the scouring solution and an outer and much larger vat which serves as a receptacle for the cloth. The necessary guiding rollers and steam pipes complete the main details. Two, or sometimes three, pieces of cloth are scoured simultaneously side by side, in such a machine, each being stitched end to end to form an endless band. The squeezing rollers form the motive power by means of which the cloth is drawn through the machine, and the lower one, since it runs in the scouring solution, serves to feed the latter on to the material. The cloth may run 20-30 minutes in each of two such machines, and is then washed with clean water in a third.

It is necessary in some cases, and desirable in many, to keep the cloth in the open width during the scouring process. The open width scouring machine is similar to the "dolly" but much broader, and is fitted with straining bars and other devices for the prevention of creases and folds in the cloth.

TRADE NOTES

MORRIS Q.E.F. RUNWAYS.

Bulletin A-12, which we have just received from The Herbert Morris Crane and Hoist Company, Limited, Empress Works, Peter Street, Toronto, deals with some very interesting recent installations of Morris Overhead Runways. The Morris Runway in textile mills does away with much needless lifting and heavy work and is a great economy. For handling and carrying warps, beams, bales of wool, etc., its usefulness will be apparent. Reproductions of some excellent photographs of these runways bear testimony to the flexibility and handiness of the system employed.

SAMPLE "SHADE CARD."

We are in receipt of a Sample Card, issued by the York City, descriptive of their comprehensive line of Alphanol Blacks, which comprise a series of eight blacks on wool in one bath, fast to washing and milling. This folder is illustrated by sixteen dyeings, each type represented by two dyeing showing different shades of the same black. The folder is made complete with ample technical directions that are explanatory of the methods of applying these several blacks to the different classes of woollen goods, for which they are particularly adapted. Dyers, interested in one-bath fast blacks on wool, should avail themselves of the opportunity of obtaining a copy of this card from the above-named company, or from any of their local branches.

CALENDARS.

The Dominion Wool Stock Mills, Limited, 203-9 First Ave., Toronto, have sent out to their friends and customers a very attractive calendar. The reproduction is from the well known pastoral painting by W. F. Hopeman, entitled, "Now Fades the Glimmering Landscape." The well-wishes of this young firm will no doubt be heartily received by the trade.

One of the most useful calendars for office use is that just to hand from the Philadelphia Textile Machinery Company, Philadelphia, Pa. It is one of the large, single-leaf kind that every office man likes to have handy. The colored reproductions of the Proctor all-metal dyer for cotton, wool, hair, etc., manufactured by this firm, makes an attractive heading, and serves as a ready reference.

THE WOOL OUTLOOK.

Messrs. H. Dawson & Co., of Bradford, summarise the situation regarding the future of the raw material as follows:—

The outstanding result of the sales just closed has been that the raw material has further asserted its strength at a time when its position seemed somewhat critical. To those who are most in touch with the consuming centres the situation is the most surprising. In the home trade there are quiet markets and a lessened consumption, the natural sequence being a level of values for tops and yarns, which is decidedly below that of the raw material. Yet, in all the wool markets, there is an activity and a keenness of demand which is amazing. It seems improbable, however, that these perplexing anomalies, which have obtained since August last, can continue much longer. Either wool must decline or tops and yarns must find a higher level of values, and at present there seems to be no indication of any weakening element in the position as regards merino wools. . . . . .

The position in cross breds has also materially improved on December, although this may be partially due to the limited supplies. The outlook for March, however, is not at all discouraging. Old stocks of wool are cleared; there should be a great depletion in the stocks of tops by the time that the March supplies come round, and the 60,000 bales New Zealands which are likely to be then available will find a ready and hungry market. The home trade has not operated in South America or New Zealand to anything approaching its usual extent, and there are good grounds for expecting a good United States demand in crossbreds during the coming months.

Some adjustments are not only necessary but overdue, especially in the home trade, to bring the supply markets and the consuming centres into better correspondence as regards values. The steady clearance of old stocks, together with cheaper money, and the firmness of the London market, should all help to restore confidence and to establish better conditions

THE MARKETS

THE WOOL MARKET.

Business during the past month has been practically at a standstill, for, if anything, the depression among the woollen mills has become more pronounced than ever. At present, although only a few of the mills are closed, there are only a few running full time, and full capacity, the majority of them having either laid off a large number of the operatives or running short time, in some cases both. Business is coming in very slowly to the woollen and worsted mills, and what is coming their way is in many cases bad business. The English competition is more pronounced than ever, and the agents of the British mills appear more inclined to cut prices and accept small orders than is usually the case. The sweater trade is very dull, but in wool underwear conditions are somewhat better, and although orders are mostly small somewhat slow coming in, most of the mills on these lines are running full time. Prices are very close in most cases. The hosiery trade is fairly active, perhaps more so than any other branch of the woollen industry.

These facts are responsible for the present dullness in the wool market, in either domestic or foreign wools. There is scarcely any domestic fleece on hand, so that pullers are decidedly firm in their quotations on the small stocks they have to offer. The last London sales saw an advance of from 5 to 7½ per cent. in prices all along the line, which to many came as quite a surprise. The home trade were the principal operators, with Germany, France, Belgium and Russia good competitors. Medium to good merinos made the greatest advance. The home trade bought heavily of the best wools and West Australia wools, the latter selling about equal to the last prices during the last previous sales. A good deal of complaining is reported about the wools shrinking more than expected and the heavy, earthy classes sold at firm, but unchanged, prices.

Stocks at most of the mills are low at present, only a very few having more than two or three months' supply of raw materal on hand, so that should there be any renewed activity in general trade conditions wools will in all likelihood be higher than the present level. Present quotations of domestic wools to the mills are as follows:—Combing, washed, 26¼c to 26¾c; clothing, washed, 27½c to 28c; washed rejects, 20c to 20½c; combing, unwashed, 17c to 17½c; clothing, unwashed, 18c to 18½c; N. W. fleece, 18c to 18½c; pulled extras, 30c to 31½c; pulled supers, 26c to 27½c; pulled combing, 27c to 28½c.

THE COTTON MARKET.

After the decline which occurred at the end of December, a strong reaction followed, carrying prices some 40 to 50 points higher than the low point reached in the first days of January.

A good demand developed, and this helped the market very much. Low grades were readily taken by exporters as well as by the American mills. The South did not give way to the pressure of the last bear raid, and it was impossible to ship any kind of cotton to New York for delivery on contract.

Then, on the 10th of January, the ginning report came out showing some 40,000 bales less ginned than last year during the period. This decrease gave courage to the bulls, as it seemed to indicate that the exhaustion had at last materialized, that less cotton would be ginned to the end of the season than we had last year for the same period, and that, of course, the total yield would not be more than 300,000 over last year, including linters. This, with the active demand for spots, gave quite an impetus to the market, which went up another 20 points and kept up around 12.50 for January, 12.70 for March, until the 23rd of the month.

The second monthly report of the ginnings, published on the 23rd, acted like a cold shower on this bullish enthusiasm. It showed 13,589,000 bales ginned, that was 256,000 for the 15 days period, or 74,000 more than last season for the same period. It seems almost evident, from the figures, that at least as much as last year will be ginned from January to the last ginning report, giving us a commercial crop of 14,600,000 bales.

In view of the poor state of the textile trade, and the decrease in the consumption of raw cotton, such a crop, without being too heavy a burden, seems ample for the world's supply. The consumers believe that there is no danger of a scramble to get the cotton they need during the next seven months. They have all adopted a policy of hand to mouth and will buy only when they need the stuff.

This state of affairs has acted very bearishly on the market, and prices came down by the end of January to the same level they reached at the end of December.

Whether or not values will decline much more depends entirely on the action of the consumers. If the takings of the mills begin to show a big falling off, prices will certainly get weaker. But on the other hand, there seems to be no pressure in the South, no anxiety to sell. The holders of the actual cotton are in a very good position to resist a too heavy decline. They know that some time the mills will have to buy their cotton and they hold it very firmly, especially those who have good grades.

The impossibility to increase the New York tenderable stock to such a point that it would be a threat to speculation is another feature against a further material decline.

It is probable that when prices go down toward 11.50 cents somebody will begin buying more freely. In fact, around 12 cents for the present month there is always a good support.

The statistical situation is about the same to-day as it was last year. The amount of the visible supply of American and the balance of the crop to come in sight to September 1st make a total supply equal to last season.

Of course, the new crop to be planted in April-May will soon become an argument to be used by the bears and the bulls and there is no doubt that it will be used to its utmost extent.

Last year the spring months went down to about 11¼ for March, May and July. We may expect the same for the present season, but it will take very fine prospects for a very early crop to depress prices under last year's levels.

BRADFORD WOOL MARKET.

(Special to The Canadian Textile Journal.)

Bradford, January 24, 1914.

The firmness of all primary markets is helping to maintain the solid front which Bradford topmakers now feel they must show to their customers. At the same time, there is no adequate response to London or overseas markets, prices certainly being firm, although new business is by no means plentiful. Fine topmakers are all determined to enforce a higher standard of value, but spinners, on the other hand, are more equally opposed to paying more, and a deadlock is the result. It is possible to make 55 cents for decent 64's tops and some are actually demanding 56 cents and even more, but the latter price is about the most that can be made for the best straight combing merino top. Spinners are covering their requirements for some time past. New orders for yarns and pieces are very few and there is no disposition shown to anticipate the future. Crossbred topmakers are very firm, but making more money is a real difficulty, 30 cents being the utmost that can be made for decent 40's preferred tops. There is a good enquiry for 36's and 40's carded, which are relatively the same as 40's prepared—only about half a cent dividing the qualities — but business actually done is very limited. Fine tops are slow of sale, but steady. English merchants are finding business none too satisfactory, although they are naturally very firm in view of the strength of cross-breds at the London Colonial sales. As for making a profit on English fleece or even skin wools, it is almost an impossibility, although a fraction more is being quoted. Mohair is inactive. There is a good deal of interest in alpaca and stocks are in a small compass. Yarn spinners report no improvement and this remains the weakest section of the trade. The piece business also remains very unsatisfactory.

THE JUTE MARKETS.

Dundee, January 26, 1914.

In the amount of business transacted recently in Dundee Jute market, there is a very considerable reduction readily accounted for by the rate of the raw material depreciation. The fall in the price of fibre disorganized the whole market a week ago, while the pressure put upon Calcutta goods for some sellers to effect a clearance quite demoralised the situation. The value of first marks have declined from $163.20 to $153.60 for January-February shipment, and at the lowest point spinners have refused to make any purchase. It was expected that another decline may come. Good jute has not fallen at the same rate and sellers are not inclined to follow the decline of native marks. Calcutta hessians have drastically reduced of late, but this decline has been of very little assistance in disposing of anything, as too many buyers are in possession of parcels which have cost them very much more than current rates. Hessians have fallen flat and business is dull. For this reason something has been done in floorcloth qualities, but it is a question of doing as little as possible. Prices are practically nominal for all grades of jute cloth—10½ oz. 40 in. hessians being 3 7-16d; 8 oz. 40 in., 2 46-48d. Hessians yarn is somewhat neglected, 68 cents being the maximum value of common 8 lb. cops and spools according to spin 70 cents to 72 cents. For sacking chains 4 7-16d to 4½d is accepted and twist at 9 cents to 9½ cents for 3 ply 8 lb.

The London jute market has been very unsettled during the past four weeks as the outcome of restricted demand from industrial centres. The quantity offering has been consistently small and has served to occasionally place values on higher level, but lack of support produced a strong reactionary effect, the result of which is that values show a net decline of $7.20 per ton from opening rates. The close is steady and rather more active. M in double triangle Group has been sold at $159.40 to $160.40 January-February and February-March shipments. Buyers over. Calcutta advices indicate a falling off of supplies, and quality reports continue unsatisfactory. Several baling establishments have closed for the season.

THE BRITISH MARKETS.

(Special to The Canadian Textile Journal.)

London, January 25, 1914.

There is a firm undertone as regards wool and, contrary to expectations, most classes are five per cent dearer, while merinos are from par to 5 per cent higher. There is nothing now in the condition of wool industry to suggest anything but a firm maintaining of present values and any change that has taken place is in an upward rather than a downward direction, while it must not be forgotten when summing up the position of raw material for the next two months that the new clip is earlier than usual and that a considerably larger proportion has already been marked in London and Australia than was the case at this time last year. It remains to be seen what effect the revision of the American tariff will have on the markets of the world. One well-known firm of wool brokers say: "Very certainly the revised tariff will eventually be a great additional source of competition for the raw material, the change having been made primarily to benefit the people of America and not other countries. What is most required is a rest cure from the heavy financial capital requirements which have been such a burden of late on all nations." Looking at the situation as a whole, I think it improbable that we shall see another change in the value of merino wool, and present prices, high as they are, are not likely to give way appreciably. For crossbreds the prospects are more doubtful. Supplies, it is true, are tending more and more to merino, and demand in with present prices relatively so high, with fashion likely to be again reduced in the coming season, but many places even turning to cotton and other substitutes, it seems questionable if the present basis can be maintained much longer, though a strong demand from the States might alter the complexion of affairs. For spinners of fine cotton yarns things are not satisfactory and profits are very small. Quotations are about as follows:—

Tops.

40's Colonial tops, prepared	29 cents
40's Colonial tops, carded.	28½ "
36's Colonial tops, prepared	28½ "
40's English tops, average.	32½ "
40's Devon tops.	31 "
36's Devon tops.	30 "

Yarn.

1-36's Demi lustre (40's-44's) English per gross.	7s. 11½d.
2-32's Worsted (40's) crossbred, per lb.	1s. 8½d.
2-16's Worsted (40's) crossbred, per lb.	1s. 7d.
3-12's Hosiery white (40's), per lb.	1s. 8d.
3-12's Hosiery white (46's), per lb.	2s. 0d.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited

Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

New York Office, 206 Broadway.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, MARCH, 1914 No. 3

CONTENTS.

Co-Operative Competition

There will undoubtedly be a good number of Canadian manufacturers in attendance at the several annual conventions of the United States textile associations and the two big exhibitions to be held in Boston and Philadelphia during the first two weeks of May. Each year many of our manufacturers take advantage of these opportunities to get in touch with new ideas, and talk over old ones with our neighbors across the line, but any attempt at providing such means as to afford an opportunity for our own manufacturers to get together is conspicuous by its absence. The truth of these remarks cannot be gainsaid, and yet they bring up a rather peculiar situation.

We naturally assume that the advantages of associations are well recognized in this country. Also that our manufacturers are anxious to acquire all the information that they can obtian through attending these annual conventions. Why then are attempts to form a Canadian Association given the cold shoulder by the majority of those engaged or interested in the textile industry in this country.

The textile industry in Canada is rather peculiarly situated. For mills operating in the various branches are compelled to specialize in certain lines. The market is comparatively small and a considerable portion of that market is absolutely open to foreign mills thereby excluding the domestic industry. There is need of thoroughly organized effort in the way of trade development, tariff adjustment, the gathering of statistical information on the industry, the market and the requirements of the market; trade abuses are particularly flaring; our appraising system is a bug-bear to the industry and all these, as well as many others, can only be handled properly by thorough organization.

Modern industry has evolved from the secretive stage, when each manufacturer thought his processes were of such great value that they must be sacredly guarded. The great impulse nowadays is gained through co-operation and the success of each mill depends on the success of the entire industry. The conservation of waste and energy and the utilization of every atom of useful methods and information is the secret of the success of the industry in this country, and this can only be obtained by the installation of a spirit of get-together among the entire industry.

What has been accomplished along certain lines in the United States by Associations has been remarakbly brought out in a series of articles now running in the "Saturday Evening Post." The writer has illustrated the practices before the formation of the Association, many of which are duplicated here in Canada at the present time, and shows how co-operating competitors have prevented waste and corrected trade abuses; have worked together for the good of the whole industry and at the same time preserved a clean competition. Writing on trade abuses, the author states that, "trade abuses have brought in the birth-throes by which more than one modern business association has been forced into being. Probably it is not wide of the mark to say that crucial suffering caused by bad trade practices, rather than calm and destructive foresight, has furnished the immediate compudsion for organized team-work in almost every industry now under progressive association organization; but the means adopted to relieve the pain of the galling trade abuse has—at least in most cases where it has been applied—developed into a permanent measure for renovating and upbuilding the whole system of the ailing industry."

That is one reason for the formation of a textile association in Canada, and common-sense provides the rest. The continual and persistent bucking among the trade, the knocking, the secretiveness and the selfishness must be done away with, and the industry must begin to take on the clothes it should rightfully wear in order to afford the proper development. Let those who attend the United States Conventions get together and talk the matter over while the idea is in their minds so that 1914 may register the formation of a "Canadian Textile Association."

Clean Out The Junk Shops

We have lately heard of several small woollen mills being re-started in different parts of Eastern Canada, and in most cases little attempt has been made to bring the equipment of the plants up-to-date. How those interested in these concerns expect to produce goods that can be sold in competition with the products of other domestic mills equipped to the last degree of efficiency, as well as with the foreign competitors, is more than we can gather.

Of course, a good deal of the old machinery, with little alteration and a few additions, can be made to suit requirements, but it is folly to believe that even then it will be just as good as new and up-to-date machines. During the past decade there have been great improvements made in the machinery used in practically evry department of the various textile trades, and in all cases the trend has been toward better and greater production. High speed machinery, machinery to eliminate hand labor, the installation of the most efficient methods—these are what are behind the products of the successful mills in Canada today, and it is becoming more and more difficult for those mills to exist that are not so equipped and so managed.

We have heard of mills being started during the past year that were unable to properly finish the goods they had woven. Others were never able to turn out a decent sample. Of course, in each case the mills were very small, but even in fair-sized mills there has been too much of a leaning toward the junk shops for their equipment. The majority of the mills realize the value of up-to-date equipment, and obey the impulse but still the longing lingers for a bargain. Bargains now-a-days are few and far between. The best policy is to clean out the junk—good equipment is the first element in the many that make for the success of the mill.

The Textile Exhibition at Boston

Reports from the headquarters of the Fourth National Textile Exhibition, which is to be held in Boston, April 27 to May 2, assure us that it will be the greatest show of its kind ever given in America. Practically every inch of the 125,000 square feet of space will be taken up, and exhibitors are vieing with one another to make the show a big success.

Textile machinery of every description, as well as supplies of all kinds and power generating and distributing means, etc., will be on exhibition, practically every firm doing business with the textile industry being represented. It will be interesting to note the changes—and they undoubtedly be many—in the nature of improvements, etc., over the last exhibition two years ago, and as the coming show will be much more complete than any yet held, textile manufacturers will be afforded an opportunity to study and criticize at close hand whatever they are most interested in. There have been many inventions put into practical form during the past two years, and the indications are that the newest and best developments in machines and processes for improving mill conditions and mill products will be shown.

Although the industry in this Country will hardly be represented in the way of exhibits there will, in all likelihood, be a goodly number of our mill owners and manufacturers take advantage of the exhibition. There is nothing that keeps a manufacturer or his chief lieutenants more alive than getting out and seeing the latest in everything. New ideas and originality are the result. There is nothing like it, for success lies just along that route. It is hoped that every Canadian textile manufacturer who can possibly get away, will visit the big show in Boston, and while there, what is to hinder the Canadians from getting together and bringing the show to Canada, so that those who remained at home may get a chance.

Watered Stock and Over-Capitalization

In a lecture at McGill University, the other day, dealing with watered stock and over-capitalization, David S. Kerr, C.A., remarked that there were indications that some action would be taken by the Government to restrain company promoters, it being proposed to have a law compelling corporations to set forth on their balance sheets what amounts, if any, represent goodwill, so-called, and the other ways and means so commonly used to justify present day methods.

The textile industry has not been free from the watered stock artists as some flaring examples have been on the tapis sufficiently recent for good remembrance, and in most cases the results have been disastrous. Industry as a whole in this country has suffered during recent years through the operations of these high finance artists, as each failure reflects adversely on the industry it represents. In the textile, manufacturing costs have to be reduced to a minimum. Prices for the products are on rock bottom and over-capitalized concerns are thus unable to continue for any length of time, which fact accounts for the rather slow, but healthy, development of the industry.

Any movement, however, to change the methods of company promotion that are in such common practice, must be welcomed by all those interested in the best industrial development of the country, and the progress of Canada in general. It is to be hoped that such legislation as proposed will be introduced before thes watered-stock artists are able to make any further inroads on those branches of the textile industry that have been and are in a healthy condition, and receiving healthy development.

EDITORIAL COMMENT.

At a public meeting held recently in London under the auspices of the British Empire League, the project for an "Empire trade-mark" was heartily endorsed.

The main objects of the trade mark are to provide simple and definite means of identification of British manufactures and produce, to enable the public to support British labor, to prevent the sale of foreign goods as British, and to develop the Empire's trade as the surest means of promoting a closer union of the mother country and the Dominions.

The scheme is a big one, and should receive the thorough approval of Canadians, in that it would help to obviate one of the biggest abuses of our present preferential tariff system.

* * * *

The reports of annual meetings of various textile concerns printed in this issue show good business for last year. The cotton industry was well employed, and the statements show profits in excess of 1912 in spite of somewhat adverse conditions in the way of reduced weekly hours of labor, high prices of raw cotton and supplies and increased wages. The knit goods trade was also well employed, and satisfactory statements are shown. In each case, however, the latter months of the year show decreased business, and so for this year, we gather from the presidential addresses, business has been considerably below the normal, and has hardly begun to show much improvement as yet.

* * * *

The system of parcels post inaugurated on February 10th has got into such smooth running order that instructions have been issued to the different post offices to immediately accept parcels up to the limit of eleven pounds. At the start only six pound parcels were taken, and it was proposed to limit the system to that weight for three months.

The inspectors have advised that the service can now handle eleven pound parcels, and, in consequence the system from now on will be in full operation. The results so far are highly satisfactory.

* * * *

Take your holiday April 27 to May 2 and spend it at the Textile Exhibition in Boston. While there, look around and see where an Association would benefit you and then everlastingly work for a "Canadian Textile Association." A good idea would be to get together some night in Boston and go over the preliminary arrangements, and then hold an organization meeting in Montreal or Toronto, or some other convenient place, on your return, while the idea is warm.

GUELPH TEXTILE MILLS WIN OUT.

An interesting development of the suit brought against the City of Guelph by the Guelph Carpet Mills and the Guelph Worsted Spinning Co., in which these companies were awarded $25,000 damages and costs, as announced in last issue, occurred last month. The City Council decided to appeal the decision, at which the companies threatened to close the five mills controlled by them, and posted up notices that all five of the mills would be closed down indefinitely on February 21st. As such action would mean the throwing of over 400 workmen out of employment, public opinion became very strong in the matter, so that the City Council decided to withdraw the appeal.

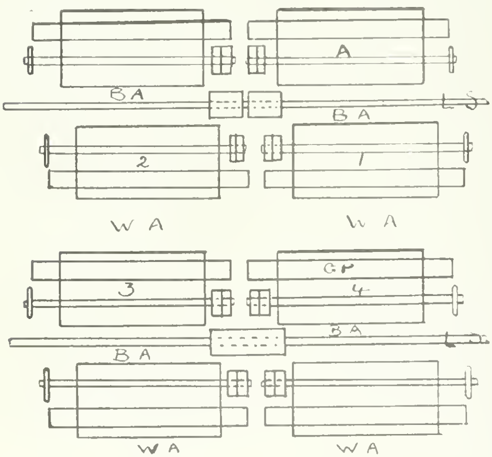
PRACTICAL TUNING AND CONSTRUCTION OF POWER LOOMS

Introduction to and First of a Series of Articles Designed to be of Great Practical Value to Our Readers By a Leading Authority.

By BEAUMONT METTRICK.

Before dealing with our subject, a few words in regard to the work of the overlooker, and his relation with the loom makers, would not be out of place.

A much better understanding between these parties is gradually being arrived at, as a result of which, the looms are being improved to specialise in one particular trade. Therefore, we find different types of looms used in different districts, according to the trade of that locality. However, this fact has a slight disadvantage, inasmuch as the employees usually get a biassed opinion about the particular loom used in the mill, so that any introduction of a new type is often met with disfavor. The advantage of a thorough technical training helps to overcome, to a certain extent, this difficulty, and allows for all classes of looms being used, and therefore judged fairly on their merits or demerits.



DIAG I.

The standard of work done by different "tuners" varies considerably. Careful tuning of looms always has a direct influence on the output and the condition of the goods, therefore it is a saving in cost of production to get the best men possible, even if a higher rate of pay is demanded. Careless methods, besides having an influence on the condition of the goods turned out, also increases the cost of production, in that the "wear and tear" of the looms is much greater.

Types of Looms and Their Utility.

There are three main or primary types of looms, these being sub-divided according to district and class of gods required. They are (a) Tappet, in some districts called Wyper or Cam looms; (b) Dobby Looms; (c) Jacquard Looms.

Tappet Looms.—Here the cam takes the place of the weaver's foot in the hand looms; that is, different shaped cams are used to work the healds, the shapes varying according to weave required. The healds can be worked positively (i.e., through a definite distance), or negatively with tappets or cams fixed inside or outside the loom frame. The picking is usually a fixed factor, working alternately from each side. The box motions may be single box, circular box (with 6 boxes) or drop box (with from 2 to 6 at each end, 4 being the common number).

These looms can be fitted with loose or fast reeds, according to the class of goods being woven. If light goods, that is, not many picks per inch being required, the loom may be run at a high speed, with a loose reed, to act as warp protector. Where heavy goods are woven, a fast reed is usually preferred. The take-up motion is positive for loose reeds, and may be negative for fast reeds. The let-off motion is usually negative.

The weft fork is to stop the loom, when the weft breaks. Side forks are used for loose reeds, and these work on alternate picks only. Centre forks may be used where fast reeds are employed.

The speed of the looms is anywhere between 100 to 200 picks pr minute, according to style of loom, goods woven and width of loom. The more intricate the loom, the heavier the goods and the wider the loom, the slower the speed.

The floor space required for narrow looms is 7 x 4 feet (approximately).

Various fabrics, where the pattern repeats on a small number of ends, such as cotton, linen, dress goods, plain coatings and goods not requiring a large number of heald shafts, may be woven on Tappet Looms, cheaply and efficiently.

Advantages of Tappet Looms.

Both the cost of looms and of repairs is cheap, less power is needed to run them, as they are light of construction, and intricate, therefore very smooth in running, and efficient in working.

Disadvantages.

Large designs are not obtainable, as we are limited to a few healds, say up to 16. The picking is usually worked in even numbers.

The West of England Heavy Woollen Loom.

This is a special type of postive tappet loom, made very strong and heavy, and specially built to weave heavy woollens, for felts, etc. It is worked by a treading motion, which is positive, usually working inside the loom frame, and few shafts are used. The picking is usually over-pick and fixed. The crank shaft is often filled with an arrangement of cams or special cranks to give a double beat up of the weft, the going part being up with strong sword arms to give a level and firm beat up. It can be fitted with one or two boxes, made to hold shuttles with extra long bobbins or cops. The reed space is extra broad, about 100in. to 154in. The looms can be run at 80 to 90 picks per minute. Very heavy gearing and balance wheels are employed to reduce vibration and give steady speed. This type is only useful for heavy plain goods, and is made by various firms. The approximate dimensions of such looms are 14ft. 3in.by 5ft. 6in.

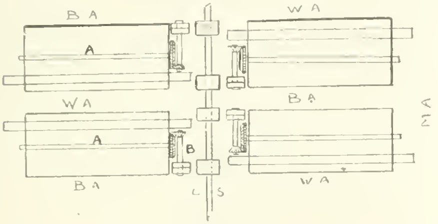
Dobby Looms.

This style of loom obtains its name from the mechanism (usually placed at one end of the loom) which works the heald shafts, by means of (a) levers and gear wheels, or (b) draw-bars and hooks, these beng the two chief types of dobbies. They are made both positive and negative, double or single lifts and open shedding usually. The heald capacity.shedding usually 12, 36 and 24 being the numbers in general use.

The Negative Dobby Loom.

This style of loom is made in great varieties by many makers, such as Messrs. Hattersley of Keighley and Messrs Hall of Bury. On this loom the healds are lifted by the dobby, and pulled down by a special undermotion, a good type being composed of springs, such as the Kenyon undermotion. This machine may be fitted with (a) Drop Box Motion; (b) Pick-at-will, or Odd-Picking Motion.

Double-action-dobby, fitted with two pattern cylin-



Diag. II.

ders, one working for the centre design, and the other the border design, work automatically. Positive or negative let-off and take-up motions may be employed.

This loom is suitable for weaving plain light fabrics, such as dress goods, plain coatings, table-cloths, towels, etc. It is not a very good type for weaving heavy cloths, where the sheds vary, such as backed or double cloths, as the varying tension put upon the springs, tends to make the running of the loom unsteady, and the bottom of the shed often uneven.

The Positive Dobby Loom.

This type of dobby is very largely used in the West Riding of Yorkshire, and all districts where men's wear is woven.

The Keighley Positive Dobby.

Is a strongly built loom, the healds being connected from top and bottom by means of leathers aid wires to jacks on the dobby, therefore positive open shedding takes places. There are usually four boxes at each side, working positively and independently of each other. The heald jacks are worked by draw bars, pushing bars and hooks. The pattern, box and picking motions are all indicated from one cylinder, therefore there is less chance of getting across one with another.

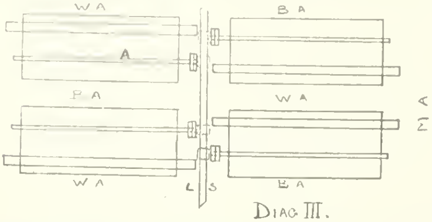
The picking is on the "pick-at-will' system, and over or under picking sticks may be used as required. The let-off and take-up motion are positive, and both can be reversed automatically along with the "lag" cylinder, when picking back takes place.

A reliable speed of from 90 to 110 picks per minute can be worked on broad looms.

The floor space required for this loom with 90 in reed space and 24 shafts is approximately 13 ft. 10 in. x 6 ft. 2 in.

This loom is very suitable for the coating grade, medium and plain tweeds, dress goods, etc.

A special improved heavy loom for heavy weight coatings is now on the market. It is fitted with improved shuttle checking motion, with ordinary fast



Diag. III.

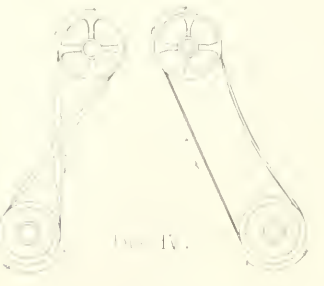
and loose pulley, or friction drive. The boxes allow for shuttles carrying bobbins up to 8 in. long and 1⅝ in. diameter.

Dobcross Dobby Loom.

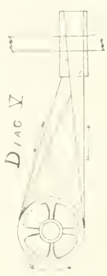
This loom is one of the chief used in the Huddersfield worsted and Colne Valley (Yorkshire) woollen trades; it has a great reputation, being neat, well-built, and of solid workmanship.

Heald shafts, usually 36 and 24, are commonly used, but any number up to 48 may be had. These are positively controlled, giving an open shed. Here the jacks are worked by means of vibrator levers and gear wheels, giving an eccentric lift to the healds.

Positive or negatively controlled boxes may be used, from 2 to 6 at each side, 4 being the most common type. Picking is the "pick-at-will" underpick type. The healds, boxes and picking are all controlled from one cylinder on the dobby, therefore, when reversing the cylinder, any chance of the parts getting across with each other is eliminated. The unwinding of the warp is worked by the tension of the warp, acting upon the back vibrating roller, which governs a sensitive shield motion, and this can be worked along with a positive or negative take-up motion. The weft fork can be coupled up with a patent pick finding motion, which automatically reverses the lag cylinder and stops the loom, at the shed with the broken pick in. The boxing of the shuttles is also protected by a special contri-



Diag IV.



Diag V.

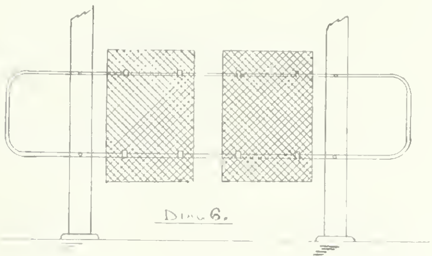
vance. A counter shaft and speed wheel help to reduce vibration and govern speed of loom. The loom may be driven by the ordinary fast and loose pulley, or the friction clutch type, connected to line shaft or motor.

Two common types are made, one to run at 70 to 80 and the other at 95 to 105 picks per minute. The approximate floor space required for a broad loom is 15 ft. 6in. x 5 ft. 10 in.

This loom is suitable for weaving any cloth woven in the woollen and worsted coating and trousering trade.

The Jacquard Loom.

The great figuring capacity obtainable is the chief feature of this type of loom, as fabrics of large and intricate design can be woven on it. The greater the number of harness cords in one repeat, the larger the design obtained. The tie of the harness varies according to the style of goods woven; elaborate tie-ups are sometimes used for such fabrics as tapestries, tablecovers, etc. The ties used mostly in the coating trade are simple ones, such as the London or straight tie and the Norwich or crossed tie. The style of shedding varies, (a) the single lift, that is where the shed lifts from the bottom line of shed for each pick, (b) the centre shed, where the shedding is formed from the centre line, and the double lift, where the shedding is formed from practically an open shed (c). This latter type can be supplied with one or two card cylinders; when two are used, they work alternately, usually one for even picks, and the other for odd picks.



The engines, machines or jacquards that work the harness, are manufactured by various makers, and can be fitted to almost any type of loom, with a slight addition to the framework.

The Single Lift.—This style is used where a high speed is not a necessity. It is usually run at 90 to 120 picks per minute. The tie-up is usually straight or crossed, and is chiefly used for pattern weaving in the woollen and worsted coating trade.

This type is gradually being superseded by the newer one of double lift, single cylinder loom, which runs at a greater speed with less vibration. This jacquard is very useful for weaving such goods as fancy vestings, shawls, coatings, linen, cotton and silk, and is made with from 200 to 1,200 needles, and neck cords; 400 with 384 working hooks being a common machine used in the coating trade for weaving patterns.

The Double Lift, with double card cylinder, jacquards are mostly used for fancy goods, that can be woven at a high speed, such as silks linens and cottons. 200 picks per minute may be attained with this machine. The hooks lifting bars and cards all work alternately. The centre shed machine is chiefly used for heavy goods, such as carpets, tapestries, and plushes, where a great speed is not a chief factor.

Arrangement of Power Looms.

When possible, power looms should be placed in sheds fitted with bays, having the skylights facing in a northern direction, as the north light is the best light, being more diffused, and the shed is also kept cooler. This can also be assisted by having the windows and slates whitewashed every summer. A concrete or stone floor should be used, a wood one having a tendency to vibrate too much, therefore looms on wood floors require more attention, do not last so long, and do not give such good results as those placed on concrete or stone. Strong iron pillars should support the bays, also helping to support the shafting.

Where steam pipes are used for heating purposes they should be placed above the tops of the looms. If placed near the floor, they are apt to dry the warps on the beams, and cause them to be brittle. The best and latest style of heating weaving sheds is by means of a humidifying apparatus. Here hot or cold air can be forced into the shed, and so keep at an even temperature all the year round, this being better for the employees, looms and warps. Looms should always be arranged so that the best light falls on the cloth, and no shadows cast upon it. The best position for working the looms without waste of floor space should also be considered. The amount of floor space being known, the position and number of looms that the shed will hold should then be calculated as per example.

A shed is 45 2-3 yards x 2 2-3 yards. Looms are 13 ft. x 5 ft. Allow 3 ft. for weavers' alley, 2 ft. back alley, 4 ft. main alley, and 1 ft. between rows of looms. 1 ft. should also be allowed between walls and looms at each end. An extra main alley of 4 ft must be taken into account at right of shed. Looms to be arranged (see Diag. 7) in blocks of four.

Floor space taken by four looms with alleys = (31 x 15) sq. ft.

Floor space available for looms = (135 x 124) sq. ft.

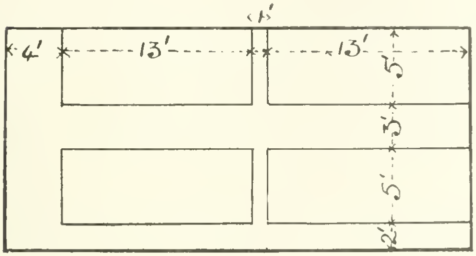
$$\text{No. of looms in shed} = \frac{135\text{x}124}{31\text{x}15} \times 4 = 144$$

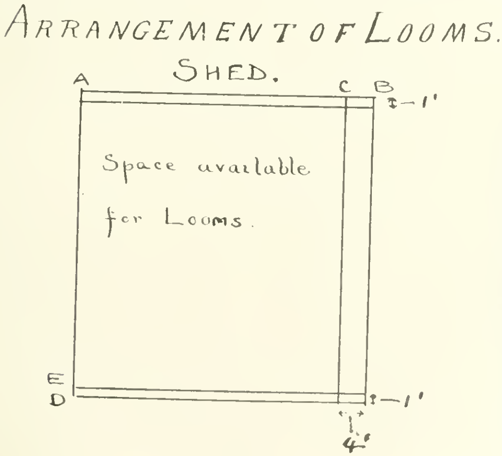
Tappet looms are usually arranged in groups of four and in two rows with a main alley running between the groups as in Diag. I. This allows for one weaver to 4 or 8 looms. If the loom gates are opposite to each other the work of the weaver is facilitated. The looms should also be arranged, so that no passage is possible between the groups, where the belts are working. This can be brought about by fencing off the belts, and just sufficient room being allowed for the weaver to get round to back of loom, from the side where the hand wheel is placed. This precaution helps to mitigate belt accidents. A cheap and efficient way to do this is as follows:

Fix two rows of old gas or any thin piping to the pillars between the loom pulleys found between the rows of looms, clean it well, then paint with aluminium or other metal paint. Hook on or fix wire shuttle guards to the pipes, between the going parts of the looms. When this method is adopted opposite to each other, without fear of accidents to weavers, owing to flying shuttles, etc. (See Diag. 6.)

Tappet looms are generally driven by open and crossed belts; four looms can be driven from one large pulley or two smaller ones, as shown in Diag. I. Diag. IV. shows how the belts run. Note the difference in surface, covered on loom pulley, between open and crossed belts, and the position of slack side of belt, as this shows best position. Therefore have slack side always on top when possible. A crossed belt will give a firmer and steadier drive than an open belt, as more surface of the loom pulley is worked upon by the belt.

Dobby looms are made right and left hand, therefore the driving motions are placed at right and left hand of looms from the position occupied by weaver in the alley. This is to allow of two rows being run by one line shaft, and to allow for one or two weavers to watch two looms. See Diag. II. for illustration of this point. Here the looms shown represent the Dobeross type, where a counter shaft is used. This runs at right angles to the main shafts of looms, therefore this is a good style of drive for a heavy loom. It allows for the loom being driven by belts, open and crossed alternately on one line shaft, having a steadying influence upon the line shaft.





Dia. 7.

Diag. 3 shows method of arranging dobby looms such as the Keighley Loom, where the loom pulley is at the end of the crank shaft. The looms are driven by half-crossed belts as in Diag. 5. A disadvantage of this style of spacing is that the loom pulley must, at one point, be under the line shaft pulley. These looms are better placed, when driven as in Diag. I. by open and crossed belts, with shuttle guards placed between the going parts to protect the weavers. The position of the looms also helps to a certain extent to protect the weaver from the danger of flying shuttles, by having the weaver's alleys or loom gates W.A. opposite the back alleys B.A. of the next row of looms.

Method of Spacing Looms.

When looms are placed as in Diag. I., the chief and most important point is to see that the crank shafts A of looms are exactly parallel to the line shaft L.S. If placed as in Diag. II. the crank shaft I should be at right angles, and the counter shaft B parallel to line shaft L.S.

This can be done by dropping vertical lines from the line shaft to the floor; mark floor, then place shafts in position from this line. After the position of the feet of the framework has been obtained, the frame can be fitted with the shafts. The frame and shafts should then be tightened up, and tested with levels. If not accurate, the parts should be filed or packed till level. Holes should be drilled into the floor, and the loom frame fixed to bolts leaded into the floor. This keeps the loom in position, level with line shaft, and helps to prevent undue vibration of the loom. If the feet are not fixed in some manner to the floor, the looms are likely to creep.

Where various types of looms are placed in one shed, it is always advisable to keep the shafts equally balanced with speed required, therefore run half the shaft driving heavy looms, and the other half light looms. It is best to place the heavy looms at the end of shaft, near to the main engine shaft, and the light at the other end; this helps to prevent vibration caused by torsional strain if placed otherwise.

FRANK STANFIELD RELINQUISHES DIRECTORSHIPS.

All, Except That of Stanfield's, Limited.

The announcement made by Mr. Frank Stanfield, presdient of Stanfield's Ltd., Truro, N.S., that he has withdrawn from the directorates of all companies with which he has been connected, except those that bear his own name, came as quite a surprise. The announcement was first made at the annual meeting of the shareholders of the Nova Scotia Car Works, Limited, of which Mr. Stanfield was a director. On the same day as the Car Works meeting, that of the Nova Scotia Clay Works, Limited, was held and Mr. Stanfield's name was stricken at his request, from that directorate also. The other companies that will lose his services as a director are the Nova Scotia Steel and Coal Company, the Nova Scotia Fire, now merged with the Home Fire Insurance Company of New York, the Macleod Pulp Company, whose mills are at Liverpool, and the Hewson Pure Wool Textiles, Limited, of Amherst.

Mr. Stanfield has frequently expressed a desire during recent years to be relieved of the burden of other companies besides his own, and has apparently accepted the first opportunity offered. There was some talk that his decision may have been made because of the present condition of the Hewson Company, but this would hardly influence him in the course he has taken with the other companies.

Mr. Stanfield is also a member of the Provincial House at Halifax, and it is said that he is considering getting out of the political game before the next elections take place. Textile manufacturing is a pretty strenuous business in this country, and apparently demands the lion's share of the time of those engaged in it.

USE OF ALUMINIUM MORDANTS ON WOOL

SOME PRACTICAL POINTS REGARDING THE PROPERTIES OF THESE MORDANTS AND THE MORDANTING WITH SAME.

By J. MERRITT MATTHEWS, Ph.D.

(Written Specially for the Canadian Textile Journal.)

Though potassium bichromate or chrome is by far the most important fibre, nevertheless there are a number of other metallic compounds which are at times employed for the mordanting of wool where certain results are desired in dyeing, which cannot be produced with the aid of the ordinary chromium mordant. Next in importance to that of chrome itself, probably the most important mordant for wool, is alum. Its use as a mordant extends back to very ancient times, and it was used as an aid in the dying of wool before chrome itself had ever been discovered. Like the salts of chromium, the salts of the metal aluminium also form stable and suitable color-lakes with the mordant dyestuffs, and also these salts of aluminium are readily taken up from their solutions by the wool fibre, and become fixed therein in a precipitated and insoluble condition. The ultimate form in which the aluminium mordant exists in the wool fibre is that of a collodial oxide or hydrate of aluminium intimately associated in the molecular distribution with that of the structure of the wool fibre itself.

Clearness and Purity of Color Tone.

The characteristic property of the dyeings produced by the combinations of an aluminium mordant with the various lake-forming dyestuffs is that of clearness and purity of color tone. This is true to a much greater extent than with the corresponding color-lake combinations obtained with chromium mordants. This is accounted for by the fact that the chromium mordant itself consists of a colored body. Under certain conditions this is considered to be a form of chromium chromate in combination with the fibre and possesses a yellow color; under other conditions of mordanting, especially where reducing agents are employed as mordanting assistants, a greenish colored chromium oxide or hydrated oxide is produced. This latter is the most usual form in which the chromium mordant will be met with on wool, consequently it may be readily understood that the greenish color of the mordant will considerably affect the ultimate color of the dyed fibre. This is especially true of such colors as reds, blues, violets, and oranges; the greyish green color of the mordant somewhat dulls or saddens the tone of the ultimate shade produced. In the case of aluminium mordant itself as it exists in combination with the fibre is colorless, consequently the tone of the color-lake produced with the dyestuff is practically unaffected. If Alizarian Red, for example, be dyed on a chrome mordant, a rather dulled red color is produced, but if dyed on an alum mordant the color obtained is a bright clear red.

Color-Lakes Lack Fastness.

Opposed to this advantage, however, which the alum mordants possess over those of chrome, is the disadvantage they have of not giving color-lakes of as great a fastness to washing and fulling as those obtained by the use of chromium mordants. This explains more than anything else the reason that the alum mordants are not more extensively employed in dyeing.

"Potash" and Ammonia" Alum.

There are a number of salts of aluminium which may be used as mordants for wool, but the principal ones which are to be met with are alum and aluminium sulphate. Alum is a term which is specifically used to designate a compound sulphate of potassium and aluminium, though the name has also been extended to include a rather large class of similar bodies, and consequently the common alum has received the name of "Potash Alum." This alum occurs in the form of large colorless glassy crystals, and besides the aluminium and potassium sulphates it also contains a large proportion of water of crystallization; its chemical formula being $Al_2K_2(SO_4)_4.24\,H_2O$. Another well-known alum is the "ammonia alum," differing from the foregoing only in that it contains ammonia in place of potash.

Potash alum being a well-defined crystalline body, occurs in a very pure state and is especially free from iron, an impurity which is liable to occur in nearly all other salts of aluminium which are not well crystallized. The same is also true of ammonia alum which likewise occurs in a well-defined crystalline form. As a question of economy, it would be natural to ask the question as why soda alum would not be employed in place of either the above, as it is well known that soda compounds are even cheaper than corresponding potash derivatives. The answer to this very proper question is that whereas the soda alum is cheaper than the potash compound, it is quite difficult to obtain in good crystalline and consequently pure condition, it being so much more soluble in water; consequently soda alum is not often met with as a commercial article.

Potash alum contains 36.8 per cent of aluminium sulphate, corresponding to 10.8 per cent of alumina (Al_2O_3). Ammonia alum contains 11.8 per cent of alumina, and as it has about the same commercial value as potash alum it is frequently used in place of the latter, as it offers a slight advantage by reason of its somewhat higher content of alumina, which is the active part of the compound acting as a mordant.

Both potash and ammonia alums are rather readily soluable in water, the amounts dissolved by 100 parts of water being as follows:

	At 20 deg.C.	At 100 deg.C.
Potash alum	15.1	357.5
Ammonia alum	13.6	421.9

Unlike many of the salts of aluminium, alum is not dissociated by boiling with water or even by greatly diluting the solution.

The chemical composition of the two alums is as follows:—

Potash Alum.

Aluminium sulphate	36.85
Potassium sulphate	18.15
Water	45.00

Ammonia Alum.

Aluminium sulphate	38.16
Ammonium sulphate	12.50
Water	49.34

Properties of Aluminium Sulphate.

Aluminium sulphate is another common aluminium salt which is used for mordanting. It is very similar in general properties to the alums, but does not contain any alkali sulphate, and is also more difficult to crystallize. In former times it was generally met with in trade in the form of fused cakes, hence the name of "cake alum" generally given to it. In this form it was liable to be rather impure, being generally contaminated with iron, on which account it was not much favored as a mordant, as the iron salts caused a dulling of the color lake. At the present time, however, aluminium sulphate is prepared in the form of small crystals of a high degree of purity, consequently it is now much used as a mordant in place of the alums. Aluminium sulphate has the chemical formula $Al_2(SO_4)_3 18H_2O$, and in the commercial state contains 14.5 to 15.5 per cent of alumina. As it can be sold at a less price than alum and at the same time contains a materially higher percentage of alumina, it is natural to find that it is fast displacing alum as a mordant.

The Process of Mordanting.

When wool is boiled in a solution of alum or of aluminium sulphate, the salt becomes dissociated and its alumina is absorbed by the fibre in which it becomes fixed in an insoluble and permanent condition. The manner of the mordanting of wool with alum is no doubt a kind of colloidal reaction between the hydrate of alumina which is formed by the dissociation of the salt in water and the gelatinous substance of the fibre. The exact nature of the mordanting process has long been a matter of discussion among textile chemists; at first it was considered that the mordanting agent was simply precipitated as an insoluble compound (generally as hydrate or oxide of the metal) within and between the interstices of the cell elements of the fibre, and consequently the process was purely a mechanical one. The very intimate nature of the combination, however, and the fact that neither ordinary chemical or microscopical methods would properly demonstrate the existence of such a precipitate on the cell walls of the fibre, led to the problem being worked out from a chemical point of view. Under this assumption it was supposed that the mordanting agent and the substance of the fibre entered into a real chemical combination with each other, and the chemical activity of the fibre was called upon to account for the chemical forces which would be necessitated. It is well known, for instance, that wool possesses distinct acid characteristics, and tends to form a chemical combination with substances possessing well defined basic properties. In the case of nearly all mordants for wool the mordanting salt can usually exist in a basic form; therefore it seemed reasonable to presume that a chemical combination could be brought about between the acidic wool and the basic mordant. This view, however, was not quite in accordance with the fact that the addition of acids to the mordanting bath generally served to promote the taking up of the mordant by the fibre. Closer study of the chemical relations of the problem has gradually led to the opinion that the real solution of the mechanism of the mordanting operation is not to be found in purely chemical reactions. The development of our knowledge relating to the behavior of colloidal substances has led to the opinion that the mordanting process in common with the more general behavior of dyestuffs in connection with fibres is to be explained by a simple absorption of the mordant by the substance of the fibre. This idea was first broached under the term of "solid solution," but a better understanding of the nature of colloidal bodies has led to a clearer elucidation of the process. The wool fibre is of a gelatinous nature and in the presence of water exists no doubt in a colloidal condition; that is to say, it combines with the water to form highly complex aggregates possessing an internal structure. If salts are present also in the water solvent, and if these salts are of such a character that they tend to produce colloidal aggrregates, the result will be that these colloidal substances will become enmeshed with each other and under certain conditions will revert from a form of colloidal solution to an insoluble state. Now it is well known that nearly all the mordanting salts employed on wool are of this character; alum and aluminium sulphate, for example, when dissolved in water produce what might be termed a latent aluminium hydrate, and this is of a very distinct colloidal nature, tending to form gelatinous precipitates. This substance exists then in this latent form when wool is steeped in a solution of alum, and consequently the colloidal aggregates of the aluminium hydrate become intermeshed with the colloidal hydrates of the wool substance. When conditions are such that the soluble colloid of aluminium hydrate is converted into its insoluble form, it becomes fixed in the fibre and combined with the same in a very intimate form. The boiling of the solution and the presence of certain chemical agents such as tartar, acids, etc., are probably the required conditions which bring about the reversion of the colloidal aluminium hydrate to its insoluble form.

Mordanting Wool With Aluminium Salts.

The general operation of mordanting wool with aluminium salts is to boil the fibre in a solution containing: 10 per cent of alum; 3 per cent of tartar; 2 per cent of oxalic acid, the percentages being figured on the weight of the wool being treated. Where light shades are subsequently to be dyed, thes proportions may be correspondingly reduced. The function of the tartar and oxalic acid is probably to retard the conversion of the latent aluminium hydrate into its insoluble, and hence promote the even distribution of the mordant throughout the fibre. For the same reason the temperature of the mordanting bath should be so regulated that the operation is started at about 100 deg. F., and then the bath is gradually brought to the boiling point.

Aluminium Hydrate Formed.

The fact that aluminium hydrate is actually formed when wool is boiled in a solution of alum or aluminium sulphate is shown by the fact that wool which has been treated in this manner has free sulphuric acid extracted from it when boiled with water; this proves very conclusively that the aluminium sulphate has been decomposed, and the wool has at first absorbed both the aluminium hydrate and the sulphuric acid, the former being rendered insoluble while the latter can be removed. If sulphuric acid is added to the mordanting bath the decomposition of the aluminium sulphate is retarded and consequently promotes thorough penetration of the mordant.

The question might naturally be raised in considering the above explanation of the mordanting of wool, with aluminium sulphate, that if this salt tends to produce a colloidal form of aluminium hydrate, why do not solutions of aluminium hydrate decompose on boiling and precipitate the insoluble hydrate. Aluminium sulphate alone is spoken of here, as irrespective of the fact as to whether alum or aluminium sulphate is used, when in solution, the active ingredient of both is the aluminium sulphate. For when alum is dissolved in water we simply have under consideration a solution of aluminium sulphate mixed with considerable potassium sulphate, and the latter does not really enter into the consideration of the mordanting operation, except in so far as its presence in the solution may affect the rate or degree of dissociation of the aluminium salt. And its influence in this respect is apparently very small. In answer to the above formulated question it may be said that no doubt in a solution of aluminium sulphate there is a partial dissociation of the salt, with the formation of aluminium hydrate and free sulphuric acid. This is evidenced by the fact that such solutions are ofa distinctly acid character; but the reason that the aluminium hydrate does not become insoluble on boiling is due to the presence of this very sulphuric acid. In the presence of the wool fibre, however, the aluminium hydrate becomes more or less absorbed and thus removed from the direct influence of the presence of the free sulphuric acid, so that when boiling tends to convert it into an insoluble condition, this result is no longer prevented by the presence of the acid.

It must also be remembered that wool absorbs sulphuric acid from solution, so that when treated with a solution of aluminium sulphate the fibre will absorb both the aluminium hydrate and the free acid. Apparently the fibre absorbs the acid more readily than the base; because, if the amount of aluminium sulphate is increased beyond the power of the fibre to absorb the aluminium hydrate, it will still absorb a greater proportion of the acid, with the result that there will then be a deficiency of free acid in the solution and an excess of aluminium hydrate, and consequently on boiling the solution, will become turbid or milky by reason of the precipitation of the aluminium hydrate in excess of the free acid. This result was clearly shown by the experiments of Furstenberg and Appleyard, who treated wool with boiling solutions of alum.

The total quantity of sulphuric acid in the alum was 25.4 per cent, and the following results were obtained by using different percentages of alum on the weight of the wool treated:—

	Sulphuric Acid—Percents.	
	Absorbed	
Alum taken Percent.	by the Wool.	Left in Solution.
5	25.4	0.0
10	22.1	3.3
15	14.6	10.8
20	11.0	14.4

On this account, if too great an amount of aluminium sulphate is employed in the bath, so that there is a considerable excess of the mordant beyond that actually absorbed by the fibre, some of the basic salt will separate out from solution in the bath and become imperfectly fixed on the fibre and will form more or less of a surface deposit. This will be a bad condition as it will result in colors which will rub badly, and which lose somewhat in working. This condition with its causes and results has been well studied out in the researches of Liechti and Switzer and presented before the Technological Institute of Vienna.

Tartar and Oxalic Used Separately.

While the mordanting of wool with alum is usually conducted with the assistance of tartar and oxalic, there are modifications of this process whereby either of these agents may be employed separately. In mordanting with alum and tartar, the bath consists of 8 per cent of alum (or 5½ per cent of aluminium sulphate) and 5 per cent of tartar. The tartar in this case plays a very different role from that when employed in connection with a chrome mordant. It is probably that aluminium tartrate is first formed in the bath, and this is then dissociated in the presence of the wool. In case oxalic acid is used as the assistant it is customary to employ 8 per cent of alum (or the corresponding amount of aluminium sulphate) and 2½ per cent of oxalic acid. The latter acts in the same manner, no doubt as the tartar; that is to say aluminium oxalate is at first formed, then dissociated by the fibre. Oxalate, however, does not act with quite the same efficiency as tartar in that not so much alumina is fixed in the fibre.

MESSRS. HOLDSWORTH & CO. ACQUIRE STACEY MILL OF MONTREAL WOOLLEN CO.

The sale of the property formerly occupied by the Montreal Woollen Company, situated at St. Gabriel Locks on the Lachine Canal, Montreal, is an interesting event in the history of the woollen industry in this country. This mill, which was built by the Montreal Woollen Mills Co., Ltd., established in 1879, is an excellent property admirably situated in the heart of Montreal's manufacturing district.

The mill has been dismantled during the past couple of years and the buildings have now been disposed of, part to a company of Montreal men for the purpose of manufacturing paper board and the old Stacey mill to Messrs. Holdsworth & Co. of Toronto and Montreal, dyers and finishers.

The "Stacey Mill," which is about forty-five feet wide by one hundred and fifty feet long, and two storeys high, will be thoroughly renovated to s uit the purposes of the Holdsworth Company. Full up-to-date equipment for a dyehouse will be installed, including machinery for both yarn and piece dyeing. The new equipment will also include cloth scouring machinery as also machinery for the finishing department.

The Holdsworth Company carry on quite an extensive business in Toronto in the dyeing, steam and cold water shrinking and finishing of light-weight worsted dress-goods and the re-dyeing of woollen and worsted piece-goods. The Montreal plant will carry on a similar business to that in Toronto; if anything, on a larger scale. The president of the company is William Holdsworth, who is, perhaps one of the best known men in the trade in this country. Mr. Holdsworth's experience has been gained in England, the United States and later in this country, and for the past fifteen years he has conducted a very successful establishment in the city of Toronto. His brother, J. P. Holdsworth, who has been at the head of the Montreal plant, operated under the name of the Holdsworth Company, at 16 Cote Street, is vice-president of the new concern, will be manager of the Montreal Branch, which they expect to have running by May 1st next.

DRESSING FOR ARTIFICIAL SILK WITH SOME REMARKS ON THE COMPOSITION AND ATTRIBUTES OF THE FIBRE

By JAMES CHITTICK.

(Specially Written for the Canadian Textile Journal.

For a proper understanding of the conditions to be met with in connection with the use of dressings for artificial silk, it may be well briefly to consider the character of the fibre and the requirements of the case.

Artificial silk is a brilliant, creamy-white fibre, with a high glassy lustre. To the touch it is firm and smooth, and it is somewhat lacking in pliability, being rather springy. Size for size, it is not nearly as strong as natural silk, and it is distinctly deficient in elasticity.

The usual process of manufacture is to reduce cellulose of some kind (cotton, wood-pulp, etc.) to a gummy liquid by the use of chemicals, and, while in this state, it is squeezed through minute tubes or orifices, issuing in the form of fine threads of gum. Immediately on their issuance these threads are solidified by chemical or mechanical means, and, after passing through sundry other treatments, come out as fibres of artificial silk, a number of these fibres being joined together and twisted to form a thread of commercial size.

It is evident that, within limits, this artificial fibre can be made coarse or fine by a change in the size of the orifice through which it is expressed, and it is also apparent that it would cost less to produce a given weight of it in a coarse size as compared with the same weight in a fine size.

At the same time, it has been found that, if a size suited for commercial use was formed of a single filament, it would be so stiff, rod-like, and unyielding as to be very difficult to work with, and so the makers have found it necessary to produce filaments of finer size, and, by uniting a number of them, a yarn is supplied having reasonable flexibility, and greater elasticity than would be the case with a single, but coarse, filament.

An artificial horse-hair is made ofa single heavy strand, and it is very stiff and unyielding.

The sizes in which artificial silks are mostly sold in America run from about 120 deniers to 300 deniers, the 120 denier size being made up of about 12 filaments, and the others somewhat proportionately. The prices might range from about \$1.75 for the coarse to about \$2.15 for the finer. Bleaching may cost 3 to 5c extra.

The specific gravity of this material is distinctly heavier than silk so the threads are not as large as equal denierages of real silk and, owing to its harder nature, it does not "cover" or fill the goods so well. These facts must be well borne in mind when laying out the work.

These filaments are very much coarser than silk-cocoon filaments. The most generally used size of raw silk is 13-15 deniers, and this raw silk thread is usually made from seven cocoons, the thread of each of which is double, so a 14 denier silk will generally have 14 original single silk filaments in it.

In the present state of the art it is impossible to approach this fineness with the artificial product. Artificial silk can be regularly furnished as fine as 60 deniers, and can be made even finer.

The proportionate cost of these fine sizes is greater, and the output is less so, as long as the makers can sell up their product in the coarse sizes, they are not anxious to push the finer counts. On account of its coarse size, and limited elasticity, artificial silk is not much used for warp purposes. Its use is principally for braids, knitted articles, and for filling in woven goods where brilliancy rather than closeness of texture is of advantage, such as tie silks, millinery goods, and for the making of small bright effects on figured dress silks.

There is no natural coherence of the artificial silk filaments to each other, as is the case with the cocoon threads of which raw silk is composed, and it is twist alone that keeps them together, and, as the fibres are very slippery, the tendency to open up and separate is considerable and must be provided against.

For use as filling for weaving purposes there is little difficulty, but for warp, and for use in knitting machines, there is likely to be much trouble.

It is here that dressings or sizings must be employed to facilitate the working of the material.

These dressings must not unduly solidify the thread, nor must it be made hard and brittle. Oily substances are a detriment, as lint and dust collect on the thread which get into the fabric and clog the eyes of the needles. Any substances which will rub or chafe off, while the material is in work, are objectionable for the same reasons.

Chemicals which soften or otherwise attack the filament must be avoided, as well as any substances which might cause trouble in subsequent dyeing operations. Nothing can be used either, which will detract from the lustre or smoothness of the material.

In view of the above, it is evident that starches, or similar materials, will dull the brilliancy, and that glues or gelatines will make the fibre brittle.

Both of these substances are also very difficult to remove completely from textile fibres without protracted boiling, and this the material will not stand. In fact, artificial silk will become glutinous if subjected to the continued action even of cold water.

A great many methods of sizing have been tried and cast aside as inpraticable. Much attention has been paid to gelatine as a material for this purpose, on account of its colorlessness, but, as it dries, it makes the yarn brittle, and completely robs it of what little elasticity it has.

One great artificial-silk concern, which has tried and abandoned many different formulae, now suggests the following:-

$1\frac{1}{2}$ lb. Farina, 1 lb. Glycerine; dissolved in 10 gallons of water.

It should be remarked, however, that farina will come under the head of the starchy matters criticized above.

The best sizing known to the writer (and it has met with great success in practical use) is one which is offered on the New York market, and which consists, essentially, in a compound of about 95 per cent of white beeswax, with about 5 per cent of ammonia. One gallon of this compound is then dissolved in 30 to 40 gallons of boiling water.

The wax is colorless and transparent, and, though a fat, is never greasy, and the amount of it in the mixture is only sufficient to hold the filaments together during the knitting or weaving process, the fibres opening up freely in the finished goods.

Should it be desired, for any reason, to remove all traces of the sizing, an immersion for a few moments in water at 200 deg. F., or over, will cause all the wax to float to the surface.

This preparation, it is claimed, can be kept indefinitely, it may be applied in any way, and it is readily handled by a practical man.

In dyeing the material, the presence of the ammonia will usually be advantageous. If desired, it can be neutralized by a bath containing olive-oil soap.

It is claimed, also, that goods sized with this dressing may be made waterproof if given a bath of water acidulated with 5 per cent of acetic acid.

The writer will be glad to afford interested parties any further information on the subject that may be desired.—A word of caution in regard to the way in which artificial silk takes the dye may not be out of place here.

In making the thread, it is not possible to get the size absolutely uniform, so it is customary to wind it into skeins of 1,000 metres and then to weigh or "denier" these skeins, dividing them into groups according to size, and in this way, commercial quantities of the material, having proper regularity of size, are accumulated.

Artificial silk, however, is apt to take the dye difficulty according to the particular lot of mixture it was made from, and according to its age, taking up color more freely when new. Any particular case or bale maye be made up of selections from material produced over a period of time, while a sufficient quantity of that size was being accumulated; or different cases from the same purchase may have been made at different times. When, therefore, these lots are dry, and have been indiscriminately and unavoidably mixed in process, bad shadiness is very apt to occur.

In piece dyed goods, this cannot be known until after the dyeing, and is irremediable; in the case of ribbons, of ordinary widths, it is not very apparent, as 1,000 metres will weave some yards before the change in color would come; when used as an "effect" yarn, only occurring at intervals, it should give little or no trouble.

As a filling for broad goods, however, particularly of a plain character, its ill-considered use is apt to invite serious loss. This should be safeguarded against by weaving the goods on a box loom, using two or more shuttles, so as to insensibly blend the shadings into each other, and, in the case of knit goods, an intelligent intermixing of the threads is advisable.

Also, if the material is skein-dyed, the skeins should be carefully looked over, and any different shadings that appear should be segregated into groups. This is a very necessary precaution.

In the case of certain kinds of artificial silk, if the acid in it has not been sufficiently neutralized, a serious rotting of the fibre may develop in time, and other kinds may, after a considerable period, get hard and brittle, breaking almost like macaroni.

In spite of all this, the product is constantly being improved, and these different troubles will doubtless be overcome in time.

This material is not silk, and never will be silk, but it has a distinct and useful character, and a place of its own. It is a fibre with which all textile manufacturers must now reckon.

UTILIZATION OF STRAW FIBRE FOR FABRICS.

Trade Commissioner C. F. Just in a recent report to the Dept. of Trade and Commerce says, in part:

The Canadian textile industry will possibly be interested to learn something further of the patented process, an invention of Dr. Reichmann, for preparing for textile purposes the fibre obtained from straw grasses and other fibre-yielding materials. This process has attracted considerable attention in Germany now that the practical difficulties in connection with the production and utilization of such fibre have been successfully surmounted. A commercial plant has been set up for handling the fibre produced from rye wheat and flax straw, where operations are being conducted on a large scale.

The process has been applied principally to straw, of which large quantities have been prepared and used for manufacturing purposes both by Mr. W. Groning, at Mesum, Westphalia, and other manufacturers. It has also been tried with other vegetable produce such as reed, grasses of all description, American sloe leaves, etc., and the results obtained have invariably been most satisfactory.

The process is very simple, the plant consisting of: Several vats for storing water and liquid chemicals, reducing drums, rotary pumps, air-compressor and drying appaatus. A plentiful supply of water and also of steam, but only little manual help is required. The stray-fibre is prepared for spinning purposes in the same way as jute, viz., it is batched, softened, carded and stretched. Ordinary jute machinery, also spinning and weaving frames can be used, with the exception of the carding machines which have to be fitted with special needle boards. In order to produce a longer thread it has been considered advisable to mix a certain percentage of jute with the straw fibre, beginning at about 5 per cent for the coarse yarn numbers, and increasing the quantity for the finer threads. The waste in carding and spinning is about the same as with jute.

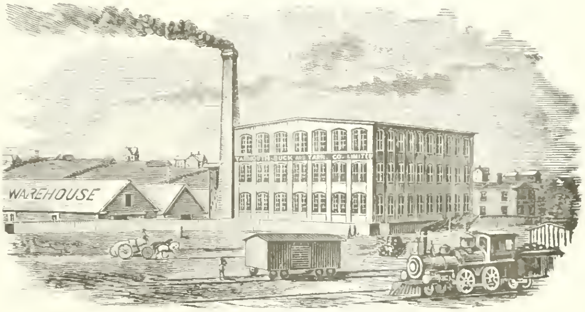
One ton and a half of straw will produce about one ton of straw fibre. Taking the prices of straw at $10 a ton, and cost of chemicals, power, steam, labor, amoritzation of plant at high figures, the cost price of straw fibre comes to about $40 a ton. This does not, however, include any royalty. The different produce manufactured from straw fibre mixed with more or less jute have been extensively tested with regard to their stability, and have also been subjected to more than ordinary wear and tear. In all cases the results have been most satisfactory, and the fibre has proved to be quite as strong as jute.

THE COSMOS COTTON COMPANY

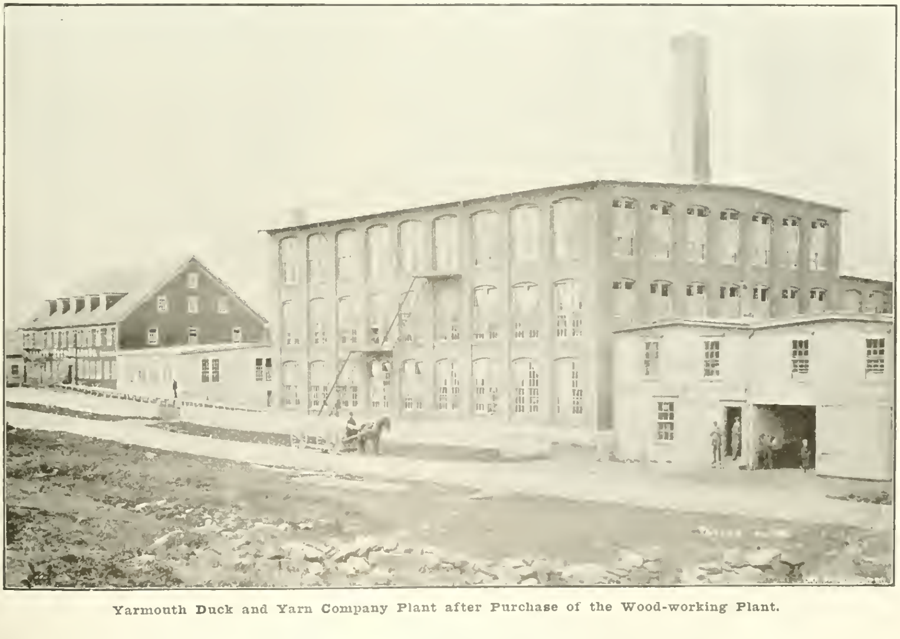
Some Interesting Facts Regarding Canada's Largest Duck Mill.

By JAMES J. WALLIS.

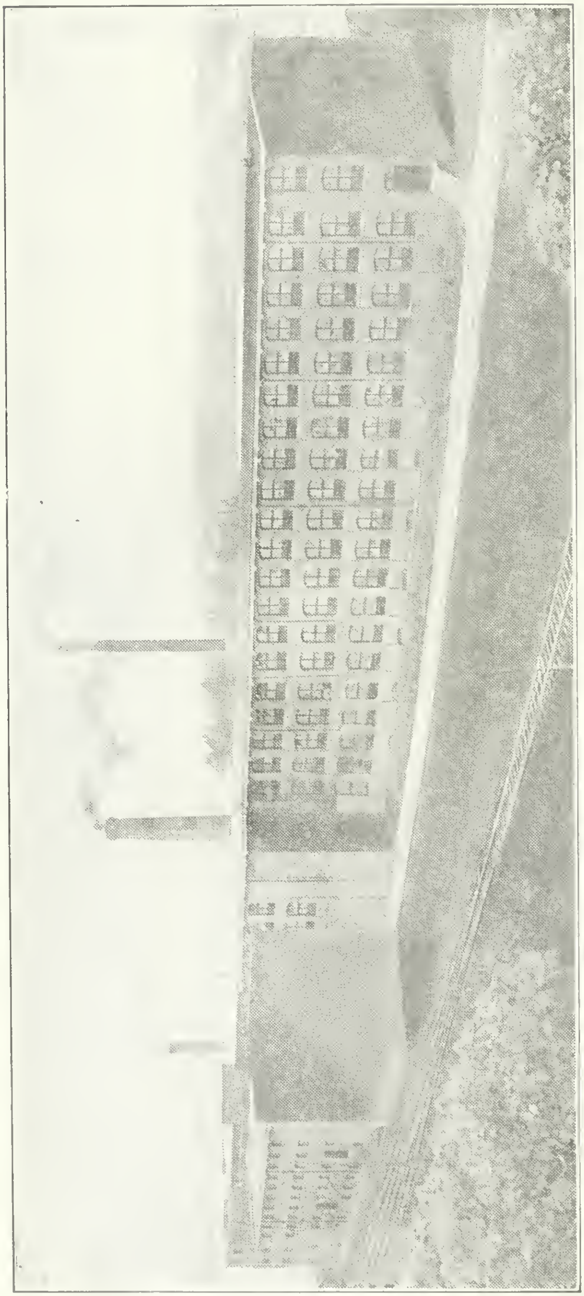
Probably it will come as news to many to learn that away down at the extreme "jumping off" place in Nova Scotia there is a cotton mill devoted exclusively to the manufacture of cotton duck, which is one of the largest of its kind on the continent. This mill is located in Yarmouth and is owned and operated by the Cosmos Cotton Company, Limited. It was established thirty years ago by the Yarmouth Duck and Yarn Company, and since then duck manufactured in Yarmouth has found its way to all parts of the civilized world, as well as much of the world which is considered uncivilized. Not a week passes but what some of the products of this mill is not shipped direct to many foreign countries such as Peru, Brazil, Japan, Ceyon, etc. The mill also has distributing houses in many large countries and the bulk of its product goes through these houses.



Original Mill of the Yarmouth Duck and Yarn Co.



Yarmouth Duck and Yarn Company Plant after Purchase of the Wood-working Plant.



Plant of the Cosmos Cotton Co., Yarmouth, N.S.

When this mill was first started, in 1883, it was a comparatively small structure, measuring only 90x76 feet and three stories high. Nine years later, in 1892, the premises of the Milton Woodworking Company—a company which was doing business in a large building immediately to the south and which had gone into liquidation—were secured. In 1907 the company had again outgrown their clothes, and it was found necessary to enlarge the main building. Even this did not suffice, and last year the company completed the largest addition of all—a building 313 feet long by 76 feet wide, and three stories high, besides a large warehouse 160 feet by 60 feet and four stories high. The main building—not including the portion acquired from the Milton Woodworking Company — now measures 515 ft. in length. Including the property of the Woodworking Company, the whole frontage is 850 feet, which, it must be admitted, is "some plant" for a small town like Yarmouth, Nova Scotia.

In 1883 the output of the mill was about 5,000 pounds of finished product every week. Now, when working to its full capacity, it turns out 75,000 pounds—real good evidence of thirty years' progress.

Needless to say, the buildings are of the most solid construction. They have to be to stand the enormous weight of machinery necessary in the manufacture of cotton duck. The older portions of the buildings are of brick and stone, the newer of brick and concrete.

The human element of this enormous plant is worth considerable study. Hundreds of well paid and seemingly contented employes are on the roll. Of course, if any one will take the trouble to talk to them individually, he will find some kickers—some people will 'kick'' even in Heaven, if they happen to get there—but on the whole they are perfectly satisfied with the mill and their employers. Quite a number of the employes have been there ever since the mill opened thirty years ago and very many of the younger men and women, too, have spent practically all their working hours in that mill. The mill was floated on a "bond issue" and quite a number of those working there are bondholders. In a large measure the mill is their mill, and its prosperity is their prosperity. Probably this is one of the reasons why the management has never been vexed by labor problems, which are the bug-bear of many a mill situated less favorably.

The "trade" will probably form a better idea of the size of this mill when they learn it is operating 12,000 spindles. Throughout the mill, both in the old and new sections, the machinery is principally of British manufacture. There are a few American machines, and included in them are the two largest looms in Canada, one of which is capable of weaving duck to the width of 204 inches and the other 166 inches. The product of these two looms is used principally in paper mills, and they are the two busiest looms in the shop, as they are the only ones it has been found necessary to put double shifts on during the past few months. It takes 4,500 spools to supply the thread for the smaller of the two and 5,000 for the larger. They make their own warp. They are beautiful machines to watch in operation—a whole study in themselves.

The whole upper flat of the main building is one large room, 515 by 76 feet, and it is filled with spinning, spooling and twisting machines. The second floor is subdivided, and in its various divisions are to be found the carding, slubbing and drawing machines. On the ground floor are the beaming, winding and weaving machines and the shipping rooms. Duck in any width from 6 to 204 inches and for a multiplicity of purposes is manufactured. Two very large users of Yarmouth duck are the Massey Harris people and

G. H. ALLEN—Manager.

the International Harvester Company. The fishing vessels of the Maritime Provinces and Newfoundland use an immense quantity for sails and of the lighter grades thousands of yards go into tents and tarpaulins.

The warehouse has a capacity of 3,000 bales and the average of the stock carried in it is $200,000. The only machinery in this building besides the elevator is the picking machine, which is in a self-contained room in one corner. From this room the cotton is drawn by a vacuum process across the street to the main mill, where it starts on its long journey through machine after machine until it reaches the shipping room—a finished product.

The heart of this great plant is, of course, the power generator, or rather generators. The old mill is driven by a beautifully kept steam engine of eight hundred horse power. The new part is driven by electricity, a large Curtis steam turbo generator of 750 kilowatts being the principal part of the plant. There are a

SAMUEL KILLAM—Superintendent.

number of smaller individual motors through the mill. A battery of six boilers furnishes the required steam.

The thorough steps taken for the prevention of fire are a revelation to many. The building is not fireproof, but so complete is the protection that the company is enabled to carry insurance at a very low premium, although the risk is the largest in this section of the province. The building and plant carry a total in-

C. L. CANN—Assistant Superintendent.

surance of over $900,000—but still we have not heard of any of the underwriters losing any sleep on account of it. There is a sprinkler system all through the mill and warehouse, and a slight rise in temperature would cause a miniature sized flood as soon as the thermometer reach 155 degrees. Brick partition walls and automatic doors would help in checking the spread of a fire. But the mill does not depend on sprinklers alone. In a self-contained compartment in the rear, cut off from all communication with the mill in any way, are two large fire pumps, each with a capacity of 1,000 gallons a minute, and which are kept under steam day and night and seven days a week. A special reservoir has been built, from which these pumps can draw a supply should the occasion arise. This reservoir has a capacity of 1,250,000 gallons and is always full. Then in addition to all these elaborate protective appliances, the mill is connected with the town water system by a special main and hydrants are dotted all over the grounds. It is doubtful if any building in Eastern Canada is so well protected from fire as is this mill in Yarmouth. All the fire-fighting apparatus is in charge of a trained body of employes which is kept in a high state of efficiency.

The enterprise is purely a local one. It was started by Yarmouth capital, and has continued all along in the control of local men. At present the officers and directors are:—

President—John H. Killam.

Vice-President—S. W. Williamson, M.D.

Secretary-Treasurer—G. Harry Allen.

Superintendent of Manufacturing—Samuel Killam.

Assistant Superintendent—Clifford L. Cann.

Directors—The President and Vice-President and Rev. W. H. Heartz, Spencer Turner and G. Harry Allen.

A. E. HUSKINS, Overseer Spinning Department.

HARRY REYNARD, Supt. Turbine Department.

PERCY A. HOOD, Overseer Carding Department.

D. E. CAIN, Overseer Weaving Department.

Indigo Dyeing

An important meeting of members of the Textile Institute and of the Society of Dyers and Colorists was held in Bradford recently to consider the report recently issued upon investigations which have been carried out with a view to the establishment of improved analytical methods for the testing of indigo-dyed or reputed indigo-dyed fabrics. The Chairman in describing the circumstances which led to the commencement of the investigations, said that in 1911 a larger number of instances came under his notice of serious mis-description. He found that complaints had been made for 20 years or more concerning cases where cloths were openly sold as indigo-dyed on which there was not a particle of indigo, and many other cases where the percentage was as low as 4 per cent, the balance often not even being what could be termed a fast blue. As far as he could see, there was apparently no remedy for this class of nefarious trading, where the general public stood to lose so much, and he, therefore, thought that it was a matter which the Textile Institute might investigate. Eventually a special committee was formed to deal with the matter. The cotton section of the committee had come to the conclusion that there was not the same necessity for investigating the ratio of compounding indigo with other dye stuffs as there was in the woollen trade, and after fixing the pure indigo standard and defining the term "indigo red" it dissolved.

The woollen section had held several meetings, and the report now before them was the result of the investigations which had been made. The various processes detailed in the report having been described a long and interesting discussion took place.

Mr. Whittaker, of Huddersfield, said that if they looked at the question from the point of view of the general public,—the people who wore blue suits and dresses,—they would come to the conclusion that they were not interested to know whether there was 50 per cent of another dyestuff. What they wanted to know was whether the dyestuff, whatever it was, would wear as well as a full indigo.

Mr. Kitchen said that a little while ago an important body had communicated with some of the most important dyers and manufacturers and merchants in the country upon the question of the standardism of the term indigo-dyed, and had asked them what they understood indigo to mean. Nearly 50 per cent of them replied declared that indigo was the shade, not the dye.

Professor J. Hubner, of Manchester, spoke appreciatively of the value of the investigations which had been carried on. Mention had been made in the discussion of methods which might be applied by the merchant, in order to allow him to test whether a material contained indigo, or how much indigo it contained. He thought when they came to that point they were on dangerous ground. Unless the method was so simple that no mistake could be possible, it was not wise in his opinion to place it in the hands of a merchant: it should be carried out by qualified men.

Referring to the discarding of the cotton section of the Indigo Dye Committee, Professor Hubner said that probably there was a certain amount of justification for that. At the meeting held in Manchester some of the most prominent indigo cotton dyers present assured them that, practically speaking, if they were asked for indigo they dyed nothing but absolutely pure indigo. Further they weer assured by a representative of a Government Department that the Department was looking around for dyestuffs which were faster than indigo, thus applying to the cotton branch, and not to the woollen. The methods which were now at their disposal, as a result of the investigations, were so excellent that although he believed the declarations of their Lancashire dyers, he might even set to work to make a few experiments to see whether Lancashire was really as good as she was made out.

A resolution was adopted expressing the hope that investigations would be pursued still further.

Profit Sharing at Batley

During the last few years much has been written and said about the impracticability of profit-sharing schemes and the like in industrial enterprises, and a distressing feature of the situation to those who favor such schemes is the large number of partial or complete failures to make such ventures commercially successful, says the "Textile Manufacturer" In this connection it is rather a significant feature that amongst the comparatively few successful profit-sharing or co-partnership schemes the most notable are those which have been inaugurated in connection with well-established and successful businesses. This also applies to the well-known firm of Messrs. J. T. and J. Taylor, Limited, who are woolen-goods manufacturers with mills at Batley. The firm has been in existence for well over sixty years, but the system of profit sharing was only commenced twenty-two years ago by Mr. T. C. Taylor, M. P., the present chairman and managing director, who then became sole proprietor of the business. Only the managers and foremen participated at first, but in respect of 1895 two fully paid £1 shares were presented to each employee who had earned 20s. or more per week, and one share to the remainder. The scheme provides that after making due allowance for depreciation and paying 5 per cent on capital any surplus profit shall be apportioned between capital and labor according to their respective amounts. For 1896 the dividends on shares was 7½ per cent and the bonus on wages 3 per cent. No distribution could be made to either shareholder or workers in the two following years, but substantial distributions have been the rule since. High water mark was reached in 1911, when 15 per cent was paid on capital and 10 per cent on wages. Including the amounts declared at the last annual meeting, held a few days ago, the firm has in the last nineteen years paid an average of fully 10 per cent on shares, and has allotted the handsome total of £130,000 in bonus shares, in dividends thereon, and in grants to the Workers' Benefit Fund. In answering a point raised by critics of the profit-sharing system as to what would be done with the increasing capital, Mr. Taylor said that all the increase they were likely to have for some time to come would be applied to increasing their producing powers. This seems to establish at once the principle that profit-sharing need not and should not stultify trade expansion, as is further evidenced by the fact that in the twenty-two years which have elapsed since Mr. T. C. Taylor took over the business, the workpeople have increased in number from 600 to about 1,600. Of the slanders upon profit sharing concerns, there is none greater than the money distributed among the employes was first taken out of them in some other way. Notwithstanding statements that have been made to the contrary, it is affirmed that Messrs. Taylor pay the full standard rate of wages in addition to the bonus and dividends. Thus an employe entitled to the double bonus, who owned fifty £1 shares and whose wages for last year amounted to £70, would benefit in the following way. He would get a dividend on his shares of £5, and a bonus on his wages of £7 in the shape of shares; a total value of £12, equal to an addition of 4s 7d a week to his wages.

Prevention of Ripping in Knit Goods

A knitting device recently patented in the United States, and shown in the accompany illustration, is designed to form barrier stitches for preventing the knitted fabric from ripping in case one or more stitches break. These barrier stitches are especially needed in stockings, as it frequently happens that in the upper portion of the stocking one or more stitches are brok-

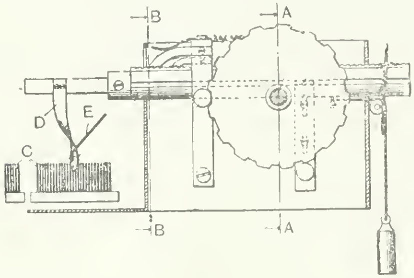


Fig. 1.

Fig. 2.

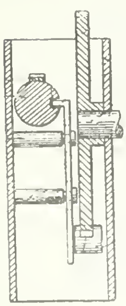


Fig. 3.

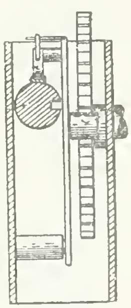


Fig. 4

en by the gripping device on stocking supporters. The new device consists in the combination with an ordinary knitting machine, of a thread guide, which is arranged in opposition to the knitting needles, and is given such a movement as to feed an auxiliary thread in the form of a coil around each knitting needle. The coil forms a barrier between two portions of the knitted fabric—as, for example, between the upper and lower portion, and prevents the ripping from extending from one portion of the fabric to the other. It is immaterial where the barrier stitch is formed, but is preferably knit along the lower edge of the doubled-up upper portion of the stocking.

Fig. 1 is a vertical section of the device, illustrating also a part of the knitting machine to which it is applied; Fig. 2 illustrates the coils; Fig. 3 is a cross-section on Line A—A of Fig. 1; and Fig. 4 is a cross-section on line B—B of Fig. 1.

The device for forming the barrier stitches comprises a guide for an auxiliary thread E, Fig. 1, arranged in opposition to the knitting needles, and capable of swinging through the space between two adjoining knitting needles, and of moving crosswise to the set of the needles. Owing to this double motion, the guide feeds the auxiliary thread in the form of a coil around each knitting needle Fig. 2, this thread embracing each longitudinal thread.

The guide D is in the form of a warped bar, the lower end of which is provided with eyes through which the thread E, coming from a spool, is passed. The lower end is of a thickness corresponding to the space between two adjoining knitting needles C, so that it can freely swing. Its lower edge is rounded so that, while it swings through the space between two adjoining knitting needles, it will not touch the yarn. The guide is fixed to the extension of a shaft, arranged parallel to and at some distance away from the edges of the knitting needles. The shaft is held in a casing so as to move longitudinally and also rock around its axis. The longitudinal feeding movement is effected by means of a rack with which two pawls are connected. The pawls are pivoted to a spring-actuated rocking arm carrying a roller. A disc fixed on a spindle that is operated by hand is formed on its circumference with cam-shaped projections, which act against the roller, imparting a swinging motion to the lever. The cam projections are so constructed that by the swinging movement of the lever the pawl will feed the shaft intermittently forward a distance equal to two knitting needles. A weight tends to retract the shaft after each movement, this retraction being limited to a distance equal to the thickness of an individual knitting needle.

The rocking movement of the guide is effected through the medium of a vertically reciprocating bar, which has longitudinal recesses whereby it is movably mounted on stationary projections. This bar carries a roller, Fig. 3, that is acted upon by the disc cams. At its free end this bar is formed with a nose which engages a longitudinal groove in the shaft. As the bar through the medium of the roller and the cam disc is caused to reciprocate, the shaft, and consequently the guide, are given short swinging movements. The two rollers are so arranged that one will enter on to the ascending part of the cam projections earlier than the other, and the shaft receives one and then the other movement.

The operation of the device can be effected by a handle, not shown. As this disc is revolved the shaft will be first rocked to swing the guide between two adjoining knitting needles, then it will be fed a distance of two knitting needles forward, moved back one needle, then again swung in the reverse direction, and again fed a distance of the two knitting needles, and so on. During these movments of the auxiliary needle the auxiliary thread E will describe the path indicated by the coils in Fig. 2. When the work is finished the thread E forms the seam which acts as a barrier between the lower and upper end of the fabric.

OUR OLD COUNTRY LETTER

(From Our Special Correspondent.)

At Burnley, one of the Lancashire centres, the cotton manufacturers, I am officially informed, have decided to stop their mills for four weeks during the next four months. If this decision is to be carried out exactly to the letter—it must be remembered that a good rush of trade would change matters—it will mean 90,000 looms and some 40,000 at a standstill. It is pointed out that a considerable glut of yarn may result and that this will concern the Oldham district. The subject, if necessary, will be taken into consideration by the committee of the Federation of Master Cotton Spinners' Association, though Burnley is outside the Federation area. A rough calculation shows that the stoppage of the Burnley sheds means to the cotton operatives a loss in wages which runs into more than $240,000. Now it is not an easy matter to organize short time in any industry, and the attempt to do it at Burnley will be watched with interest. Complaints of pressure to sell Burnley goods have been rife for months, and there has already been a considerable amount of spontaneous short time. Perhaps there has been a trifle more demand for Burnley goods lately, but the trade is still sluggish and unprofitable, and a reduction of output appears to be the only obvious way to improve it. The chief objection from the manufacturers point of view is that it applies one drastic sort of treatment to cases that are not alike; for instance, some are well beforehand with their contracts and others are not; some are pretty well off for work for their looms and some are wanting work all round. The common sense of it would seem to be that manufacturers should adopt short time according to their particular purposes or circumstances, but they are jealous of their neighbors, and do not wish to be the first to give in; furthermore, operatives are likely to become restive if they are exceptionally short of work. From the consumer's point of view, it may be desirable that the British industry did not grow too expert in regulating production, but the difficulties in the way of making a close concern of the cotton trade are extreme. Heretofore Burnley has not been very successful in attempts to organize short, but perhaps it has not often had such a bitter experience as that of the last few months. It is estimated that about 20 per cent of the Burnley production is already stopped indefinitely.

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Turning to the cotton trade prospects for 1914, it may be stated that at the time I write there is nothing cheerful in England and little actual evidence of an early return to prosperity is not to be found. Some people are confident that a change for the better will take place before long. For instance, the President of the Manchester Chamber of Commerce says: "Granted satisfactory harvests and an easing in the monetary stringency abroad, I then see no reason why markets which buy from us should not consume their accumulated stocks, recover, and help us with a renewed demand; but of this I am convinced that this revival cannot be forced, will not be speedy, and must of necessity be a gradual one." That is one opinion, but the general opinion among the manufacturers, so far as I can ascertain, is that British producers will have to wait until towards the close of 1914 before they can expect any real revival in the cloth line. Spinners of yarn are, of course, dependent upon the activity in the weaving branch of the industry, and their turn will not probably come until manufacturers of cloth are busier. It is felt, however, that looms during the last few years have been put down on a larger scale than spindles, and before long this will have its effect upon yarn producers. Export merchants also complain sometimes that there is a great increase in the number of firms doing business in the markets, and this may help to account for the occasional disparity between the report of an individual and the evidence of statistics issued by the Trade Board.

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At the moment there is considerable interest being taken in the merits of the steel band as a substitute for rope in the main drives of cotton mills. A good deal of surprise is being felt at the number of conversions being made, because it is quite unusual for Lancashire mill owners to adopt any power specialty very readily. Probably the explanation, apart from the advantages claimed for the steel band, lies in the ease with which the conversion is made. The ordinary grooved rope pulley is fitted with a plate which rests in a small cutaway section of the grooves. The smooth cylindrical surface thus formed is serrated and provided with a friction covering made of canvas and cork glued together. On this run the steel belts, which are made from a specially hardened charcoal steel, having a tensile strength, it is claimed, of 95 tons epr square inch. The thickness varies up to 1 m.m. and the width from $1\frac{1}{2}$ inches to 8 inches, according to the power to be transmitted and the speed. The joint, which might be expected to be the stumbling block here, as it has been in the past, as in the present case extremely ingenious. The advantages of this method of driving are: Reduced lateral space on the pulley occupied by the steel belting; reduced weight as compared with leather belting or ropes, with a consequent relief to the bearings, and, it is claimed, a very much longer life.

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On March 3rd the next colonial wool sales open in London, and a much larger selecteion of cross-bred wools will be available than was the case in January. It is also anticipated that one may see some definite clearing of the wool situation. It seems improbable that these perplexing anomalies, which have obtained since August last, can continue much longer. Either wool must decline or tops and yarns must find a higher level of values, and at present there seems to be no indication of any weakening element in the position as regards merino wools. The steady clearance of old stocks, together with cheaper money and the firmness of the London market, should all help to restore confidence and to establish better conditions during the coming in-yarns, dress goods and worsted coatings show remark-terval. Supplies to the States and Canada of tops, able increase during the past two months. Take the States as an example, the following are the values compared with January 1913:—Wool £179,207 (£93,382); dress goods £70,913 (increase £55,582); worsted and mohair yarn £13,138 (£12,831); wool tops £17,084 (last January 913 none exported). These figures only relate to Bradford, and as compared with the stagnation which reigned during the uncertain months while the Underwood Tariff was under discussion, these figures show promise for the future.

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Mr. T. C. Taylor, M.P., president of J. T. & T. Taylor, Ltd., who presided at the annual meeting of the firm's employees the other day, stated that the woollen trade received a check in the latter half of 1913, but in spite of that the turnover of his firm had been almost equal to that of the year before. Prices of wool had become high, and they appeared at the moment to be tending higher still. Manufacturers had not been able to secure an advance in the prices of their goods equal to the combined effect of the increased cost of wool, coal, oil and labor. Higher rates, the cost of national insurance and many other miscellaneous items had all told in the same direction. The firm, therefore, could not pay the same dividend as last year. They had decided to declare a dividend of 10 per cent on shares, and a labor bonus of 5 per cent, or 10 per cent to those employees who were entitled to double bonus—namely those of 21 years of age and over who had been not less than five years in the employ of the company and owned shares equal to half wages in the year. The labour bonus, as usual, would be paid in fully paid-up shares of the company, and the dividend on shares in cash.

HEWSON COMPANY INVESTIGATION.

Legal Action Threatened by Creditors.

The outcome of the inquiry into the affairs of the Hewson's Pure Wool Textiles, Limited, of Amherst, N.S., which started two weeks ago, is awaited with interest, not only as throwing light on the causes which have brought about the present situation of the company, but as to the prospects for the holders of the securities of the company. There are $350,000 of the bonds, on which the last half-year's interest has not been paid, and the preferred stock amounts to $250,000. The large amount of common stock, besides, will represent little if any more than the mere loss of prospective gains.

These securities are held mostly in the Maritime Provinces, and the loss will be somewhat severely felt, at the best. There is little change for the preferred stock, and the general opinion is that the bonds will show a heavy shrinkage when the final accounting is made. There is some talk that, instead of liquidation, there will be a re-organization, preferred stock becoming common, and a change being effected in the status of the bonds, it being thought that a couple of years of good business would pull the company out of the hole.

We believe that some of the creditors of the company have taken legal action on the ground that there must be some redress at law for the present position. Similar action is threatened by some of the bond and shareholders, who are acting independently. It is alleged that misrepresentation was made at some stage of the company's early history, and the desire is evidently to place the responsibility where it properly belongs.

Card Setting.

Carding is perhaps the most important cleaning process in the mill and especially is this so in a mill where the cotton is not afterwards combed, as it is then the least real cleaning process and bad work cannot later be corrected. The revolving flat card, on account of its all-round superiority, has gradually succeeded all other styles until now it is adopted entirely in equipping new mills. The working parts of the card require careful and accurate setting in relation to each other to produce good work and the quality of the work done may be regulated by the settings. Special gauges of the required thickness are used to test the settings and as they are very thin and easily damaged they should be handled with care, as a damaged gauge means a faulty setting and bad work.

Then the feed is now almost universally used and is made in several styles. For short staple the face of the plate is short and vice versa, and in any case the distance from the bite of the roll to the point where the plate is nearest to the lickerin should be greater than the length of staple. The setting of the feed plate to the lickerin depends on the feed weight of lap, but for an ordinary lap, say 12 ounce, a distance of .011 of an inch would be all right. The mote-knife or knives, (there are often two) comes between the feed plate and the screen and may be set at .012 of an inch from the likerin, and the screen about one-eighth of an inch at the end nearest the mote knife, and .019 of an inch at the other end. For an accurate setting at this point the lickerin should be removed and a quadrant gauge used. The cylinder screen is usually hinged in the center, the back half being set concentric with the cylinder about .032 of an inch away, while the front end is set 3-16 to 1-4 of an inch from the cylinder. Some fibres are carried past the doffer by the cylinder, and if the screen were set close at the front end much good fibre would be knocked off and lost at this point. The lickerin is commonly set .10 of an inch from the cylinder and the back plate may be set .012 of an inch from the cylinder at the bottom edge and 1-32 of an inch at the top edge.

The flats are supported at their ends by a curved plate called the "flexible bend" which is practically concentric with the cylinder and over which the flats move and which may be raised or lowered at its several points of support in order to raise or lower the flats to change the distance from the cylinder. There are several different types of flexible bends having different methods of setting, the most largely used being the bend with five setting points, although the bend in which the setting is done at one point on each side of the card is in use on some cards.

There are two common methods of setting the flats on a card having the five-point setting. One is to remove a flat on each side of the setting flat to allow room for the gauge, and by means of a handle move this flat to each of the five setting points, making the proper adjustments on each side of the card, and then, having tightened all the nuts, to test the settings again at the five points. Another is to remove a flat each side of the flats which are directly above the setting points and use these to set the center flat first, then the flat at the front of the card and the one at the back, after which the two between the ends and center are set. After the settings have been made and tested with the gauge, the cylinder and flats should be revolved, and if any rubbing is heard at any point, a wider setting is necessary at the point of friction. The flats move over the cylinder at a speed of about three inches per minute and may be set .011 of an inch from its surface. This setting varies considerably with different kinds of work and a closer setting may be attained on cards, which are in good condition and well ground. The stripping comb is usually set about .07 of an inch from the flats.

The setting of the front plate has an important bearing on the amount of flat strippings, which would be greater if the plate were set farther from the cylinder. It is commonly set .012 of an inch from the cylinder at the bottom and .034 of an inch at top, this setting being changed to the amount of flat strippings. The doffer is ordinarily set .007 of an inch from the cylinder and the doffer comb .010 of an inch from the doffer.—W. P. in "Textile Manufacturer."

Shaded Cloth.

One of the most annoying problems that is encountered in the manufacture of worsted cloths is the prevention of what is known as shady goods. So indeterminate are the couses that the manufacturer is often at his wits end to diagnose the situation and apply a remedy. To be sure, shady goods, so called, often exist only in the imagination of the market examiner, and the fault is apt to become very much more common when the demand for goods is letting up or the goods are sold at prices which are found to be above the market on the delivery day. The only remedy for this phase of the case is to fight the abuse in every possible way. Every manufacturer has had experience in sending out goods that he knew were in excellent condition when they left his mill, and having a complaint made that they were found shady by the public examiner, wrathfully ordering them returned to the mill for inspection, and on opening them, finding them dirty, wrinkled, and with the nap disturbed, and in such a generally slovenly condition, that it would be impossible to venture an opinion as to their standard until after they were refinished.

This problem of a fair and intelligent market examination is a most serious one and deserves careful study by all manufacturers. There are, however, unfortunately, too many legitimate occurrences of shady goods and the object of this article is to collate a number of the possible causes, leaving it to the manufacturer to eliminate those that are not causing the trouble and thus concentrate his trouble on the minimum of probable causes. With the cause of the trouble ascertained, the average manufacturer is ordinarily able to adopt the remedy.

In an investigation of this subject it is proposed to take the opposite view of that which is ordinarily taken and to examine possible causes in the various finishing and dyeing operations, starting with the operation which immediately precedes the examination and working back through all the processes to the raw material if necessary.

The last process cloth undergoes, before examination, is, usually pressing. If a rotary press is used, shadiness may be caused by unequal pressure, which has the effect of making some parts of the cloth harder than the other parts. This will cause the cloth to appear as though it varied in color, thought it is an optical effect only that obtains. If the steam is blown on unevenly, this may, also, cause a variation in appearance. Furthermore, after cloth is passed through a rotary press at a great heat, it is perfectly apparent that all the natural moisture of the cloth has been taken away from it. When the cloth is placed in a truck or on a table, it is exposed unevenly to the atmosphere, and, consequently, absorbs moisture unevenly. The effect of this on cloth is the same as is seen in an exaggerated way when blotting paper absorbs water—where the moisture is absorbed the color appears darker. This effect is removed when the cloth is thoroughly cooled, but to cool a 60-yd. piece evenly is something extremely difficult to accomplish. A great deal of cloth is condemned on this account and sent back to the dye house, to be evened up, when the color on the piece may be perfectly level. This trouble of uneven cooling is most apparent on light and delicate shades, such as tan and gray, but is often apparent on darker shades, though not to such a marked degree.

Ordinarily the process previous to pressing is shearing. If the blade on the shear is incorrectly set, the cloth is unevenly cleared out and there will be an apparent difference in shade, due to the differenee in amount of nap left on different parts of the cloth. This can, usually, be readily discovered by careful observation.

In examining goods from the dyer for evenness, there is the same danger of incorrect diagnosis, through uneven cooling, as was referred to previously in regard to goods from the press and it is often impossible to tell definitely what condition the color is in, if the cloth is examined in a hot condition.

Scouring, or lack of scouring, is responsible for a great deal of trouble. The action of a washer seems to be to remove the dirt and grease from the centre of the cloth, transversely through to the edges, and if the foreign matter—and this includes the soap used—is not thoroughly removed, the cloth is shady before it goes to the dye house, and whatever color is put on will reproduce the original unevenness. Of course, this will always be most apparent in light, delicate shades.

Crabbing goods in the grease often sets the dirt in so fast a manner that the washer is unable to extract it. This can be easily seen if the goods are examined after crabbing, and is often due to using an insoluble oil in the previous processes of manufacture. Goods which are uneven from end to end are often caused by uneven steaming on the crab.

In the dye house there is plenty of opportunity for much that is wrong to happen, and the conditions in the average dye house make it difficult to carefully guard against many sources of trouble. Too quick boiling will tend to make cloudy goods, but the usual complaint of goods being shady from side to centre very seldom is caused by the process in the dye house. When it is overcome by redyeing the reason, probably, is that the additional boiling has the effect of evening up the inequalities that the first treatment did not accomplish. As far as goods that are shady from side to centre are concerned, the dyer usually does more to cure the disease than to cause it.

Unevenness in shade can be caused by irregular action of the loom (or by faulty dressing), causing the number of picks or ends to vary, making the cloth denser at some parts than others. This is very difficult to discover and may require the assistance of a magnifying glass for determination.

Mixed filling or warps is a frequent cause of variation of shade. This is, usually, impossible of discovery until the cloth is dyed. It is then very apparent and can generally be located by the change in color being very abrupt.

Sometimes, owing to a mixture of tops or roving in the manufacture of yarn, filling bars occur, owing to the mixed stock, but merge almost imperceptibly into the ruling shade. This is a very serious matter and many entail large losses before the cause can be definitely located.

The foregoing are the principal causes of shady goods, though it seems that causes due to special conditions obtaining in various mills aree onstantly being demonstrated. Ordinarily most of the blame is placed on the dye house, though experience teaches that the dye house is often not at all blame.

By following the cloth backward, from the last process and eliminating each probable cause, better and quicker results will be obtained than by examining goods in a hot and abnormal condition, and promptly sending them back to the dye house for additional treatment, which is neither necessary nor desirable.—"Fibre and Fabric."

THE DUVETYN FINISH.

The Duvetyn finish, which is produced on cotton fabrics by what is known as "emerising," is a somewhat recent novelty in the way of finishes. It has enjoyed a run of popularity, and is still in favor. At the time of its introduction it was worked as a secret process, different finishers employing methods differing perhaps in some detail or another. Experience with the work has brought improvements, and one of these forms th subject of an invention by the Societe Durbar-Delespaul, of Roubaix (French patent 449,266, 1911). It is an application of a well-known process of raising or "emerising," and it is stated by the inventors that the patent involves no improvement in the technique of that process. The "emerising" process is used generally on cotton goods woven in such a way that the weft floats on the face of the cloth and the warp on the back, much the same as a moleskin This process of finishing does not require any special treatment in the weaving, and is equally well adapted for worsted or carded woollen fabrics as for cotton. The fabrics are emerised either in the gray or after dyeing or printing. The process changes the surface of the cloth—gives it the appearance of velveteen, chamois, or the skin of the mole. The operation is very simple, and consists of subjecting the cloth in two or three passages to the action of several rollers which revolve rapidly in a direction opposite to that in which the cloth is moving. These rollers are covered with emery cloth.

Pulverized flint, stone, glass or sand may be substituted for the emery. The action of the roller on the weft of the cloth produces a very short, thick nap, with the fibers standing straight from the surface of the cloth. The extent of this action depends, of course, on the nature of the fabric to be finished, and is regulated by the tension of the cloth, the speed and number of the rollers, and on the fineness of the emery with which the rollers are covered. It is evident that carded woollen goods can be finished by this process more easily than worsteds, owing to the difference in the twist of the yarn. Emerising differs radically from napping or raising on the ordinary raising machine: the latter tears the fibers from the thread in order to form the nap. Emerising consists not in tearing the fibers out, but in wearing or polishing the surface. Both raising and emerising, however, serve the purpose of reducing the strength and solidity of the fabric. In order that the nap may be uniform it is necessary that the fabric should possess a certain degree of stiffness. For this reason the cloth is heavily sized, and this prevents the action of the emery penetrating deeply into the fibers. The ordinary glue used in finishing answers the purpose, and after it has been applied the material is dried thoroughly before emerising. By covering the rollers with bands of emery the Duvetyn finish can be produced in the form of stripes.—Textile Weaving.

WORLD'S COTTON STATISTICS.

Mr. Arno Schmidt, the Secretary of the International Federation of Master Cotton Spinners and Manufacturers' Associations, has now published statistics relating to the consumption of cotton during last season, together with stocks of cotton in spinners' hands on 31st August last. Owners of more than 90 per cent of the total spindles in the world have made returns. It must be borne in mind when drawing conclusions from these figures that the consumers of American and Egyptian cotton are represented by a higher percentage than 90, as the missing 10 per cent is partly accounted for through the smaller receipts from India, Mexico, Brazil, Turkey, etc., where indigenous cottons are almost exclusively used. With regard to the consumption of cotton for the season the owners of 129,895,651 spindles have made returns out of a total of 143,452,659 spindles. The total consumption is given as 20,277,386 bales against 19,831,392 bales in the previous year. The consumption in Great Britain, where returns have been received from the owners of 49,805,768 spindles out of 55,652,820 received from the owners of 49,805,768 spindles out of 55,652,820 spindles, is 3,825,153 bales, against 3,765,482 bales in the previous season. Stocks of coton in spinners' hands on 31st August are given as 3,540,771 bales as compared with 3,869,540 bales twelve months previously. The stock for Great Britain is given as 339,859 bales, as compared with 360,825 bales on the 31st August ,1912. According to a table giving the stocks of spinners per 1,000 spindles the amount for Great Britain is 6.82 against 7.40 last year. The amount for Germany is 24.79 as compared with 28.24 in 1912, in the previous year. With regard to consumption per 1,000 spindles, the amount for Great Britain is 76.901 against 77.27 in 1912. Germany is 151.99 as compared with 167.61, and the figure for America is 18.365 against 177.09. Of the 129,85,651 spindles making returns, 64,325,243 are mule spindles and 65,570,408 ring spindles. The machinery engaged on American, East Indian and sundry cotton is stated to be 108,745,812 spindles whilst the spindles engaged on Egyptian cotton are 21,149,-839. The spindles in course of erection throughout the world are reported to be 2,563,544. With regard to Great Britain returns have been received from the owners of 49,805,768 spindles. Of these, 40,493,532 are mule and 9,312,236 ring spindles. The machinery using American, East Indian and sundry cottons amounts to 35,506,008 spindles, whilst there are 14,299,760 spindles engaged on Egyptian cotton. The number of spindles in the course of construction in Great Britain is 1,125,-956.

Book Department.

Copies of any of these Books may be obtained through the office of the Canadian Textile Journal, 600 Read Building, Montreal.

The Cotton Cloth Computer.

The Calculations which the Manufacturer of Cotton Cloth has constantly and repeatedly to make, in order to arrive at the cost of Warp and Weft, and to determine the Weaving Price, are both tedious and time-taking. By the aid of the Cotton Cloth Computer, however, anyone, without any previous tuition, can at once obtain the cost of Warp in a piece, the cost of Weft, and the Weaving Price, with any percentage additions, or deductions, etc.; also the weight of warp, weight of Weft, and the number of Hanks required of each. Moreover, the Computer is so arranged that if any variation is made either in the length, width, picks or reed, in the price of the yarn per lb., or in the counts of yarn—the effect of such variation on the cost is instantly seen.

The Weaving Price is ascertained very readily, and any number of percentages can be added or deducted, this being done with facility and rapidity, and without any calculation whatever.

The method of using the Cotton Cloth Computer is almost self-evident. Clear and simple instructions are given, however, together with a number of practical examples, and, by the aid of these, anyone with five minutes' attention is enabled to make the fullest use of this valuable time and labor-saving instrument.

Pocket Size, with instructions, in neat case $2.50, post free. Large size for office use $8.00.

Fine Cotton Spinning.

A Practical Manual by J. W. Lomax, lecturer on Cotton Spinning at the Oldham Technical School, Member of the Textile Institute. In this work the writer treats the subject strictly from the point of view of the cotton spinner, with the object of meeting the requiremens of workmen, students, and mill officials who desire first and foremost an acquaintance with the practical details of the various departments and machinery of a cotton spinning mill. Matter and subjects which are outside the scope of most text-books are dealt with, and actual practical experience has been drawn upon wherever possible. The chapter dealing with the actual purchasing of cotton and the means adopted by the spinner to cover yarn sales in cotton futures has been added with a view to placing at the disposal of the reader a practical explanation of this most important detail of commercial cotton spinning. This is a branch of the subject which theoretical text-books have ignored almost entirely.

For the purpose of further assisting the reader the Futures Board in the Manchester Royal Exchange is reproduced and explained, and a reduced Diagram of Comparative Prices of Cotton for the years 1905-6 to 1909-10 is given.—Price, post paid, $1.25.

Productive Costs in Cotton Spinning Mills.

By Arthur H. Hardman, Associate of the Chartered Institute of Secretaries; member of the Textile Institute.—This book is an endeavor to evolve from the divers methods of costing which are practised in the trade to-day, a complete system of cotton yarn costing, which shall on the one side be sound from an accountancy point of view, having its basis in the account books of the concern; and on the other be sufficiently practical to take into consideration all the details and problems of the processes of manufacture, so far as they affect the cost of the product.

The book deals with the principles of the subject, which are applicable to all mills, and illustrates their application by numerous examples. It is the first published attempt to deal with the subject of costing in cotton spinning mills in detail. —Price, postpaid, $1.25.

Theory of Sizing.

By H. Nisbet, Weaving and Designing Master, Municipal Technical School, Bolton; Author of "Grammar of Textile Design." This volume treats of the essential constituents and properties of sizing ingredients, and of the chief factors determining their selecting, blending and mixing suitably to the requirements of manufacturers and merchants of textile fabrics. It is designed to fill the need, at a reasonable price, of a standard text-book for students of weaving in particular, and also as a book of reference generally, for those requiring information ont he important subject of sizing, sizing ingredients and size mixing.—Price, postpaid, $1.00.

COTTON DYEING.

The Cassella Color Company just issued a new supplement to their well-known book on cotton dyeing, descriptive of two interesting dyestuffs, viz., Diamine Fast Scarlet L. 4 G. and Diamine Fast Scarlet L. 3 B. Ptd. These dyestuffs produce full, deep scarlet shades upon cotton and union goods, and are distinguished by their excellent fastness to light and ironing. These dyestuffs are particularly interesting on account of their brilliancy, and which will enable designers of cotton textiles to make use of the shades in combination with other contrasting effects in the production of wide lines of novelty goods.

The "L. 3 B." mark is much bluer than the "L .4 G." mark and, bordering slightly upon the cardinal tone, should prove of particular interest where heavy, full shades are required.

Copies of Supplement No. 5 describing these two dyes may no doubt be obtained from the Cassella Color Company.

THE WATERPROOFING OF FABRICS.
By DR. S. MIERZINSKI.

The second revised and enlarged edition of this publication, translated from the German by Arthur Morris and Herbert Robson, B.Sc., has just come to hand. This book is recognized as an authority on the subject of waterproofing of fabrics, dealing with the processes from the preliminary treatment of the fabrics through the various operations. The book contains chapters on "waterproofing with acetate of alumina," "impregnation of the fabric," "drying" "waterproofing with ammonia cuprate," "waterproofing with insoluble soaps of metallic oxides," "dyeing waterproof fabrics," "waterproofing with gelatine, tannin, caseinate of lime, and other bodies," "the manufacture of tarpaulin" and "British waterproofing patents. The book is published by Scott, Greenwood & Son of London. Price 5s. nett.

Annual Meetings During Past Month.

MONTREAL COTTONS LIMITED.

The 41st annual meeting of the Montreal Cottons, Limited, was held in Monteal on March 4th, and notwithstanding the rather adverse conditions which prevailed throughout the latter part of the year, a slight gain in the total net gain was reported over 1912.

Manufacturing profits and other revenue totalled $395,313, against $394,587 in 1912, only a nominal increase, but a satisfactory showing in view of conditions. Cloth sales for the year were $3,017,703, a decrease of $211,000; cloth in process $1,100,895, an increase of $295,535; cloth stock at the end of hte year was $805,360, a decrease of about $219,000.

The usual allowances including $115,000 for depreciation were made before bringing down manufacturing profits. Net profits after bond interest amounted to $348,259, equal to 11.60 per cent on the company's $3,000,000 capital, against $350,001, or 11.67 per cent the previous year, and $252,618, or 8.4 per cent in 1911. Of this, 11 per cent, or $330,000 was paid to the holding company, Montreal Cottons Ltd., in dividends against $240,000, or 8 per cent the previous year, when the holding company paid only one quarterly dividend on the common shares.

The balance sheet shows the usual strong position maintained. Working assets at the end of the year were $3,209,161, an increase of $366,000, which more than offsets an increase of $346,000 to $909,351 in current liabilities. The profit and loss surplus of the company stands at $2,141,729 before including the balance carried forward from 1913.

Mr. S. H. Ewing, the president, in dealing with the trade outlook, stated frankly that the condition of the textile trade, like that of all other industries, had been unfavorably affected by the money situation, and that since January 1st there had not been sufficient improvement to justify putting forward any opinion as to the prospects for 1914.

With reference to the falling off in sales, Mr. Ewing stated that this had been due to the monetary stringency, which had caused a general sagging curtailment of trade all over the Dominion— the only outlet for the company's fabries. New provincial legislation had further reduced the working hours from 58 to 55 hours weekly. Considering this and the advanced cost of living, the company had thought it advisable in the interests of its working people to advance the scale of wages paid.

The following officers and directors were elected:— President, S. H. Ewing; Vice-President, C. B. Gordon; Secretary-Treasur, John Lowe, Jr.; Directors: Messrs. H. S. Holt, A. H. Gault, F. O. Lewis, J. P. Black, W. C. Finley, F. W. Molson and Senator R. Dandurand.

STANFIELDS LIMITED.

The annual meeting of Stanfields, Limited, was held at Truro, N.S., on March 2. T he company has a record of seventeen years of increases in sales, that for 1913 being $200,000. Profits, after bond interest and sinking fund, were $116,503, compared with $119,406 in 1912. The profit and loss account balance stands at $120,045 against $101,042 the year before.

PENMAN'S LTD.

The annual statement presented to the shareholders of Penman's Ltd., at the annual meeting held in Montreal on March 2nd was most satisfactory, profits standing at $102,705 higher than in 1911 and $39,695 higher than in 1912. The net profits available for dividends amounted to $325,900, equal to 30 per cent on the preferred stock, or five times the dividend, while the balance remaining after preferred dividend was equal to 12.15 per cent on the common against a dividend of 4 per cent.

The profit and loss account showed as follows:—

Dr.

To interest on bonds		$100,000
Old machinery broken up		14,655
Bad debts written off		3,497
Div. on pfd. stock	$64,500	
Div. on com. stock	86,024	
		150,524
Transferred to reserve		100,000
Balance at credit profit and loss		$522,483
		$891,160

Credit.

Balance brought from 1912	$447,106
Profits for year ended 31st Dec., 1913	444,053
	$891,160

The balance sheet shows total assets of $7,806,490, of which $2,557,890 are current, as against total current liabilities of $1,458,407.

The officers and directors were elected as follows:— C. B. Gordon, president; R. B. Morrice, vice-president; Victor E. Mitchell, K.C., J. P. Black, J. R. Godon, H. B. MacDougall and Wm. McMaster and D. Morrice.

HUMPHREY'S UNSHRINKABLE UNDERWEAR Co.

A very favorable statement of the year's business was presented to the shareholders of the Humphrey's Unshrinkable Underwear Company at the first annual meeting held in Moncton, N.B., recently. The following directors were elected: F. W. Sumner, O. T. Daniels, J. A. MacDonald, W. F. Humphrey, W. F. Ferguson, A. E. Trites, and Geo. T. Douglas. The following officers were re-elected: President, F. W. Summer; Vice-President, O. T. Daniels; Treasurer, W. F. Ferguson; Manager and Secretary, J. L. McDonald.

PATON MANUFACTURING COMPANY.

The statement presented at annual meeting of the Paton Manufacturing Co., held in Montreal on the 25th of last month, was accepted as very satisfactory under existing conditions of trade. The past six months showed a considerable falling off in business but notwithstanding this, the directors decided to declare the regular 3 per cent dividend for the half year. It will be paid March 15th. The following officers were re-elected: John Turnbull, president and managing director; Hon. Robert Mackay, vice-president; D. Forbes Angus, Jonathan Hodgson, George Hyde, George McLoy and Lt.-Col Frank Meighen, directors.

BELDING-PAUL-CORTICELLI CO.

The annual statement of the Belding-Paul-Corticelli Company, Limited, for the year ending Nov. 30, 1913, presented to the shareholders on February 18th, showed net profits of $127,876, a decrease of $6,594, as compared with the previous twelve months. After payment of debenture interest amounting to $37,409, and after making provision for sinking fund and depreciation and paying two quarterly dividends amounting to $29,904, there remained a balance of $31,967 to be carried forward. At the annual meeting Messrs. J. M. Mackie, of Charles Meredith and Co., Ltd., and A. O. Dawson, of Canadian Cottons, Ltd., were elected to the directorate succeeding Messrs. B. G. Winans and F. Birks. The board is made up as follows: Messrs. F. Paul, Wm. McMaster, A. H. Sims, Wm. Hanson, J. W. Mackie, A. O. Dawson and C. A. Reynolds.

UNITED STATES WOOL STATISTICS.

The National Association of Wool Manufacturers of the United States in its annual wood review places the number of sheep fit for shearing on April 1, 1913, at 36,319,000, a decrease of 2,162,000 from the 1912 statement. The report says, in part:—

"Our estimate for the total clip, exclusive of pulled wool, for the present year is 25,675,300 pounds, a decrease of 9,868,100 pounds from our last year's estimate. The scoured equivalent is 100,2670,80 pounds, a decrease of 6,299,572 pounds from last year.

"We increased our estimated production of pulled wool for this year to 43,500,000 grease pounds, an excess of 2,000,000 pounds over our total for 1912. This increase is based upon actual returns from slaughtering centers, and is the natural consequence of the reduction in flocks, especially in the territorial districts. The shrinkage from the brushed to the scoured state is placed at the same figure as last year, namely, 27 per cent, which makes the scoured equivalent 31,755,000 pounds.

"The total wool production of the country, both sheared and pulled, is placed at 296,175,300 pounds, or 7,868,100 pounds less than the estimated product of last year, and is equal to 132,020,080 pounds of scoured wool.

"For a series of years the average weight and shrinkage for the whole country have been as follows:

	Average. Weight, lbs.	Shrinkage P.c.
1901	6.33	60.6
1902	6.50	60.0
1903	6.25	60.8
1904	6.50	61.6
1905	6.56	61.3
1906	6.66	61.8
1907	6.60	60.6
1908	6.70	60.5
1909	6.70	60.9
1910	6.70	60.0
1911	6.98	60.1
1912	6.82	59.3
1913	6.95	60.0

The wool came to market this year generally in good condition, as is shown both in the average weight per fleece and in the average shrinkage in cleansing, the average yield of clean wool per pound being practically the same as in the other years shown in the above table, and equals 40 pounds to the hundred.

"The gross value of the wool product, both fleece and pulled, for the year, based on its scoured value in Boston in the early days of October, as is follows:—

Fleece wool	$43,785,054
Pulled wool	13,797,900
Total	$57,582,954

"This is a decrease of $18,236,267 from the corresponding value for last year, and means a very serious loss to the wool growing interests. In the first group of States, as arranged in the table, the wools were worth $15,388,234, or 35 per cent of the total value of the fleece wool. The second group produced wool to the value of $1,724,877, or nearly 4 per cent of the total, while in the third group the value is $26,671,943, or 61 per cent of the whole. The ratios are essentially the same as in the preceding year, the decrease in number of pounds produced and the increased value balancing each other so far as relative proportions are concerned.

Fleece and Pulled Wool Production.

"The next table presents a statement of the production of wool for a period of 25 years with the annual increase or decrease."

Year.	Pounds.
1889	295,779,479
1890	309,474,856
1891	307,401,507
1892	333,018,405
1893	348,538,138
1894	325,210,712
1895	294,296,726
1896	272,474,708
1897	259,153,251
1898	266,720,684
1899	272,191,330
1900	288,636,621
1901	302,502,382
1902	316,341,032
1903	287,450,000
1904	291,783,032
1905	295,488,438
1906	298,715,130
1907	298,294,750
1908	311,138,321
1909	328,110,749
1910	321,362,750
1911	318,547,900
1912	304,043,400
1913	296,175,300

LIFTING AND SHIFTING MACHINERY.

We have just received a copy of Bulletin B2 of the Herbert Morris Crane and Hoist Co., Ltd., containing pictures and dimensions of their type "P" Swing Jib Crane. The proportions of this crane guarantee an easy swing, a high factor of safety, reasonable deflection and durability. This crane should find special application around textile mills for handling raw stock and in the shipping department for handling baled and boxed goods, loading etc.

Saving the Waste

By WM. SHAW.

(Specially Written for the Canadian Textile Journal.)

The incapability of the world to furnish a sufficient quantity of raw cotton required by a vast and ever-expanding cotton industry, has failed, as has been proved by experience. It has been found impossible to produce enough cotton to supply the demand, although it is possible to cultivate cotton over almost the whole of the inter-tropical and in many of the temperate portions of the globe. Such conditions call for a remedy, so that a few suggestions with the idea of helping out are in order.

Our first suggestion to the manufacturers is to see how much good staple is being wasted in his plant. The second is to see whether some of this waste fibre cannot be used again.

The amount of removable matter in cotton varies greatly, and even in different growths of the same variety constant practice is necessary to become a good judge of cotton, so as to properly set the different arrangements on different machines in order to extract the foreign matter.

Very few mills have an effective method by which proper attention is given to the grid bars, and stripping plates, and for this reason we have contended that an overseer of carding able to sample the droppings on the pickers, and the strippings on the cards, and also able to judge the distance at which they should be set to save the long fibres, is worth his weight in gold to any plant. But how many carders take the pains to sample the droppings of the pickers and the strippings from the cards? How many cards have adjustable front knife plates to enable the good carder to adjust them so as to save for his plant the long fibres that are allowed to pass on to the waste house?

These questions are important. In some mills we find the grid bars are opened for dirty stock and closed for clean stock. When the bars are opened small pieces of leather are cut and placed between the bars so as to hold them the desired distance apart. In some cases one or more bars must be removed. On the other hand, in some mills, no matter what kind of stock is run, the grid bars are never disturbed.

To prove that proper setting of the stripping plates on all cards will save much good fibre for any plant, make the following test. Set the front knife plate almost to touch from the cylinder, and it will be found that very little, if any, stripping will be extracted. Next set the front knife plate to 250-1000 gauge, and you will find that much long fibre will be extracted. Therefore, we must set between these two extremes, and this requires the best judgment and experience. Did you ever hear of a carder going around with the grinder setting the front knife plates? Let us be honest and admit that what we have pointed out is sadly neglected in most mills. In justice to many good carders, however, it must be said that there are many cards on the market that have stationary front knife plates.

Our only aim is simply to save a little good cotton for some worried manufacturer, so that the question is how much waste can be used to good advantage.

We know of a few manufacturers that use the droppings from the pickers to good advantage, and also the cleaner waste from the card and spinning rooms. The stock is made to pass through what is known as a duster, and then run through a picker and formed into a lap. This waste is sold from 10 to 12 cents per pound in the form of a lap, and sold for different purposes, such as for upholstering. The price of this waste before dusted and made into a lap is sold as a rule from $1\frac{1}{2}$ to 3c per pound.

It is very easy to make a duster, as it consists only of a small wooden cylinder with about thirty pegs about three inches long scattered and inserted on the surface of the wooden cylinder. Under the cylinder a screen is placed to prevent the waste from falling to the floor and at the same time allow only the dirt to fall through. The screening is similar to that used for sieving ashes.

It is safe to say that mamny large plants here in Canada could increase their dividends by following these suggestions.

CONSUMERS' CORDAGE CO. OFFER SETTLEMENT.

A recent report in the "Financial Times" states that "the Consumers' Cordage Co., Ltd., is asking shareholders to accept a payment of ten per cent on their holdings in settlement of claims for unpaid dividends amounting to 31 per cent on the principle, apparently, that ten per cent in the hand is better than 31 per cent spread out over an indefinite period. The company, it is understood, has enjoyed two prosperous years and has paid dividends on the preferred stock for those years. This year it is probable that the general depression may affect the company, though affairs are reported to be in excellent shape. What benefit the small shareholder would derive from accepting ten per cent of the unpaid dividends in cash as against thirty-one per cent due him it is, at first glance, difficult to see, except that as indicated in the foregoing ten per cent in the hand may appeal to him more strongly than thirty-one per cent on a small-installment plan at indefinite periods. It can readily be seen, however, that the wiping out of a liability of unpaid dividends on the preferred stock should help the common stock now that the concern is on a firmly established basis."

ISLAND UNSHRINKABLE UNDERWEAR CO., LTD.

New Company at Charlottetown, P.E.I., Getting Started.

The new company, called the Island Unshrinkable Underwear Co., Ltd., which is being formed Charlottetown, P.E.I., for the purpose of manufacturing unshrinkable wool underwear and sweaters, is meeting with very fair success in the disposal of the stock. The authorized capital of the Company is $90,000 with a paid-up capital of $50,000. The president of the company is S. E. Reid, formerly Provincial Secretary and Treasurer and Commissioner of Agriculture, who is looking after the organization. The secretary-treasurer is John P. Gordon, of Moore and McLeod, merchants, Charlottetown. The directors are: W. B. Prowse, S. A. McDonald, John T. McKenzie, C. A. Clark and Dr. A. B. Reid, all of Charlottetown.

The capacity of the mill will be about 25 doz. per day, manufactured almost entirely from wools grown on the Island, which are recognized to be exceptionally adapted for the manufacture of underwear and sweaters.

MILL AND GENERAL TEXTILE NEWS.

Walter Scott has resigned his position as boss carder with the Almonte Knitting Co., Almonte, Ont., to accept a similar position in Amsterdam, N.Y.

Wm. McMaster, vice-president of the Belding-Paul-Corticelli Co. and director of the Bank of Montreal, was appointed a director of Penmans Ltd., at the recent annual meeting of the Company, succeeding E. B. Greenshields, who resigned.

Messrs. Norton, Callard & Co., 4 Hospital Street, Montreal, have been appointed sole Canadian representatives of Messrs. Joseph Cookson, Limited, of Manchester, Eng., manufacturers of cotton waste for wiping, floor cloths, lamp wicks, twines, ropes, cords, etc.

The Dominion Department of Agriculture has signified its intention to make a comprehensive wool exhibit at the provincial exhibition, which opens in Regina on July 27th next. The exhibit will be the same as that shown at the Toronto exhibition last fall.

Harry Hirsch, head of Julius, Cohen and Josephy, of Bradford, England, was around for a few days last month. He and the Canadian representative, H. V. Andrews, of Toronto, visited several of the mills in the East.

Joseph Quenneville, formerly overseer of carding with the Montmorency Cotton Mills at Montmorency Falls, Que., has accepted the position of overseer of carding, spinning and winding with the Shawinigan Cotton Co., Shawinigan Falls, Que.

Wm. Clark, master mechanic with St. Anne Branch, Dominion Textile Co., Montreal, has resigned, and is succeeded by Wm. Hewlett of Miller Bros. & Sons, Ltd.

Henry Clark, has resigned his position of overseer of spinning, St. Anne Branch, Dominion Textile Co., Montreal, and is succeeded by Wm. Taylor.

The Niagara Linen Company of Niagara Falls, N.Y., are building a branch factory in Niagara Falls, Ont., to cost in the neighborhood of $50,000.

J. W. Sims, formerly of the Wallaceburg Knitting Co. Wallaceburg, Ont., has laid a plan before the Town Council of Embro, Ont., asking for financial assistance to start a knitting business there.

The plant of the Elora Textile Co., Elora, Ont., was badly damaged by fire on February 8th. The loss amounted to about $3,500 fully covered by insurance. This is a new concern and had only been running a few weeks. The plant is again in operation.

C. F. Libby has again assumed the management of the Clinton Knitting Co., Clinton, Ont., succeeding Mr. Fulton.

Wyatt F. Palmer, of Comanche, Okla., has secured a patent for a cotton cleaner for removing the dust, sand and trash from ginned cotton. The invention consists of a cylindrical lint flue made in sections joined together after the manner of stove pipes, spaced supporting rings and having its wall in spaced relation to the lint flue, a clean out opening in the lower side of the lint flue, a closure for said opening and a flue leading diagonally through the lint flue into the screen.

Messrs. Boyd Caldwell & Co. are very busy in the new hosiery department recently installed in the Appleton mill and are installing several new machines.

The J. J. Cusack Company, Limited, has recently been incorporated, with a capital of $100,000, to carry on the business, both wholesale and retail, of general dry goods merchants and manufacturers. The chief place of business to be Montreal.

The 2nd series of Colonial Wool Sales opened in London on March 3. The market was active, with prices strong and an average of five to ten per cent over the January prices. Cape of Good Hope and Natal realized 5 per cent; merinos 7½ and crossbreds 7½ to 10 per cent dearer than the last sale.

Henry Brinton, President of the H. Brinton Company of Philadelphia, died January 30th, at his home at Bala, Pa., after a brief illness of heart failure.

The American Cord and Tassel Co., 338 St. Lawrence Boulevard, Montreal, have recently installed several Harley-Kay scarf machines for the manufacture of artificial silk and mercerized scarfs.

Mercury Mills to Instal Cards.

We understand that the Mercury Mills, Limited, Hamilton, Ont., contemplate installing three sets of wool cards, with the idea of going more extensively into the manufacture of underwear.

Huntsville Woollen Mills, Limited.

A new company, the Huntsville Woollen Mills, Limited, have purchased the woollen mill in Huntsville, Ont., formerly operated by James Hall and later by Wm. McCutcheon. The mill has been closed for the past few years. The provisional directors are: John Dobney, J. J. Hubbard, J. A. Tweed, Alex. Hughson and H. T. Jenkins, all of Toronto. The capital of the company is $40,000.

R. G. Long & Co.'s Plant Damaged by Fire.

A disastrous fire in large new building at 579 Richmond Street, Toronto, on February 25th did considerable damage to the plant and equipment of Messrs R. G. Long & Co., Limited, manufacturers of sweater-coats and knitted novelties. The damage is reported at $80,000, with $65,000 insurance. Several clothing firms, including the Independent Cloak Co., the Beaver Shirt Co., and the Monarch Clothing Co., suffered somewhat heavily. We understand that Messrs. R. G. Long & Co. will make preparations to re-commence operations as soon as new quarters can be obtained.

Montreal Woollen Co. Plant Sold.

The large plant formerly occupied by the Montreal Woollen Co. at St. Gabriel Locks, Montreal, has been completely cleared of all the woollen machinery and the buildings have been sold, part to Messrs. Holdsworth & Co., of Toronto and Montreal, and part to a Montreal company, which will manufacture paper board.

Linen Mills to Resume.

The Dominion Linen Mills, at Guelph, which have been closed down for several months, are about to resume operations, it is said, under a syndicate of Toronto capitalists. These mills were in the hands of the Trusts & Guarantee Co. of Toronto, who had advertised for tenders. The personel of the new company has not yet been made public.

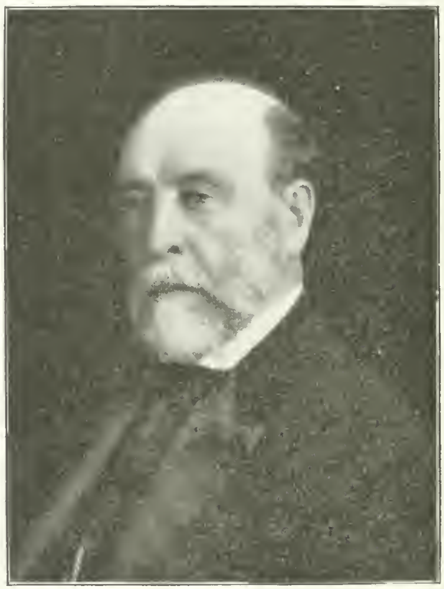
ENGLISH WOOLLEN AND WORSTED TRADES.

(From Our London Representative.)

Trade in woollen and worsted mills of England is not very satisfactory to manufacturers. There appears to be a scarcity of orders and the small mills are feeling the dullness of business very much. Though there is an improved feeling in the Dewsbury and Batley districts so far as cheap woollen cloths are concerned, very few mills are run to the extent of overtime in order to cope with the desire of merchants for quick delivery. There is, however, more machinery at work and consequently more operatives, and the receipt of a large number of good orders from Canadian merchants have lately made things look busier. The new patterns in cheap and medium tweeds are reported to be taking well, and in some cases better rates have been conceded by merchants. In Morley the factories are rather busier consequent upon orders for cheap tweeds and serges, etc., from Bradford, Leeds and Manchester houses, and here, too, makers are getting rather better prices. Birstall and Ossett are also busy and in Ravensthorpe a slight improvement is noticeable. Business all round is increasing with Canada and the States, but continental orders are wanting in numbers. The blanket trade of Dewsbury, Mirfield and the Spen Valley has only improved so far as colored goods are concerned. The demand for whites is dull, but stocks are not large. Motor rugs are selling well, and appears to be a good line for the mills in this district. There is rather more doing in carpets both in Dewsbury and Heckmondwicke, tapestry and Brussels taking well in the latter town and Dutch in the former. The demand from Canada is dull. Flannel manufacturers are better employed and the export trade to the Dominion is improving slightly. In Leeds, business is yet far from normal, and only small covering orders for tweeds, serges, costume cloths of lower qualities are being given out. The present high prices, which remain firm, are causing buyers to hold off, and of speculation there is none. The woollen merchants are moderately busy, but say they could do with more work. With Canada recently a slight improvement in trade is noticeable and manufacturers report that it is likely to continue, not only in low and medium woollens, but in medium worsteds also. In Rochdale merchants from Canada and the States have been making inquiries in the flannel trade for next season's winter trade. Manufacturers are firm in their prices, for not only is wool dear, but cards, strapping, oil, coal and other necessary requisites are on a high level as regards values. On this account and owing to the continued shortage of flannel weavers, manufacturers are not making much flannel to stock. Sporting flannels are much sought after. All the flannel makers are buying wool more readily, but chiefly in small lots to cover present use. Manufacturers in Hawick report that the woollen and worsted trade has undergone very little change for the better. Complaints are made that orders are not coming in as quick or as large as was expected. With the exception of a few of the principal makers, it is evident that the present season will be below the average throughout all the Hawick district. There are heavy stocks on hand in some cases, and possibly the advance in prices has also acted as a check. The advance asked for the finished goods does not at all compensate for the advance in the price of the raw material. Spinners are not busy, but in most mills full time is being worked. The hosiery branch of the trade continues very dull. In Huddersfield and other woollen centres in Yorkshire and Scotland there are general complaints of the lack of business, but the feeling is optimistic and it conjectured that by the middle of March all mills will be working up to full time. The effects of the "boom" last year are being felt somewhat, and then again the high cost of production just at the present time is making mill men extremely cautions. It is remarkable that as I write the paper industry, the cotton trade and the woollen and worsted trades, including the hosiery branches, are far from what one could call busy and making a decent profit. Profits, I am afraid under the present circumstances, are unusually small.—J. R. B.

DAVID MORRICE RESIGNS PRESIDENCY.

Mr. David Morrice, president of Penman's Limited, since the organization of the company in 1906, announced his retirement from the presidency of the company at the annual meeting on March 2. Mr. Morrice had been connected with the Penman concern for over 40 years, having sold their product in the very



DAVID MORRICE,
Who has resigned from Presidency of Penman's Ltd., after over 40 years connection with the Company.

earliest days. He is succeeded by C. B. Gordon, president of the Dominion Textile Co., while R. B. Morrice succeeds Mr. Gordon in the vice-presidency of the company. Mr. David Morrice will continue on the directorate of the company.

United States imported 1,105,958 pounds of combing wools from Canada during the 12 months ending December 1913, valued at $251,896, as compared with 735,400 pounds valued at $168,912 in 1912, and 173,726 pounds valued at $43,747 in 1911.

THE MARKETS

THE WOOL MARKET.

There has been a very slow improvement of trade during the month and most of the mills that had shut down during January have again started, although a number of underwear and woollen mills are still running short time; four or five days a week. The mills are gradually being filled up with orders, however, and although they are sometimes pretty close owing to the increasing cost of the raw material, they will serve to keep things going until trade conditions improve generally.

Little domestic wool remains in dealers' hands, what did remain having been shipped to the United States during the month. Pullers are very firm with what little they have to offer, and are not disposed to meet dealers' demands.

The second series of Colonial sales opened in London March 3. The offerings have usually been good, and the buying vigorous from all sections. To date merinos have advanced 7½ to 10 per cent, crossbreds 15 per cent and South African 5 per cent over last sale, and reports state that even at these advances wool is difficult to get as the market is in seller's favor. The advance has come as a surprise to many. The continent has been very active in the English wool markets at the last number of sales, which has kept prices high. The home trade has held back, but sellers figured it out that it had to buy sometime. The feeling is that quite a quantity of the wools being bought on the Continent will be placed for sale at the later sales, when the home trade are forced to operate more freely than they have of late.

Woollen manufacturers are faced with increased costs all along the line, but still little advance has taken place in the prices they receive for their products. Such advance is now about due.

THE COTTON MARKET.

Dullness and inactivity have been the prevailing features of the cotton market during the month of February. The bears have laid great stress on the poor condition of the Textile Trade, which is, indeed, a very strong argument. However, the takings by the mills of American cotton, at the end of February, are still 100,000 bales more than last year. This seems to indicate that the consumption is not decreasing, even if business is not as profitable as last season.

On the other hand, the bulls insist upon the strength of the southern markets. Actual cotton, especially grades of middling and above, cannot be bought now except at very high prices, as high in fact as when New York futures were selling at 150 to 200 points higher than to-day.

These two contending factors, a poor trade condition and the unflinching strength of the spot situation, are acting like two equally powerful forces on the market, and neutralize each other, so that no definite result is obtained, neither by the bulls nor by the bears.

The future market has been nearly dead for the past four weeks. The range has been very narrow, with a tendency to lower prices. March was quoted at 12.39 on February 2nd; it kept fluctuating all the time, and reached down to 12.06 on March the 4th, reacting at once to 12.17.

The other months have declined more than March, and the trading difference between March and May, which was about 23 points on the 1st of February, is now over 40 points. This wide gap between the active months shows intense manipulation with the threat of a little squeeze of the shorts in March. But at the same time, such manipulation could not display itself as freely if the spot market was not so stiff, preventing shipments of actual cotton to New York to protect the bear element.

The market is at a standstill. All arguments for a further heavy break seem to be exhausted. The large surplus of the India crop as well as of American cotton has been marketed, and has already had its influence on prices, causing the decline under the 12 cent level for the spring months.

If prices are to go lower, it will be the result of very brilliant news about the start of the new crop. But we should remember that, so far, very little is done towards preparing that future crop. The weather in the last two weeks has been bad, and little headway was made in ploughing the soil and nothing but reckless guesses can be made for the next two months. In the meantime the mills will need cotton every week and the scarcity of good grades will be more and more stringent as the season advances.

In our minds, there is no chance just now for a further heavy decline in this crop's values, and any drop towards 11½ cents in New York futures will invite a good deal of buying which will support the market.

The statistical position is far from bearish. With a crop of 14,600,000 there are still to be marketed some 2,800,000 bales which, with the visible supply of American cotton, makes a supply of 7,200,000 for the next six months. This same calculation made the last year supply 7,100,000. Therefore we are in the same position as last year, when prices for New York futures did not go under 11.25. This season the supply contains a very great proportion of unspinnable cotton, which makes the situation still stronger until the new crop becomes available.

ENGLISH WOOLS.

(Special to the Canadian Textile Journal.)

The general disposition is too look upon things in the wool markets with less optimism, though there is still a sufficient amount of business being done to keep prices on a firm basis, attempts being made at every opportunity to advance prices. When this is done the move is rather protective than otherwise, and may be taken as an indication that the disposition to sell has passed away. For some time to come values are safe, but the prospect is very gloomy. For instance at Leicester staples can command a better margin on all well-conditioned sound lots and in colonial wools the readiness with which all supplies are taken off the market at extreme rates indicates that stocks in consumers hands are very light, and present rates have come to stay. In yarns low prices are also disappearing. In the Dewsbury district wool prices show great firmness. The wool staples of the district have lately had an improved trade and rates are inclined to harden. Still the outlook is not bad at present in Dewsbury. Generally speaking consumers are moving quietly and watching the long and stubborn contest between growers and importers of wool on the one hand, with spinners, merchants and manufacturers on the other, and this struggle is likely to continue until the March Colonial Sales in London, by which time a larger volume of trade will be coming forward.

BRADFORD WOOL.

(Special to The Canadian Textile Journal.)

Bradford, February 23, 1914.

There is just a moderate amount of business offering in tops—just enough to keep prices firm if they were in any need of firming-up. As a matter of fact there is no need of this character, for with a large volume of orders on their books than they have had for months, top-makers are not at all keen to increase their commitments unless they can see their way clear to getting the raw material to meet them. The tone of the market is therefore strong. Wool is wanted, and all reports agree that the Australian sales have been very stiff. English wools still meet with a good inquiry, and prices are well held. In fact, the demand for wool is exceedingly keen and the prospect is not very prosperous from a manufacturers' point of view. Here are some of the quotations: 64's tops, 57 cents to 58 cents; supers, two cents less, and a corresponding advance for 70's upwards; a good 40's top is quoted 30 to 31 cents, 40's carded, 30 cents to 31 cents, 46's carded, 33 cents; 50's average 39 cents, 56's average 43 cents and 58's average 47 cents. In some cases even more is demanded. When we come to yarns, we find that advances here are equally as numerous, a big business having been done during the past month in singles and two-folds. Single 30's, which could be bought some time ago at $1.86 are now quoted as high as $1.98 per gross and on Botany yarns spinners are making two cents more per lb. than they could possibly get bid last last week. Two-fold 32's and 40's appear to be wanted, and there is also inquiry for thick singles. The advances asked for mohair yarns are checking business for the present, but there is rather more doing in alpaca of the better qualities.

Adverting back to wool it is quite evident that it is going to be dearer—that is the opinion in Bradford today. This is largely accounted for by the fact that topmakers in Bradford want more wool and it is a long time since there was so little available. The largest amount of business in tops continues to be done in the merino department—at any rate, the best reports of actual selling are forthcoming from that quarter. There is also a fair amount of selling in crossbreds, and prices here are particularly firm. English wools look like benefitting owing to the temporary scarcity of colonial cross-breds. Considerable business is doing in medium and fine fleeces and also skin wools. The special descriptions called for in the yarn sales are single 30's and two folds, and prices have advanced in consequence.—J. R. B.

THE JUTE MARKET.

(From Our Special Correspondent.)

Dundee, February 21, 1914.

The market for manufacturers is quiet and inactive, and values are irregular, a feature which has pervaded the market for some time past. Groups of first works for February-March shipment have been offered at £31 15s and singles at £32. It is to hessian yarns that interest is mainly directed. The sales of common 8 lb. cops is claimed at 2s 6d, but not a spindle is obtainable from spinners at a fraction under 2s 7d. In spools transactions vary from 2s 10d to 2s 10½d, and there is a tendency to raise values. Twist in 3-ply 8 lb. sells at 4⅛d, sacking weft at 2¾d to 2 13-16d for 24 lb. and Dutch at 2 13-16d to 2⅞ and sacking chains at 4¼d. In 6-lb. warp yarn contracts have passed at 2s 9½d. Rio qualities which have practically retained their values of late due to the scarcity of fine jute are quiet ta 3s 4d to 3s 4½d for 8-lb. warp. Carpet warp is steady at 4 5-16d to 4⅜d for 14-lb. Calcutta fabrics are firm at 23s 3d for 10oz. 40in. c.i.f. Buenos Ayres July-September shipment. Hessians are steady without being largely tested of late at 3 14-48d to 3 5-16d for 10¼ ounce 40 inch and at 2 10-12d basis for 8oz. 40 in. As a rule recent advances could not always be insisted upon with orders.

* * * *

IS IT FAST? WILL IT WASH?

"Permanent colors create permanent trade. The insistent demand of the consumer for fast colors makes it imperative that the retailer, the jobber, the cutter-up and the textile manufacturer recognize the question of fastness of color as an important one. Is it fast? Will it wash? is now asked by every woman at every counter and by every buyer of colored cotton goods of the maker."

An interesting little booklet just to hand from the Badische Company, 214 Lemoine St., Montreal, presents a brief account of the more important classes of fast colors for cotton goods that will be both of interest and of service to those engaged in the business. The booklet may be obtained from the Badische Company on request.

LACHINE CANAL DRY.

Cotton Mills to be Inconvenienced Longer than Usual.

The emptying of the Lachine Canal, which took place on March 1, a month earlier than usual, to allow work to be carried on by the Government on a power plant at Cote St. Paul, has resulted in serious inconvenience to a large number of manufacturers whose factories are situated on the banks of the canal, including the three cotton mills, the Merchants, Mount Royal and Colonial. These mills have auxiliary power and pumps, so that no delay has been caused, although there is considerable inconvenience. Many of the factories, however, will suffer considerable loss, and in some cases have been forced to suspend operations.

It is usual for the Canal to be emptied for several weeks each spring, usually around April 1, when many of the mills shut down for repair work and general overhauling. This year it will be empty for upwards of eight or ten weeks.

When the Department of Railways and Canals first announced its plans, several deputations waited on the Minister to ask that the work at Cote St. Paul be held over until some period of the year when the mills were not so busy, or else to make use of some scheme whereby the inconvenience might be lessened. Engineer's plans were submitted, but nothing was done in the matter, so that, in the meantime, the manufacturers are forced to get along the best way possible.

Harry Ball, formerly with the Kingston Hosiery Company, Kingston, Ont., is now engaged with the West Bros. Knitting Co. of Syracuse, N.Y.

TABLE SHOWING THE IMPORTS OF RAW AND MANUFACTURED TEXTILES INTO CANADA FOR THE MONTH OF NOV., ACCORDING TO THE LATEST FIGURES COMPILED BY THE DEPARTMENT OF TRADE AND COMMERCE

	Imports for Nov. 1913	Imports for 8 mos. ending Nov, 1913	Imports for Fiscal Year Ending March 31 1913	Imports for Fiscal Year Ending March 31 1912
Imports of wool and manufactures of, into Canada:				
Blankets, pure wool	12,861	141,031	141,342	65,015
Cassimeres, cloths and doeskins	103,541	1,418166.	3,221,612	3,119,001
Coatings and overcoatings	70,087	901,327	1,216,752	1,314,945
Tweeds	55,533	876,065	1,473,463	1,514,097
Felt cloth, N.O.P	5,569	34,978	31,920	27,270
Flannels, plain	9,634	115,098	126,141	93,142
Knitted Goods, N.O.P	70,203	1,077,909	1,507,032	973,264
Bed comforters	.... .	7,420	3,674	593
Railway rugs	3,677	57,801	64,141	57,228
Shawls	5,740	79,429	131,576	87,389
Shirts	6,115	59,533	61,652	38,875
Socks and stockings	121,619	1,253,628	1,664,825	1,247,047
Undershirts and drawers, N.O.P	33,079	315,292	82,567	122 931
Yarns, 30c. lb. and over	132,131	1,654,417	2,240,973	1,886,268
Yarns, N.O.P	14,049	211,523	305,328	252,745
All fabrics and manufactures, N.O.P	510,890	6,675,207	10,435,013	7,069,152
Lustres, mohairs, alpacas and Italian linings	66,704	840,281	1,324,483	1,191,246
Women's and children's dress goods	5,697	116,982	221,287	197,722
Clothing, women's and children's outer garments	39.059	415.735	528,130	492,375
Clothing, ready-made, N.O.P	131,794	1,608,803	2,418,111	1,754,223
Carpets, mats and rugs	117.552	1,656,182	2,987,748	2,282,370
Felts, pressed	25,098	305,633	389,382	299,435
Worsted tops—dutiable	....	1,928	445	2,676
Noils and worsted tops, N.O.P. free	123,951	769,873	980,432	689,304
Wool, not further prepared than washed, free	159,507	1,346,573	2,068,028	1,555,395
Yarns, free	503	7,859	19,358	10,932
Imports of Cotton and manufactures of Cotton, into Canada:				
Cotton cordage	3,328	22,261	37,192	63,349
Duck, over 8 ozs., per sq. yd., N.O.P.	57,510	592,575	1,131,705	609,467
Embroideries	154,384	626,785	1,549,711	1,482,746
Gray, unbleached cotton fabrics	138,477	1,072,304	1,061,683	626,806
White or bleached cotton fabrics	204,369	2,064,740	3,003,130	2,393,633
Tailors' hollands of cotton and towelings in the web	15,252	141,082	267,492	167,641
Fabrics, printed, dyed or colored, N.O.P	326,563	3,729,158	7,042,249	5,829,166
Jeans, coutilles and sateens for use in corset manufacture	31,561	174,644	301,365	269,697
Handkerchiefs	62,918	526,790	832,652	620,048
Batts, batting and sheet wadding	4,289	23,688	33,701	24,789
Bobbinet plain, in the web	6,833	37,872	55,895	49,272
Knitting yarn, N.O.P	10,629	179,489	207,008	144,558
Warps	27	6,922	6,099	4,666
Seamless bags	3,032	23,342	63,699	26,643
Sheets, bed quilts, pillow cases and damask of cotton in the piece, uncolored table cloths or napkins of cotton	77,672	837,223	1,109,557	290,800
Shirts of cotton	24,561	327,474	655,976	468,456
Sewing thread	50,865	396,205	700,290	705,881
Crochet and knitting cotton	8,631	49,834	39,964	33,890
Other thread, N.O.P	15,246	126,184	102,264	49,681
Clothing N.O.P	40,030	1,953,867	3,044,538	2,435,746
Blouses and shirt waists	8,125	112,971	232,067	168,606
Cotton bags, N.O.P	19,587	144,407	151,966	197,609
Lampwicks	1,364	18,423	....	....
Lace	54,789	625,003	1,685,532	1,328,024
Shawls	382	4,056	2,583	3,091
Socks and stockings	41,467	639,564	842,518	789,453
Tape, uncolored and colored	5,932	47,044	13,123	8,201
Towels	32,593	308,281	472,801	316,088
Undershirts and drawers	5,579	78,052	115,440	61,467
Uncolored cotton fabrics, bleached	2,123	33,731	37,851	38,169
Velvets, velveteens and plush fabrics	53,105	819,494	996,310	765,559
Other manufactures of cotton, N.O.P	92,209	826,779	1,270,788	788,810
Raw cotton, free	1,287,708	1,376,331	8,735,191	7,932,467
Yarn No. 40 and finer, free	76,577	733,207	1,231,953	1,138,306
Yarn, polished or glazed for manufacture of shoe laces, free	746	2,260	1,435	2,824
Imports of Silk and manufactures of Silk, into Canada:				
Fabrics, N.O.P	395,087	3,965,321	5,762,223	4,782,372
Fabrics, for manufactures of neckties	11,956	131,140	170,625	....
Handkerchiefs	8,159	106,932	114,231	83,300
Blouses and shirt waists	6,004	44,413	90,140	36,691
Clothing	82,845	751,499	1,021,134	814,549
Silk, spun, N.O.P. and in the gum not more advanced than single team or thrown organzine, not colored	1,513	48,027	53,605	60,640
Silk, in gum or spun for manufacture of ribbons and shoe laces	63	357	1,595	2,168
Sewing and embroidery silk	11,082	94,115	145,815	51,861
Shawls	176	4,540	13,647	16,840
Shirts	968	8,581	13,824	7,712
Silks—N.O.P	37,129	273,031	568,090	310,167
Socks and stockings	19,085	164,049	280.940	182,016
Underwear and drawers	2,130	9,127	4,304	2,824
Velvets and plush fabrics	37,491	537,348	555,434	738,956
Artificial silk, free	23,207	135,825	....	....
Silk, in gum, or spun, for mfr. of underwear or woven labels	2,540	56,786	....	....
Silk, raw, or as reeled from the cocoon	43,257	222,753	....	....
Imports of Jute, Flax, Hemp, and mfrs. of same into Canada:				
Bags or sacks	15,069	231,410	294,495	289,052
Canvas of hemp for ship's sails	1,528	11,375	....	....
Carpetings, rugs, mats	2,376	40,456	85,119	71,695
Uncolored damask of linen in the piece, stair linen, diaper, doylies, tray cloths, table napkins and cloths, quilts and sheets	80,025	712,470	1,192,979	1,056,113
Handkerchiefs	61,653	229,885	303,517	242,346
Towels	13,734	140,992	225,697	215,227
Fabrics, brown or bleached	12,927	83,078	175,201	123,720
Fabrics of flax, unbleached N.O.P	29,309	272,343	457,573	282,148
Tailors hollands of linen and towelling in the web	10,681	125,119	231,257	182,956
Linen clothing N.O.P	953	17,410	18,713	19,150
Linen blouses and shirt waists	.... .	1,244	301	550
Linen thread, N.O.P	18,356	159,135	273,059	231,169
Linen shirts	94	1,397	4,714	3,410
Tapestry, jute		665	683	273
Jute cloth, uncolored, not finished	976	4,825	21,326	1,215,702
Fabrics of flax, printed, dyed or colored	803	22,731	45,198	32,891
Other manufactures of flax, or hemp, N.O.P.	4,896	32,425	92,160	73,425
Manufactures of jute, N.O.P	8,676	220,047	359,250	261,035
Linen yarn, free	894	15,269	58,825	62,489
Jute cloth as taken from loom, free	197,555	1,822,446	2,601,785	1,062,173
Jute or hemp yarns, free	20,659	213,158	481,747	248,285
Jute canvas, uncolored, free	138,640	1,554,539	1,424,011	366,977
Miscellaneous Imports:				
Knitted goods of every description, N.O.P	20,471	144,836	118,536	34,449
Binder twine, free	505,545	3,503,797	2,320,351	2,136,841

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

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Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

New York Office, 206 Broadway.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, APRIL, 1914 No. 4

Credits and Special Discounts

There are many ways in which an association would be of great benefit to the Textile Industry in this country. Although the industry is small when compared with that of other great industrial countries, similar conditions are met with here that years ago brought about the formation of associations in those countries. Other industries in this country, notably mining, pulp and paper, milling and others, have found the need for an association and have taken care of that need by getting together in such a way that they were able to combat existing conditions in a much more satisfactory manner. During the past twenty-five or thirty years, it has been faced with more serious situations than perhaps any other industry in the country, and any efforts that have been put forward on its behalf have been through individual endeavor. The present state of the industry is sufficient evidence that the plan that has been followed has not been satisfactory to the industry.

In the United States, woollen manufacturers found two abuses working to their detriment, viz., credits and special discounts, and it was not until those manufacturers realised that they could only combat these two nuisances by thorough organization and co-operation on their part, that they were able to do anything worth while in stamping out what had become absolute nuisances to the industry. To-day, the credit department of their association is one of its greatest assets, and furnishes each member of the industry such information as will insure him against giving undue credit to any buyer in the country. Canadian manufacturers are up against a similar situation and a very small proportion of them have not experienced losses through not having information on hand as to the stability of their customers.

In connection with the special discount nuisance, this has been very much in evidence in Canada, with the result that on many lines orders could not be obtained unless prices were beaten down to the lowest point possible, and buyers have used this weapon so effectively that manufacturers have suffered more than they care to acknowledge. A discount department of an association which would make a thorough investigation of the discounts practices of the trade, looking at the matter from the view point of the buyer as well as the seller, would be able to work out a schedule fair to both parties and, if a uniform discount schedule was adopted—which would only be accomplished by thorough co-operation—one of the worst trade abuses existing at the present time would be overcome. Trade quarrels would be done away with, time would be saved in making out and obtaining orders, and much money would be saved to our manufacturers.

Then again, in other branches of the industry co-operation on the part of the manufacturers would save them considerable money in the buying of the raw material. In yarn buying, the purchasing of supplies, machinery purchases, etc., a great saving could be accomplished. When manufacturers are brought together frequently in a friendly discussion of the problems affecting the whole industry, they invariably begin to compare experiences in the matter of their purchases of these articles, and if any variation is found, they will immediately inquire into the cause of the same The result is that they have more information, and are able to make better terms with the houses from which they buy. In the United States, the hosiery and underwear manufacturers through their association have established their yarn buying on a net basis and have thereby saved themselves thousands of dollars by doing away with the abuse which was so flaring up until a few years ago. The result is that the manufacturers get what they pay for and supply firms have been forced to bring their methods absolutely above board.

These are a few of the benefits that have been derived from association work among textile manufacturers in the United States. In Canada, these abuses are very much in evidence at the present time, and can only be done away with by the co-operation of the whole industry. Many other ways in which the industry would benefit from an association have been pointed out in these columns, and there is no doubt but that the entire industry would derive much benefit. The sooner a "Canadian Textile Association" is formed the better.

Quality in Fabrics

A matter that comes up for considerable discussion almost daily among textile manufacturers and distributors is the apparent disposition of the Canadian consumer toward imported goods. The extent to which this is in evidence is keenly realized by practically every manufacturer of high grade woollens and worsteds in this country, and also those engaged in the manufacture of cheaper lines, as well as cottons, knit goods, etc. Over seventy-five per cent of the yearly consumption of woollens and worsteds in Canada is imported goods and about fifty per cent of our yearly consumption of cotton goods and nearly forty per cent of our yearly consumption of knit goods is the product of foreign mills. The hold that importers and dry goods houses have on the Canadian market is, therefore very great, and the manner in which they have influenced the consumer is what affects the domestic manufacturers and adds to the difficulty of manufacturing in this country.

The efforts that are made to sell imported goods instead of domestic goods are primarily due to the larger measure of profit in the transactions. Consumers are generally more easily convinced of the superiority of foreign fabrics than of domestic goods and it has come to be the established practice in most dry goods houses to secure a wider margin of profit on foreign cloths than domestic. This would not be the case if it were as hard to sell foreign goods as domestic.

In most instances, the attractive qualities of imported goods do not consist in a greater intrinsic value. They may be styled more to the liking of the consumer or they may be constructed in ways that seem more satisfactory to the buyer, but in few cases do the fabrics possess better wearing qualities than the domestic goods. Many consumers of fine cloths make themselves think that the best goods cannot be made in this country and in this they are influenced by dealers and merchants throughout the country. Go into any high-class dealing establishment, and you will find them telling their customers with a peculiar pride that they do not carry any domestic goods in stock and their customers invariably find a great deal of pleasure and comfort in wearing clothes made from imported fabrics, and at the same time, both the dealer and the consumer may be handling domestic goods which have been sold as "imported."

Thousands of yards of domestic goods are sold each year as "imported," especially high grade woollens and worsteds and novelty cloths. Consumers think that the imported mark insures distinction and quality and distributors, to whom our mills sell, find it easier and more profitable to sell these goods as "imported" fabrics. That the importers are more successful in disposing of goods profitably than many domestic merchants are is evidenced by the number of houses carrying on this line of business throughout the country, which rank as the wealthiest and most successful in the dry goods distributing business. That they make more profit in handling imported goods is quite evident or they would not continue. But it is folly to believe that the ultimate consumer is paying less for his clothes than he would providing they were made from domestic fabrics.

Some years ago, a Canadian manufacturer of fine men's wear, tried to market high-priced and high-grade suitings, insisting that they be sold as such, but the experiment failed because the manufacturer realized that it would have taken a good-sized fortune to convince the small merchant and consumer that his fabrics were as good if not better than the imported fabric. To-day, the product of his mills are being sold in a great many stores, as the "finest imported" suitings, and it is safe to say that there are many mills in this country that would not receive fifty per cent of the orders they do if they insisted that their products be sold as domestic. Jobbers and tailors insist on selling the goods in their own way, with the result that many a manufacturer here in Canada has had his pride touched on seeing the product of his mill being sold as imported. And yet, the importer has the upper hand, and the manufacturer is, therefore, forced to leave "well enough" alone.

Such conditions are not conducive to the best interests of the woollen industry in this country and the present situation applies to the cotton and knit goods trades as well, although to a lesser extent. That the importer can sell imported goods to better advantage than he can domestic cannot be denied and, on this account, our manufacturers of high grade goods and novelty cloths are forced to allow their product to be sold as imported. If the stimulation of quality production in this country is to rest on the need for labeling goods as imported, as is undoubtedly the case, it certainly appears to be to the interests of merchants and manufacturers alike to create a different situation than exists at the present time. Canadian mills are capable, and do produce high grade goods equal in quality to the products of any other country, but the Canadian consumer is not ready to pay for them unless they are marked "imported."

What is required is a campaign of educating the consumers to a knowledge of how well Canadian fabrics are made, and to the fact that although imported goods sell freely in this country in competition with domestic goods, the consumer does not benefit one iota. Importers make wider margins of profit and are, therefore, better satisfied to handle imported goods, which is really one of the greatest forces working against manufacturing woollens and worsteds in this country.

UNSANITARY CONDITIONS IN MILLS.

A report comes from Toronto that the M.O.H. of that city has equipped four inspectors for a campaign to prevent factory diseases and to stamp out any indications of such diseases there may be at the present time. The report says, in part:—"This preventive work is being carried on in the United States and other countries with much success. Forms of illness that are termed factory diseases have been traced to bad sanitary conditions in workrooms and to some employees being injured by the dust of the chemicals in the material which they handle." The work of the inspectors will be to improve the sanitary conditions of the workrooms and to see that any cases found are given proper treatment.

We heartily commend any steps in this direction, so long as they are taken intelligently, for, although much has been accomplished in the way of inducing, or in cases compelling, employers to provide sanitary workrooms and sanitary conditions for workmen, there has been a lot of needless agitation and undirected effort. There has long been a tendency on the part of "would-be uplifters" of the human race to get mixed up in such affairs without having adequate information at hand or methods to put into effect whereby the desired result might be obtained. Invariably such effort accomplishes very little good, and usually considerable ill-feeling.

The question naturally arises as to whether it is not a paying proposition for any employer to give serious consideration to this matter. There is undoubtedly a tendency in that direction. Modern and up-to-date concerns give it careful study in the erection of buildings, the arrangement of machinery and the heating, ventilation and lighting systems as well as the provision of rest rooms, lavatories, wash rooms, etc., which are all necessary to proper sanitary conditions. The humanity side is gradually receiving the proper consideration, but we still find the reverse is true in far too many instances. Sweat shops still exist, child labor is still employed and a dozen other conditions conducive of unsanitary and unhealthful occupation are still to be found. If our health inspectors direct their efforts in the right direction much good can be accomplished, but the first move on their part is to obtain the sympathy and support of the employers and workers alike.

LONG STAPLE COTTON.

According to a statement issued by the Agricultural Department of the United States Government, long staple cotton of superior quality can be grown in America and the reason it is not grown at the present time is that the farmers do not undertake to produce it, because they have no direct interest in preserving the purity and uniformity of the crops, owing to the fact that buyers do not insist upon quality. New early maturing varieties of long staple cotton have been developed, and improved methods of culture have made it possible to produce good crops of this cotton in many parts of the united States. It is claimed that natural conditions favor its production, and if the growers are encouraged to take more care in maintaining their cotton at a high standard, unlimited supplies may be grown.

The Textile Exhibition at Boston.

From information that has come to hand we take it that quite a representative body of Canadians are planning to attend the Fourth Annual Textile Exhibition to be held at Boston, April 27th to May 2nd. The Exhibition will be one of the biggest of its kind ever attempted, and will be full of the most important and valuable information to manufacturers and all who have the opportunity of attending. During the week the National Association of Cotton Manufacturers will be in convention, and an attempt is being made to have as many members of the American Cotton Manufacturers' Association and of the Southern Textile Association as possible to attend the Exhibition in a body.

The Knit-Goods Convention.

The Tenth Annual Convention and Exhibition of the National Association of Hosiery and Underwear Manufacturers of the United States to be held in Philadelphia on May 11th to 15th is being looked forward to by many Canadians, who have formed the habit. Recent reports indicate that the event will far exceed all previous gatherings, both in attendance and in the importance of the subjects that will come up for discussion. All the space available in the Exhibition has been taken up, and it is said that this feature will show a marked improvement over previous events.

The programme will include papers on "The Conditioning of Cotton Yarn"; "The Economy of Distribution as Relates to Sound Credits"; "Operating Costs and Economies"; "Trade Marks and their Protection," as well as interesting addresses on important subjects by leading authorities and discussions of the papers read.

The committee of Master Spinners of Manchester, Eng., decided on March 21, to close throughout Easter week the mills spinning American cotton, because of present conditions in the cotton trade.

THE UTILISATION OF WOOD PULP IN TEXTILE MANUFACTURING.

Some Interesting Facts in Regard to this Product.

By H. A. CARTER.

Artificial silk manufactured from wood pulp is to-day very largely used for the production of braiding, furniture upholsteries, knitted neck-ties for gentlemen's wear, straw hat bands, and other like goods, and the inventors of the processes by which it is produced, are using every endeavor to further perfect them in such a manner that the product can be still more widely employed. Some details of an article which has during recent years made its way so extensively into textile manufacturing will, accordingly, be of interest.

The trees which provide the product are two sub-groups. The Sugar Cane, or bamboo, do not seem to ordinary people to be related to the cereals, but the botanist regards them as very closely related to each other. They are Spermatophytes, that is seed bearing plants of the two groups Gymnosperms (naked or exposed seeds), and Angiosperms (enclosed seeds). Coniferae, Pine Spruce, Monocytledons, Bamboo, Sugar Cane, Dicotyledons; Poplar. A plant may be described as a structure, or a collection of structural elements, which grows and builds up tissue, this it does through its assimilating organs, which are the leaves. The roots aid in the process by taking up nutriment from the soil.

The weight of a wood depends upon the state of the wood in respect to moisture, and upon the proportion of small weighty lignified vessels, such as might be termed centre wood, which is denser than the more distended vessels composing the sap wood. Poplar is a very light wood, and Spruce and Pine are light. The hardness of a wood is measured in terms of the number of kilograms needed to force a punch of 1 sq. cm. in area to a depth of 1.27 mm. into the wood perpendicular to the direction of the fibres. The strength of a wood is the resistance offered by it to any force having a disposition to break the fibres across transversely, or to get the better of the cohesion of the fibres, or longitudinal stress.

What has been said gives some idea of the fitness of any particular wood, or woody substance, for converting into a fibrous raw article. Such woods should contain a large proportion of long cells, or fibre, and for cheap production of Artificial Silk wood pulp the large annual stem possesses properties of growth, transport, and treatment which are very satisfactory. Such woods are obtained from Norway, France, Italy, Roumania, Great Britain, Canada, America, Russia, Austria-Hungary, Germany, Sweden and Spain.

Two methods are employed to convert these woods into pulp, by one they are broken up by wet-grinding to a mechanical pulp, after which they contain no constituents which are soluble in water, the other method is a chemical formulae which, acting upon the woody components, change them into secondary substances which are soluble, leaving the cellulose, which maintains the form and sizes of the original fibres, making a chemical pulp made up of the fibrous structural parts of the wood in the completely resolved condition. There are only a few woods that are really suitable for treating in this manner, and coniferous woods, and poplar are ones made use of.

Wood is always a composition of carbon compounds, and carbon is best described as pure charcoal, an elementary substance bright, brittle, and having no smell. The composition of woods varies, and the differences met with are marked, and distinguish the various kinds, but these differences are merely small departures from a class which is universal.

Lignification has been described by a German Chemist, of repute, as the formation of a cellulose derivative by combination with certain acid, and unsaturated, ketonic groups, the resulting compound being ligno-cellulose, and by different processes which act on these acid, and unsaturated, groups the ligno-cellulose is converted into secondary products of the last-named, which, are soluble, and cellulose, which is resistant and insoluble. Ketones are a class of bodies derived from the fatty acids by the substitution of the hydroxyl of the latter by a monad positive radicle.

The cellulose in the condition of these soluble secondary products, or derivatives, is a structureless colloid. In the plastic state it may be made to assume any form, and so it is produced in Artificial Silk works in filament, or thread. What is most noticeable in the cellulose in these artificial conditions is a continuity of substance. In changing from the condition of solution to the eventual solid state, there are no breaks in this continuity, and the structural features of these artificial forms are conditioned by this circumstance.

Wood pulp manufactured into artificial silk has 50 per cent less breaking strain per unit denier than natural silk; and its extensibility under breaking strain is 8 per cent less. The true elasticity of both is the same.

Strehlenert says, referring to breaking lengths expressed in terms of kilogrammes per square millimetre of section, which is a good ground of comparison, considering that the two products have been proved to possess a very similar structure; the relationship between natural silks, and the artificial silk products, is as under:—

	Dry.	Wet.
Natural China Raw Silk	53.2	46.7
,, French ,, ,,	50.4	4.09
,, ,, boiled off	25.5	13.6
,, ,, dyed red, weighted	20.0	15.6
,, ,, blue black @ 110 per cent	12.1	8.0
Artificial Silks, Chardonnet, Nitrate process	14.7	1.7
Lustra, Lehner, Nitrate process	17.1	4.3
Celluloses, Glanztoff, Cuprammonium process	19.1	3.2
,, Viscose, Xanthate process	21.5	5.3

Celulose is equally resistant to change for the artificial silks obtained by widely varying processes, such as by treating cotton by the Chardonnet and Lehner processes are, in their properties, closely akin to the fabrics, or threads, produced from wood pulp, by the Glanztoff and Ciscose systems.

Fibres generally may be looked upon as the strength giving parts of plant structure, and to quite understand the chemistry of woods the jute fibre should be studied as a structural type, and the jute substance as a typical ligno-cellulose. It may be taken to hold the middle position between the cellulose, and the perennial woods, and it may be said to be, as a rule, the case in connection with the distinguishing reactions of these bodies. Jute, if treated by the cuprammonium reagent is almost wholly dissolved, but it has little effect on the ligno-cellulose of the woods, and strong solutions of the caustic alkalis mercerise jute, and fibrous ligno-celluloses, of similar components, but not upon the woods.

It has been estimated that Germany, Norway, Sweden, Finland, America, and Canada produce per annum, between them, 4,628,000 tons (air dry) of mechanical and chemical wood pulp. The wood comes into consuming districts in logs measuring 8 feet x 4 feet x 4 feet. The Aspen, Balsam, Basswood, Fir, Pine, Spruce, and Tamarac trees, all yield commercial wood pulp.

The manufacture from wood pulp of paper owes its origin to J. C. Schaffer, a priest, who made paper of good quality from several species of wood, about the year 1770, but the production of artificial silk yarns from wood pulp is comparatively a recent invention, but very little was heard of this prior to year 1890, although, no doubt, experiments in the direction were being carried out by at least a few inventors. Samples were exhibited in England for the first time, in bulk, abut 1893. The Chardonnet process had not been working very long at Besancon before the manufacturing of artificial silk threads from wood pulp commenced, and the industry has since grown very rapidly, cotton is, however, our type of chemically balanced cellulose, and is of a higher order of stability than the wood celluloses. Wood cellulose is always a residue of chemical processes.

The cellulose in particular in the form of artificial silk is treated with formaldehyde in aqueous solution containing, in addition, auxiliary agents, which determine combination, and as a result of the combination there is, experts state, some constitutional change in the cellulose itself, accompany the fixation of the H_2CO groups, which gives proof of a power of internal structural modification that opens up an interesting field for study.

Two means are employed for the bleaching of wood pulp, the most common being the use of ordinary bleaching powder, the second the treatment of the pulp by solutions of soda, or magnesia, prepared by electrolysing the chlorides.

The celluloses in the form of ultimate fibres are the unit elements of structure of the yarns, and threads, which are the basis of textile fabrics. The processes by which they are mechanically prepared, and then spun into thread are determined by their dimensions. Artificial silk may be said to be structureless, as it is prepared from structureless solutions of cellulose derivatives, it in this way is like true silk, which is produced in solution in the glands of the silkworm, and turned out into the atmosphere, the worm doing the mechanical process of drawing and laying the threads in the specialised form of cocoon. Cellulose allows of very hard treatment in going through a cycle of operations, and reverting to an amorphous substance which retains much of the structural properties of the original.

In addition to the manufacture of artificial silk from wood pulp by the Glanztoff and Viscose processes a very important new textile has lately been produced from the product, namely "Silvalin" yarn, samples of which spun into various counts applicable for many different purposes, dyed and plain, were exhibited at the City Hall Exhibition, held in Manchester in October last year, in connection with the Textile Industries, together with numerous examples of the yarns woven into piece goods curtains, mats, carpets, etc., etc., and were very favourably commented upon. R. Kron has devised a method for the spinning of this Silvalin yarn in which the production of the original pulp strips is intensified at its full width, the web being subdivided into narrow strips by an arrangement for projecting jets of water upon the web, at such distances that the web is divided into 100-500 strips per metre. The separation of the strips is, however, not thus completed, they are wound upon a roll of the full width, and are afterwards separated, and detached as discs. It is based upon a patent covering process for twisting, or spinning, the cellulose (pulp) directly from pulp rolls, on addition patents, (1) for winding up the wet web at breadth of the machine to be afterwards divided in pulp discs of suitable narrow width. (2) Improvements in the manufacture of pulp rolls in a moist but coherent state, and patents for process, and apparatus, for winding up moist strips of paper pulp, etc. Process and apparatus for subdividing a web of pulp (as on the wet sud of a paper machine), into strips. Apparatus for direct delivery of moist pulp strips, and spinning machine for preparation of detachable cops.

The Kron process proceeds as under. The formation of the web on the Fourdrinier wire, its subdivision into strips by the impact of jets of water for the number of strips required to be formed. The pulp strips are submitted to the action of press rolls for the gradual removal of water and progressive solidification of the fibrous mass, it is then, further, dried by heat on a steam heated cylinder, and then wound up in what is called a magazine roll, which so holds a series of discs in close contact. These are detached as needed for the further process of twisting, and are set out for winding off in a horizontal, or inclined, position below the spindles.

The winding-off and twisting, calls for the passage through the machine which is the subject matter of the fourth patent named, the apparatus from which the strips are delivered continuously to spindles. These have a speed of 3,000 to 8,000 revolutions per minute with the sliver travelling at 8 to 16 metres per minute, according to the size of the yarn, and the degree of twist needed.

It has been estimated that this description of yarns made from pure wood-cellulose have a mean breaking length of 5 to 7 k.m., with an extensibility of 6 to 7 per cent.

Warps of wood pulp yarn need no previous dressing or sizing. The goods when finished have about one half the strength of jute materials of the same make, and weight. They lose their tensile quality completely when wet, but regain their strength in drying. This is a serious drawback on these materials, but so long as they are kept dry they are all right. Wall coverings, stair matting, braids, webbing, furniture coverings, upholsteries, hatbands, canvas for tennis shoes, overalls for workmen and tweeds made of wool and silvalin, and worsted and silvalin suitings were exhibited at the recent Manchester Exhibition in addition to the goods already named. Some of these only contained from 25 to 100 per cent of silvalin, however. One exhibit which looked very well was a handsome hanging, or cover, for a drawing room mantle board. String and cordage made from the material was also shown. The natural colour of the yarn is a light brown, and in this such colours as crimson, blue, green, etc., show up in very good relief. The material, in fact, takes the dye remarkably well, and the stall which the Silvalin Yarn Spinning Co., of Manchester, had at the exhibition attracted an unusual amount of attention from visitors.

The yarns and cloths can be bleached white. Two systems are employed for the bleaching of wood pulp, the most common being the use of ordinary bleaching powder, the second being the treatment of the pulp with solutions of hypochlorite of soda, or magnesia, prepared by electrolysing the chlorides as already stated.

The bleaching of wood pulp by means of a clear solution of ordinary cloride of lime is simple, and may be said to be fundamentally a process of oxidation. The methods consists in immersion of the pulp in a given quantity of diluted bleach liquor of definite strength but many modifications are available, and they need to be closely studied in order to produce the best results economically. If wood pulp be well washed in warm water before bleaching this gives it a greatly improved colour. Large quantities of paper are, of course, manufactured from wood pulp, and one of the earliest and largest works formed in England to carry on this industry is that of the Kellner Partington Paper Pulp Co., Ltd., of Barrow-in Furness.

With respect to artificial silk manufactured from wood pulp, its breaking length in kilometres averages 12.0, and its elasticity is 2.0.

As a chemical individual, wood cellulose differs but little from cotton cellulose, and where only chemical relationships are involved there is an obvious probability of the former being able to substitute cotton as a basis of manufacture. For such substitution there is always the inducement of relatively low market price.

Artificial silk yarn, or as it is often called Lustra cellulose, is used largely for ladies belts and table covers. Belgian manufacturers utilise it largely also, for figured effects, especially in linings and it is also employed extensively for making tapestries and furniture covers. It is further used largely for wide and narrow braiding. Ether and alcohol are two agents which are greatly used in the production of lustre-cellulose thread from wood pulp.

Herr Emil, Claviex, a Saxon, who has invented a process for making thread, somewhat like silvalin yarn, from wood pulp. This is based upon a finished, but unsized paper as a raw material which is cut into fine strips of a few mm's width, each strip being separately wound in a bobbin, which is then transferred to a spinning or twisting frame. In the condition of twist it is submitted to a rolling process to consolidate the thread, and this treatment is repeated after moistening the thread in a second machine, the speed of which is regulated to give a certain drawing effect.

The spindle for the spinning, or twisting, of the paper strips has a spool, or reel, earrying the paper strip of 2-3 mm. width, and this is carried on a hollow brass axis, which is held in position on the spindle by means of springs. The fliers rotate in the same direction in which the paper strip was wound on the spool, the slip is thus twisted, and drawn off through rollers under a suitable tension. The yarns produced under this system are known as "Xylolin," and they compete successfully against jute yarns.

Just as various means are employed in textile manufacturing for giving a high degree of twist to textile yarns in their final form the same principles and form of machine are pressed into the service of the paper pulp spinner. The twisting of the yarn is done on ring spindle machine frames, which have 60 to 70 spindles on the side. In spinning weft yarns, the delivery of the spun yarn varied, which permits of it being wound directly into cops, or on to tubes placed over the spindles. With regard to the effectiveness of this method two restrictions apply, one is the method of making the pulp strips in a "cylinder" machine; the alternate process and machine founded on the flat running Fourdrinier wire with its much higher productive efficiency is taken by Kron process as the basis of their system. The second restriction, with regard to output, and accordingly economic production, is in the speed of the machine, and process of rounding and consolidating the strips. A machine of 80 spindles having a running speed of 12-15 m per minute, will produce from 1,382,400 m. to 1,728,000 m. per diem, off which 30 per cent must be knocked for breaks and stoppages. A beating engine of the Hollander type with 160 to 200kg. dry pulp capacity, dealing with four charges in the 24 hours, will feed two of these special machines.

Viscose, which in thread or yarn is an artificial silk, is formed by a combination of cellulose with acid groups, the compound is soluble only in alkaline liquids, it decomposes by its own force with reformation of cellulose. The first step in the viscose process of artificial silk manufacture is the conversion of the cellulose by treatment with caustic soda solution at mercerising strength. The wood pulp may be treated with the alkaline lye by reducing the wood pulp in a kollergang with water sufficient to cause the disintegration of the sheets, and then adding the calculated quantity of caustic soda dissolved in a quantity of water sufficient to produce a mixture of cellulose 25 to 30 per cent, caustic soda 12.5 to 15 per cent and water 62.5 to 55 per cent or the sheets may be steeped in excess of a lye of 17.5 per cent caustic soda, lift, drain from the excess, press to a calculated weight, and then grind in a mixer to secure even admixture of the mercerising reagent with the cellulose.

There are at least a few classes of knit goods, or what may be termed knit goods, in connection with which wood pulp artifical silk and such yarns as are produced by the Silvalin Company, and the Claviez and other processes, are of interest, for one both descriptions would answer well for knit fringes on curtains, overmantles, and similar goods, the yarn produced by the last named two systems has not the lustre of the first named or of artificial silk manufactured by the gun cotton process, indeed, no lustre whatever was to be seen n the samples exhibited at the late Textile Machinery Accessories Exhibition held in Manchester to which reference has already been made, nevertheless, the goods looked very nice indeed, particularly those which had had designs printed upon them. On the light brown background of the Silvalin cloth, they were, in fact, very artistic. Having this color they would not need many washings owing to soiling rapidly, if made nto fringe knit materials, golf bags, holdalls, rucksacks, etc., and other lines might be struck of this class in connection with which they will prove of value.

With respect to the gun cotton, and artificial silks, it is doubtful whether they will ever give complete satisfaction when manufactured into piece goods for general wear such as ladies dress goods, so, though for braiding, ladies belts, neckties, straw hat bands, and so on, the yarns answer very well, and a very good demand exists for them for these, and the other purposes which have already been named.

Cellulose may be said to be the non-nitrogenous skeleton of vegetable tissues.

The rise of the various wood pulp manufacturing industries has led to great forest devastations, and in some cases the governing authorities have had to pass laws restricting within certain bounds the cutting down of trees to meet the demand for raw supplies.

The utility of wood pulp yarn, and the method employed in its manufacture were discussed at a meeting of the London Section of the Society of Dyers and Colourists, held lately, and the fact that the yarns lose their tensile strength entirely in wetting, and that they have only half the strength of jute fabrics of the same weight and make, was named.

After soaking in cold water, the "Kron" yarn seems to lose 75 per cent of its strength, but still has a breaking strain of 170 grms. The yarns have an elasticity of 6 to 7 per cent, and a breaking strain of 5 to 7 kilos. It is difficult, however, without trial to estimate what would be the behaviour of such yarns under practical wearing conditions, especially when they are woven with other fibres, and although the former statement may be true in itself, yet in the actual use of such yarns, in practice, more satisfactory results have been obtained than might be expected.

For example a sample of table cloth material which has been in use in Germany for three years, with constant washing, is still quite good. It contains some 60 per cent of this yarn.

It is only by actual trial that the working properties of such material can be tested, and these seem to be satisfactory within certain limits, which may be regarded as giving the yarns a place in the textile industry.

The yarns are manufactured in Germany in one factory to an amount of 6 to 7 tons per week. Factories are being erected that will devote themselves particularly to its use in the manufacture of sacks, and suchlike materials. At the same time these yarns have an actual decorative value, many really beautiful products being obtainable.

Dyeing seems to present no difficulties, and may even be conducted in the yarn state.

These products will have special interest to the dyer and the cleaner, who may once more have their working conditions rendered more difficult. The many uses that this yarn has been put to include the manufacture of wall and paper coverings, hessians, tarpaulings, and overalls, and many other cloths of varying make, in addition to the use of the yarns themselves in the shape of twine and string.

The value of the paper pulp in yarn form has been expressed by O. N. Witt in terms of the comparative value of one c.m. of wood, which has been put at 3s. Transferred into paper it has a value of £1 15s., into paper yarn £2 5s., and into artificial silk £7 10s. These figures are significant.

Paper yarn is now being spun, and cloth woven from it at Dundee, in Scotland, in a mill which has been specially fitted for the purpose, and the proprietors of the mill, who have been putting forward great efforts in connection with the business for some time past, are meeting with considerable success in the venture. The firm in question is Messrs. Ferguson & Co., of Bedville Works, Lochee Road, Dundee, Scotland.

TEXTILE ALLIANCE, INC.

Organized to Stamp Out Graft in Textile Mills in the United States.

As a result of the vigorous fight on the part of various textile interests in the United States against the bribery and corruption of textile employes by a powerful German dyestuff firm, the "Textile Alliance, Inc.," has been organized in an attempt to stamp out such practices. From suits that have already been tried out in the United States Courts, it has developed that alarming conditions prevailed and that mills throughout the country were paying exorbitant prices for their supplies and that the bribery practice was quite common.

The "Textile Alliance, Inc." have been organized by members of the various textile associations of the United States for the purpose of:

"The protection of millowners and operators from, and the prevention and reform of, abuses, unjust and unlawful exactions, deceptions and frauds in the manufacture and sale of mill supplies and the prevention and prosecution of unlawful, illegal and improper actions, misdemeanors and crimes in connection therewith."

The Alliance is soliciting the aid and support of all sellers of mill supplies in eliminating all forms of graft and irregular practices from the purchase of supplies in the mills belonging to the Textile Alliance and ask that all cases of graft and corruption be reported. The Executive Committee of the Alliance is composed of: Mr. John P. Wood, President of the National Association of Wool Manufacturers, Philadelphia; Mr. William A. Mitchell, of Massachusetts Cotton Mills, Lowell, Mass., representing the National Association of Cotton Manufacturers; Mr. Caesar Cone, of the Proximity Mfg. Co., Greensboro, N. C., representing the American Cotton Manufacturers Association; Mr. Albert M. Patterson, of the Waterloo Woollen Mfg. Co., Waterloo, N.Y., representing the American Association of Woolen and Worsted Manufacturers; Mr. John J. Nevins, Associate Secretary of the American Association of Woolen and Worsted Manufacturers.

SAVER FOR COTTON COMBERS.

James E. Keeley, for 21 years a comber man in the mills of Massachusetts and Rhode Island, has invented a small attachment for a cotton comber which will save the teeth of the half lap and also in many cases the nipper knives and the knipper arm.

Mr. Keeley, in common with the other comber hands, has always had trouble with the machines when the feed broke and wound around the fluted roll. He thought that something could be done to prevent the resultant breaking of the needles of the half lap, and also the nipper knives. After working for some time, he evolved a small piece of metal which is attached to the machine in such a manner that when the feed breaks, the roll is stopped, and the knife is unable to force its way into the needles of the half lap.

Mr. Keeley worked for seven years in the Grinnell Mills of New Bedford, and after leaving there, he became a comber hand in the Elizabeth Mill, No. 1, at Hillsgrove, R. I., where he is now working. He has not commenced the manufacture of his attachments as yet, but is trying one out on one of his machines, where it has been for about a year now. During that time, it has never failed to perform its duties when the feed broke.

PRACTICAL TUNING AND CONSTRUCTION OF POWER LOOMS---II

THE CARE OF BELTING

By BEAUMONT METTRICK.

The majority of power looms are driven by leather belts, therefore a few remarks at this point in regard to the care and use of belting will be found of interest.

To get the greatest efficiency out of the belts, it is important that a correct record of all belting used should be kept. Different types of looms and looms in different positions will be found to vary in the amount of wear and tear of their belts, so that if an account of the deterioration be kept, the best positions, etc., of the looms may be found, that will give better and more efficient drives with least waste in the life of the belting.

If possible, the length of belt required for each type or row of looms should be kept uniform. This could be brought about, by having all the loom pulleys at one particular angle from the driving pulley, therefore, one

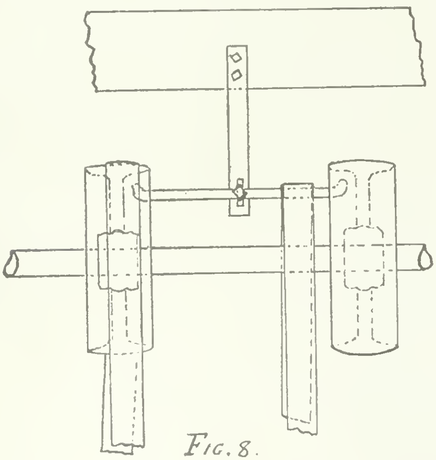

Fig. 8.

length for open and another for crossed belts could be used. The length of belting required being then known, the belt should be stretched as much as possible before being cut off the roll to the length required and placed upon the pulleys. After the belt has been running for a day or two, it will be found to have stretched, according to the quality of leather, style of loom, and the class of goods being woven. The belt should be taken down, when the loom is standing, and cut again to its original length. Before doing this, the percentage of stretch and time of running, etc., should be noted for future reference. This will help to ascertain the quality and efficiency of the leather used. The cost and record of different beltings can in this manner be arrived at, and a definite time found when the belts will require shortening. This can be done when the looms are at rest, and before any appreciable loss of power or speed takes place. Experiments show that the average stretch of a leather belt is usually about 6 to 7 per cent. during its time of running. After a few years of running, the pliability of the belt will be found to be used up. When this happens, it will be better and cheaper owing to the quality of work turned out, to substitute the old belt by a new one, instead of trying to patch up the old one.

The above method of keeping the belts in order will be found to give more satisfactory results, than the old rule of thumb method of allowing a belt to run, until it is too slack to drive the loom properly, this being found out owing to the knocking off of the loom, as not sufficient force is given to drive the shuttle across the going part. The loom is then stopped, and a certain length cut off, usually haphazard. When the loom is again started, the belt may be a little too tight or slack, thus, if too tight, a certain amount of friction in the necks of the loom shafts is set up, causing an extra amount of stretch in the belt: all this results in waste of material and power, with inefficient working of the loom. If too slack the loom will have been running too slow, or the belt slipping, probably for a considerable time, before the weaver has drawn the attention of the overlooker to this fact, therefore the production of the loom will not have been up to the standard during the time.

Management of Belts.—Excessively tight belts should should be avoided, as these cause unnecessary friction, resulting in wear in the bearings, unsteady running and heavy picking, therefore some loss in power.

Slipping of Belts.—Resin should not be used, to cause the belt to grip the pulleys, as it is only effective for a short time, afterwards caking on to the pulleys and drying up the leather, thereby eventually causing slipping of belt instead of gripping.

Many good belt dressings are now placed upon the market, most of which are found to be effective. A good and cheap manner of dressing often used is as follows: Clean the inner face of the belt, then apply a good dressing of thick fat or oil such as tallow (dubbin is sometimes used). This fills up the pores of the leather, and prevents it from cracking, thus allowing the belt to get closer grip of the pulleys.

The life of a belt can be lengthened considerably by washing and dressing it at various periods. Always allow the fat to be absorbed and thoroughly dried into the leather, before working the belt. A belt with the side that was originally the outer side of the skin, running next to the pulleys, will not slip so readily, owing to the surface of the leather being more even, than a belt with the inner side of the skin next to the pulleys. The inner side, being more pliable will also lend itself better to the extra stretching that takes place on the outer side of belt, as it bends around the pulley. Avoid patching up belts with short lengths of various qualities and age, as the tension will vary at different parts, and uneven running and slipping of the joints will take place. When a belt is made up of short lengths, the quality of leather should be uniform, and the joints cemented together, except at one joint used for regulating purposes. This will cause the belt to last longer and run smoother, than if the joints were laced or fastened up by belt fasteners.

When belts are laced, the lacing should be straight on the inner side, running over the face of the pulley, and the crossed side on the outer side, the lace being flattened as much as possible, to present a smooth surface to the pulley, thus preventing slipping. A better method is to square the edges, then fasten up with patent belt fasteners, taking care that both sides of belt are at an even tension.

Belts with cemented joinings should run with the joint following the drive, and not against it. A belt that is constantly slipping, jumping off the pulley, or breaking, usually proves that the load which it is required to drive is too heavy for the strength of the belt.

The width and thickness of the belt should vary according to the load driven, the heavier the load, the wider the belt.

When belts are not working a load for a considerable time, it has been found that they grip better and last longer, if they are allowed to rest. This can be done without taking the belt away from the shaft, if a belt

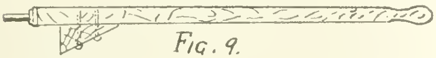

FIG. 9.

support is provided as shown in Fig. 8. This support can be used also when tightening or repairing the belt, the advantage being that it does away with allowing the belt to rest upon the revolving shaft, which is a dangerous practice, and apt to unduly stretch or wear the belt, especally if the belt is rubbing against the key or keybed of the pulley. Fig. 9 illustrates a simple type of strap remover, the strap being placed upon the pulley by the small wood projection, and removed by the steel pin at the top of the remover. It is a very handy tool, and is easily made.

Rule to calculate the approximate length of belting in a roll.

Add the outside diameter and the inside diameter of roll (in inches), then multiply by the number of coils in the roll, and then by 0.1309. This gives length in feet. e.g., a roll of belting is 30 in. diameter outside edge, and 5 in. diameter inside edge. Number of coils is 40. Find length of belting.

$(30 + 5) \times 40 \times 0.1309 = 183.26$ ft.

(To Be Continued.)

NEW COMMERCIAL DAILY.

To Appear About May 1st.

The announcement has been made that a new company has been formed to take over the present weekly "Journal of Commerce," published in Montreal, and that it will be turned into a daily financial and commercial newspaper. The Honorable W. S. Fielding, ex-Minister of Finance, is president of the new company and will be Editor-in-Chief of the paper with Mr. J. C. Ross, the present editor of the weekly "Journal of Commerce," as Managing Editor.

The daily "Journal of Commerce" will be devoted exclusively to commercial and financial matters, and will cover commerce and finance in the widest possible way. In addition to the general financial news and gossip, and the general commerce of the country, special departments will be devoted to Canada's basic industries, which field has been entirely neglected so far as the daily newspapers are concerned. The textile and allied trades will be covered thoroughly as well as daily reports from the great raw material markets of the world. When we realise that about fifty per cent of our cotton goods, over seventy-five per cent of our woollens and worsteds and nearly forty per cent of our knit goods are imported, the value of a publication that will give accurate daily reports on the dry goods trade can well be imagined. The publishers of the new daily "Journal of Commerce" are making every endeavor to secure men who will cover this field in a thorough manner.

Each industry will be covered as thoroughly as possible, as well as shipping, transportation, general commerce and the business of finance, insurance, banking, etc. It is expected that the daily "Journal of Commerce" will make its first appearance on or about May the 1st. It will not be in any sense a political or party paper, but will be an independent financial and commercial daily.

WELDON PATENT ACQUIRED BY GILES CO.

President of Klauder-Weldon Co. Makes Statement.

The John H. Giles Dyeing Machine Co. of Taunton, Mass. announce that they have purchased from the executors of the Estate of Leonard Weldon, United States letters patent No. 645,698, issued March 20, 1900, for improvements in dyeing machines. It is claimed that it antedates any patents on dyeing machines granted to either Leonard Weldon or Chas. L. Klauder that are in force at the present time. The use of it has been allowed the Klauder-Weldon Dyeing Machine Co. of Amsterdam, N.Y. by courtesy of the heirs of Leonard Weldon, but the patent is now owned by John H. Giles Dyeing Machine Co., Amsterdam, N.Y., and Taunton, Mass., who now has the exclusive right to manufacture under it.

The attention of the president of Klauder-Weldon Dyeing Machine Co. was called to the statement that John H. Giles had purchased patent No. 645,698, of March 20, 1900, from the estate of Leonard Weldon, deceased, and that thereby he became the sole exclusive builder of machines under the oldest unexpired Leonard Weldon patent. In answer to a question he stated that this patent was for a mercerizing machine, and that the Klauder-Weldon company did not, and had not, built one about the time of the issue of the patent and it proved a failure, and that was the only connection the company ever had with the patent.

He further stated that the statement that the Klauder-Weldon Dyeing Machine Co. did not own the Weldon patent No. 659,906, of Oct. 16, 1900, was not in fact a correct statement. "The company purchased," he said, "for a valuable consideration, in 1893 or 1894 all of the patents, applications and future inventions of Leonard Weldon relating to dyeing machines and was the real owner of the patent. Mr. Weldon died a few months after the issue of the patent in question, and the company supposed that a formal assignment of the patent was made, and it was not until recently that it learned otherwise. It requested the executrix and executor of the estate of Mr. Weldon to execute a formal assignment, and upon their refusal to do so it brought suit against them to compel such transfer and obtained an injunction preventing them, during the pendency of the suit, from assigning or in any way interfering with the title of the patent."

BLENDING AND PREPARATORY PROCESSES IN WOOLEN SPINNING---X.

RAG AND WASTE PULLING MACHINES

By JOHN W. RADCLIFFE.*

In a previous article upon this subject the reader's atttention was called to a study of one of the most important waste opening machines there is in the textile trades at the present time. This machine, known universally as the "Garnett" was, in the article referred to, dealt with in a somewhat general manner, but if the reader will refer back to the diagram Fig. 18 illustrated therein, and peruse its parts in conjunction with the illustration shown at Fig. 21 of the present article, a more specific acquaintance with the workings of the machine can be acquired. These diagrams and the following description clearly illustrate the methods by which the component parts are driven.

It must be assumed that the respective right and left hand sides of the machine are obtained by facing it at the feed end, shown at Figs. 18 and 21, therefore the former is the left hand side (see previous issue of this journal) and the latter the right hand side.

The doffer B is driven from the second cylinder A', and the parts are given in Fig. 18. On the shaft of the cylinder A' is a pulley Q', which by means of belt P imparts motion to pulley Q'. On the stud of the latter is a small spur wheel R geared into a large spur wheel S, and which is fixed on the doffer shaft. The workers C and C' are driven from two different sources, both in the old and new types. Those workers placed over the first cylinder A are driven from the shaft of the dividing roller K', or what is sometimes termed the (tummer) or second licker-in, while those upon the cylinder A are driven from the shaft of the doffer B. To make it more clear, the method of driving the dividing roller K' will be described prior to that of the first series of workers.

On the right hand side of the machine Fig. 21, upon the shaft of the licker-in H will be found a small spur wheel V fixed and geared into a large spur wheel T,

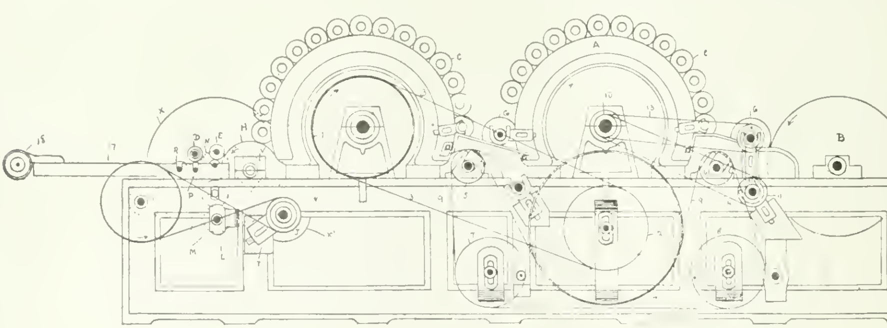

Fig. 21.

It will be observed by examining Fig. 18 that on the end of the shaft of cylinder A is fixed a belt pulley L, which is the pulley that receives the necessary power required to drive the machine from the large pulley upon the main driving shafts by means of a belt. The cylinder A is then driven direct, but the second cylinder A' receives its motion from the first one, by the large pulley M and M' upon each cylinder shaft, and the belt N and N', the two letters indicating the upper and lower surfaces of the belt. The licker-in H (Fig. 21) is driven by a pulley T, and belt passing round another pulley Q, which has a spur wheel 8 upon its stud, and this latter wheel is geared into another one, fixed upon the shaft of the licker-in proper, Fig. 18.

The directions of the different wheels or pulleys, although not all indicated by arrows, still from the swifts arrow on Fig. 18 to the licker-in, they can be traced with comparative ease.

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which is also fastened on to the shaft of the dividing roller K'. At the opposite end of this roller K', given in Fig. 18, is placed a belt pulley, having a belt passing around it the latter of which also passes around a large pulley. Upon the stud of the last pulley is placed a small spur wheel 4, which drives by means of an intermediate wheel 5 the large socket wheel 6, that revolves loosely round the shaft of the large cylinder A. The socket wheel 6 conveys motion to each of the wheels 7, fixed on the ends of the worker shafts simultaneously. Those workers upon cylinder A' are driven by the pulley T' fixed upon the end of the shaft of doffer B. Motion is conveyed by the belt U to the larger pulley V; upon the stud of this pulley is fixed a small spur wheel 1; this is geared directly into the second large socket wheel 2, placed upon the shaft of cylinder A', which in turn drives the worker shaft wheels 3 in a similar manner to those on the first cylinder or swift A Fig. 18. This method is like the one on the old type, but the new one is driven by means of chains, which, in conjunction with the varying numbers of teeth in the respective wheels on the workers shafts, give the differential speeds that have already been mentioned.

The manner in which the differential speeds of the workers are obtained is shown in Fig. 22 and motion is conveyed in this system in a similar way to that already described to the large belt pulley V in Fig. 18, and B in Fig. 22. On the stud of this latter wheel is placed a chain wheel or toothed wheel, around which is passed the chain D D, and along over the top of the first seven wheels E, F, G, H, J, K and L, each having 16, 15, 14, 13, 12, 11, and 10 teeth respectively, the continuity of motion is maintained by a second chain T being passed around a second wheel M, on the same worker shaft as wheel L, and along over the remaining worker wheels N, O, P, Q, R, and S; each of these wheels have a diminution in the number of teeth, as E, F, G, H, J, K and L.

The pulley indicated at U is simply to tension the chain D D and to keep it sufficiently tight to prevent any slipping or jumping of teeth taking place. To give

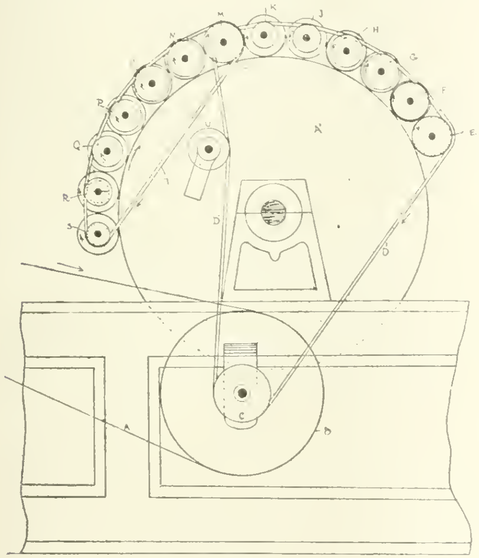


Fig. 22.

an idea of the amount of differentiation that takes place, the speeds are given in revolutions per minute when the first worker E has a speed of twenty-four revolutions.

		No of revs. per minute.			
Wheel	E	24-00	Wheel	M	38-40
"	F	25-60	"	N	40-90
"	G	27-42	"	O	43-80
"	H	29-53	"	P	47-20
"	J	32-00	"	Q	51-20
"	K	34-82	"	R	55-75
"	L	38-40	"	S	61 40

It will be seen that the last workers speed is over two and a half times that of the first one, and hence its gentler treatment of the opened material and its rapid conveyance of the same through the machine.

The various cylinders and rollers are covered their entire surfaces with Garnett wire clothing, which varies slightly in density and setting according to the class of work it is intended to work up.

Some idea as to the types of Garnett clothing in use on this class of machine may be gathered from a perusal of diagram Fig. 23, which illustrates several popular examples of suitable clothing for waste opening machines. The Garnett wire before being mounted upon

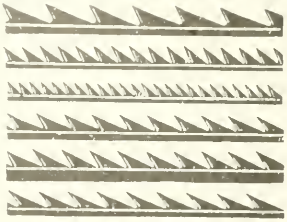


Fig. 23.

the machine is in long continuous lengths, so that a cylinder or roller may be completely covered without undesirable joints having to be made at intermediate points of the cylinder's surface.

The working parts of the wire are of saw like formations as illustrated at Fig. 23, and at the base of these points is a small flange which keeps the working points upright upon the roller or cylinder covered, and at the same time separates one round of wire from another in regular order throughout.

In pulling soft hosiery, knitting or carpet waste yarns it is not entirely essential to adopt a machine of such proportions as those illustrated at Figs. 18 and 21, as a smaller machine gives very desirable results for the pulling of waste yarns somewhat soft in nature. Such a machine is illustrated in diagram Fig. 24, where the material passing along feed sheet A is taken by the licker-in B and the tummer C and yielded up to the swift or cylinder D.

At this stage the material must stand the challenge of seventeen workers, and then by means of "fancy" and "stripper" E and F respectively, it is raised to the surface of the cylinders Garnett clothing to be readily

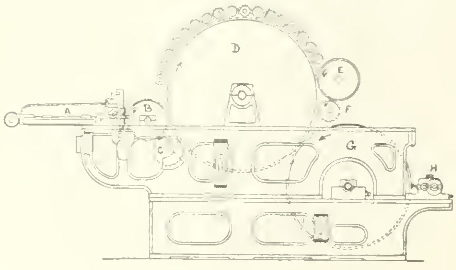


Fig. 24.

delivered to doffer G, from which the opened material is cleared by a doffing comb H. This small machine is a very capital one for use where the space is limited, or the materials dealt with are not very hard twisted or felted.

Rag and waste pulling machines are becoming more and more indispensible to the woollen manufactures at the present time, and no equipment can be called entirely complete or up to date without possessing one or the other.

(To Be Continued.)

THE KNIT GOODS TRADE IN THE FAR EAST

Recent Consular reports from various Consul Generals in leading centers of China and Japan contain the following interesting information regarding the knit goods trade in those countries. The reports say, in part:

"The growth of the knitting factory industry in Honkong is of decided significance in the clothing and cotton trade of this part of the world. The factories have been developed almost entirely within the last three years, the chief factory, in some respects, is a foreign concern known as the Wei San Knitting and Spinning Co., which has been in existence some seven years, and has a daily capacity of 100 to 120 dozen sweaters or pieces of underwear and similar garments. This factory employs about 125 people, mostly girls and young men, whose wages run from 48 cents to \$4.40 gold per week, the greater number earnings about \$1 gold per week. Similar wages are paid in all such establishments. There are seven other concerns of more or less importance owned and operated by Chinese companies and under Chinese supervision, five of which are equipped with considerable machinery. One of these is at Causeway Bay, Hongkong, and is the property of the Wah Me (Chinese American) Co. There is a small factory at Tsim Sha Tsui and another at Sham Shui Po, all on Hongkong Island. Four others are located in Kowloon. They are the factories of the China Foreign Knitting Co., the Man Sung, Li Man Hing Kwok, and Quong Sun, and all are more or less thoroughly equipped in a modern way.

"The export of Chinese-made knit garments (made in Hongkong of American coton yarn) to the United States is the latest deevlopment at Hongkong-American trade. The export of such garments is made almost entirely for the use of Chinese in the United States, but it has grown into considerable volume, and Hongkong factories are paying considerable attention to the trade. One factory reports that almost half of its entire output is now being exported to the United States.

"The largest and first established of Chinese enterprises is the China Foreign Knitting Co. in Kowloon. This concern is typical of the rest of the establishments. It employs about 200 people, and devotes its plant to making foreign style knit underwear and hosiery. Its present capacity is 60 dozen pieces of underwear and 100 dozen pieces of hosiery per day. Its plant includes 10 machines for knitting underwear, most of them manufactured at Troy, N. Y.; 80 machines for knitting hosiery, most of them from Pawtucket, R. I., and one other machine of American make for making lining for underwear. Other native factories are similarly equipped, though without quite the capacity of the factory described. There are a large number of stocking knitting machines in use in homes all over Hongkong and in Canton and many country villages.

"The knitting establishments are quite modern for Chinese concerns in their buildings and other arrangements, and show constant improvement in plant and in the quality of the output. All of them use American knitting cottons almost exclusively, claiming that the American yarn runs better in the machines and otherwise suits their needs. The factory described makes stockings in four standard colours besides white, and underwear in three standard colours besides white. The product of the factory described sells at \$11 to \$13 local currency per dozen pairs of underwear, and at \$1.60 to \$2.20 local currency per dozen pairs of hosiery — the Hongkong dollar at present (May, 1913) being worth about 1s. 11½d. The goods for local use are distributed largely through the Chinese department stores in Hongkong, and through local brokers to small Chinese shops and peddlers. Those exported are sold direct to the Chinese exporting firms and are often sold at substantially the cost of manufacture to prevent the accumulation of stocks. The amount of such goods sold in the interior districts beyond the ordinary scope of foreign trade is constantly increasng at a very satisfactory rate, and in line with the growing use of such goods by the Chinese all over China. The competition met by the goods is almost exclusively Japanese, the Japanese factories usually having travelling representative in this field selling direct to retailers.

"There are at present in Canton nearly 3,000 small hand knitting machines, which turn out numerous cheap socks, cotton singlets, and sweaters in competition with imported goods of British, German, and Japanese manufacture. The one small knit goods mill (Wing Hing Co.) in Canton produces socks and underwear. Native-made socks from hand machines sell at \$1 Canton notes, or 38 cents gold, per dozen, while the sweaters sell for \$16 to \$17 Canton notes, or \$6.68 gold, per dozen.

"There is, in Swatow, a promising market for knitting machines. Up to the present hand and semi-automatic machines have been principally in demand, but there are indications that there may be market shortly for full automatic power driven machines.

"At present there are about 230 hand machines for knitting stockings (socks) in use, capable of producing 450 dozen pairs of socks per day, and about 35 semi-automatic machines, also operated by hand power, capable of producing 175 dozen pairs of socks per day. With the exception of about 20 machines in a factory in Chaoyang, all the above are in home use. In the factory to which reference is made hand power is used. Rates of wages per month paid in this factory at \$6 to \$8 Mexican (\$3 to \$4 United States currency) with food to machine operator. Boys spooling cotton yarn are paid by amount of work done, and earn from 6 to 10 cents Mexican (3 to 5 cents United States currency) per day; they receive in addition two meals a day.

"The machines at present in use run from 72 to 190 needles in a 3¾-inch cylinder, both coarse and fine goods being knitted. Bombay cotton yarn is used exclusively. The majority of the hand machines inuse and all of the semi-automatic machines are of American manufacture. For knitting the ribbed tops of socks English and Canadian machines are used. About 40 German hand machines are also in use.

"The factory mentioned markets its output in Shanghai and the north of China. A combination of a number of home workers which markets the bulk of its output in Siam, Singapore, and other Southern ports. The majority of the home workers, however, sell the article knitted to local shops, and peddle a portion of them on the street. The average price of socks knitted locally is about \$1.50 Mexican (75 cents United States) per dozen.

"To give some idea of the market for socks it may be mentioned that, in addition to the local output, over 14,500 dozen pairs of first quality, and over 27,500 dozen pairs of second quality cotton socks were imported during 1912.

"There is at present under construction a steam factory, financed by Chinese, which will have for its initial installation 20 full automatic knitting machines of American manufacture.

"No underwear is knitted locally, but some 20 machines of the 'Lamb' type are in use in knitting coarse cotton sweaters. The daily capacity of each machine is eight sweaters.

"I am informed that to sell knitting machines locally it is necessary ot have a machine for demonstration purposes. Unfortunately the majority of American manufacturers, even when anxious to enter the market, are not willing to ship any machine except against cash. In refreshing contrast is the action of one American firm which built a special machine of the semi-automatic type to certain specifications, shipped it free to a local agent, and in return for its trouble has already sold some 30 odd machines of the same type. The knitting industry appears to be making rapid advances all over China, and if American manufacturers desire to secure their share of orders for machines it will be necessary for them to do more than send out catalogues."

"Apparently there is only one knit goods mill (Heng Yi, a Chinese firm) in Antung. No underwear machines are used, but the firm is now using seven stocking knitters, and has seven more ordered from Japan. Three of its present machines are English auto knitters, costing $120 Mexican $59.76 gold, at present Treasury exchange); the others are all Japanese machines, with the trade mark 'Hanejirushi' (wing or feather brand), and costing 35 to 37 yen ($17.50 to $37.50 gold).

"Cotton, woollen and silk stockings are made both coarse and fine gauge, and the ordinary output per machine (hand operated) is eight to nine pair per day. Each operator receives 40c small coin (about 15 to 16 cents) per day. Prices per dozen, wholesale, are as follows: Cotton stocking, $1.50 to $2; wool stocking, $4 to $6; silk stockings, $5 to $6. Retail per pair: Cotton stockings, 50 to 60 cents. These stockings are half-hose and the prices quoted are in the local small coin. The demand is good.

"One Japanese machine just received cost only about $10 small coin, too cheap to be good for very long. The Japanese machines turn out seamless half-hose, while some others do not. This does not seem to make much difference in the sale of the goods. No underwear is made by machinery locally, but this firm is considering the manufacture of summer underwear."

"The Osaka Knitted Goods Guild, which city is the headquarters of this industry, states that it is developing very rapidly. At the end of 1912 the number of members of the guild was 1,451, an increase of 71 over the preceding year, and the number of operatives employed by them was 9,860. The value of the goods for the home and foreign market produced in Osaka in 1912, as compared with 1911, is as follows:

	Home Market.		Foreign Market.	
	1911.	1912.	1911.	1912.
Underwear.	$927.297	$1.016.785	$2.778.241	$3.655.367
Socks	116.300	133.030	483.624	523.642
Gloves	58155	73.750	70.628	102.399
Others ...	61.358	79.677	—	61.200
Towels	184.077	193.281	739.907	3.902.992
Total	$1,347.187	$1.496.523	$4.072.400	$8.245.600

"As may be seen from the statistics, the value of goods produced last year for the home market shows an increase of only $149,336 over 1911. All classes of goods, except towels, showed some decrease in quantity, the increase shown in the value being due to an improvement in quality. On the other hand, a good increase was shown in both the value and quantity of goods for export. The total export of knitted goods from Osaka, in 1912, amounted to about $4,347,600 in value, an increase of over $1,000,000 on the figures for the preceding year. The increase is attributed to the continued demand in India and other parts of Asia, and specially to a marked increase in the demand in China.

Almost all the knitted goods and towels exported from Japan came from Osaka. The average price of knitted undershirts exported to India is 83 cents a dozen, while the axerage price of those exported to China is $2.21½, a far better quality even than the goods sold in Japan. Shipments of knitted goods are distributed about as follows: 40 per cent to British India, 30 per cent to French India, 20 per cent to Hongkong, and ten per cent to China. Osaka manufacturers hold large orders from China this year, and it is expected that the present positions held by India and China as customers for Japanese knitted goods will be reversed before long.

The wholesale prices of knitted goods per dozen are as follows: cotton undershirts for winter in China, $3.50 to $5.50; for summer in Philippines, $1 to $1.50; for summer in India, $0.65 to $1.25. Cotton undertrousers, $3 to $5. Cotton stockings for winter in China $0.40 to $0.75; for summer in India, $0.25 to $0.75. Wool stockings for China, $1.25 to $2. Silk socks, $4 to $6.50. Silk undershirts, $15 to $40.

HYDRON COLORS ON COTTON YARN.

We are in receipt of a copy of a large and substantially bound book on the dyeing of Hydron colors on cotton yarn and published by the Cassella Color Company, New York. This work appears to be most opportune in view of the continually growing interest on the part of dyers and manufacturers of cotton goods made from cotton yarn dyed with fast colors.

The text covers fourteen pages of complete technical details of the various methods for dyeing the Hydron Colors either for self shares or for the production of compound or made shades.

The descriptions of the several dyeing processes are written in a full, clear and exact manner, so that the working dyer is in a position to grasp the few simple details for applying this interesting group of colors, while nothing appears to have been omitted that could leave any doubt in the mind of the workman.

The volume is illustrated with 122 dyeings apparently from practice, showing a range of shades through all the tones of blues, violets, yellows, olives and browns. Of particular interest at this time to dyers of mode shades is the series of Khaki shades produced with Hydron Colors, and which seem to offer possibilities for a wide field of usefulness. Other suggestions for mode shades include, browns, greens, olives, slates, etc.

On the whole, a copy of this volume should prove a valuable and useful addition not only to the reference library of the working dyer, but on the designers' tables where it might be availed of when occasion requires shades to be employed possessing extreme fastness.

Without doubt, a copy of this work may be obtained upon request from the Cassella Color Company, New York, or any of its branches.

Improvement in Knitting Machines

The diagrams shown herewith show an invention, recently patented in the United States, relating to knitting machines of the cylinder and dial type in which two sets of needles are employed for the production of a ribbed fabric, especially a double-faced fabric having the back and front of different materials. It is claimed that in knitting a garment of this kind on coarse gages, it is not necessary to have any special construction at

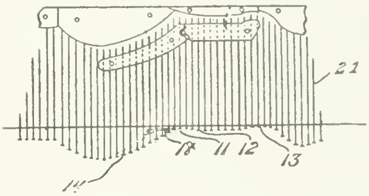


Fig. 1. Position of a Cylinder and Needles.

the drawing or casting off points of the dial or cylinder needles, as an ordinary rib knitting machine may be used for the purpose. In fine gages, however, it is impossible to use the ordinary construction for drawing in the full amount of loop used by the dial needles, which loops are drawn through the loops of the cylinder needles, as several needles would be drawing loops at the same time, and the increased or excess tension tears the yarn. This defect is remedied by using the needles as jacks to supply the amount of yarn needed by each needle. This result is obtained by holding the latches of the needles closed by means of a guard, so that they draw the loops to the extent necessary to produce the fabric, before the loops are interknit and cast off.

Fig. 1 shows a portion of the cylinder and its needles; Fig. 2, a portion of the dial and its needles. Fig. 3 is a perspective view of a part of the machine. Fig. 4 is a vertical section on the line 4—4 of Fig. 3.

The yarn, a and b, is supplied to the machine by any suitable means. The former, a, is laid along the cylinder needles and the latter upon the dial needles, the cylinder needles being indicated at 22 and the dial

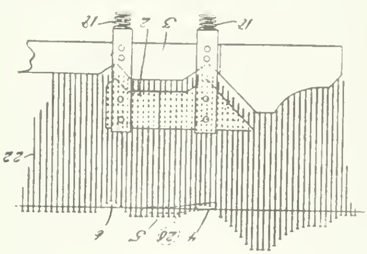


Fig. 2. A Portion of the Dial and Needles.

needles at 21, carried in grooves to reciprocate in the usual manner.

Referring first to the action of the cylinder needles, the yarn, a, is taken in at the eye of the yarn guide and laid across the raised ends of the needles. It is taken in by the hooks as in any ordinary machine. The cams are mounted on a cam cylinder and the needles are first drawn down by the cam drawing the thread or yarn down over the dial needles, which are then advanced, at a point (Fig. 2) back of the open latches of the dial needles, to the low point indicated at Fig. 1, just below the upper edge of the cylinder. At this point the old loops or partly completed stitches are cast off of the cylinder needles, and new loops are formed by said needles with the new yarn so taken in. The cylinder needles are then forced up by the cam to a point above the edge of the cylinder as shown.

As the needles draw down the latches are closed and held closed by a latch holder, so that the needles act as blades for forming loops or sinking to a certain extent, the yarn of the dial needles. After the dial loops are formed, while the cylinder needles are at point 5, the cylinder needles are drawn down by the cam, Fig. 1, and the loops taken in at the point, 4, are formed into complete stitches at the point indicated at 6, Fig. 1. The loops cast off at point 4 cannot be formed into complete stitches until free from the dial needles, that is, until the remainder of the loops formed at point 4, are cast off by the dial needles at the point 6, the dial needles

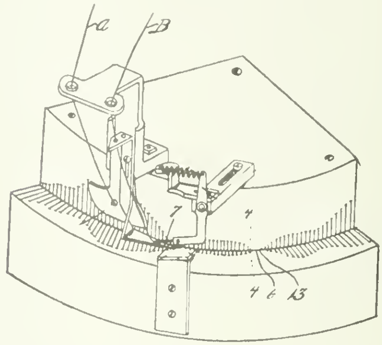


Fig. 3. A Perspective View of Part of the Machine.

being advanced between the cylinder needles between points 4 and 6.

The cam, 3, in connection with the latch holder holds the cylinder needles up to form blades while the dial loops are being made.

The yarn, b, is laid on dial needles by the separate yarn guide having an eye for the yarn. The needles are then drawing in from the point, 14, Fig. 2, to the point, 11, by action of the cam, and the needles start to draw back at said point, 14, after the yarn of the cylinder needles has been looped by action of the cam over the dial needles at points back of the latches of the dial needles, which are open at this point, and when the dial needles draw back of the feed point, 17, the latches thereof are closed by means of the latch closer and holder which, as shown in Fig. 3, rests with spring pressure on the needles at the point, 18, Fig. 2. As the needles drawn in at this point the latches are closed over the yarn taken in at the eye. The latch closer receives the strain on the yarn by closing the latch, instead of using the yarn to close the latches as in ordinary machines, and holds the latches closed until the needles are retracted beyond the same. At the point, 11, Fig. 2, the yarn of the dial needles is drawn around the closed latches of the cylinder needles, then at the point, 5, Fig. 1, and those needles act as jacks for the purpose of drawing the necessary amount of yarn to form the loops of the dial needles. By means of the cam the series of loops are held at the point, 12, and finally drawn into stitches at the point, 13, opposite the drawing in point, 6, of the cylinder needles; after which

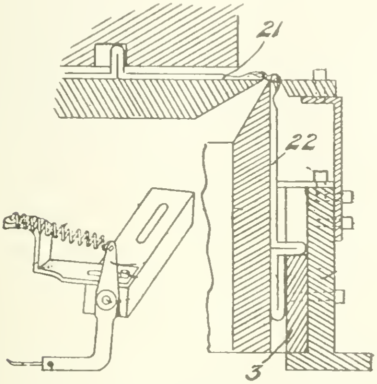


Fig. 4. A Vertical Section of the Machine.

both sets of needles are advanced for the next operation in the usual manner. It will be seen that in consequence of this operation the cylinder needles, when advanced to the point, 5, act as blades or sinkers for the yarn loops of the dial needles, and the dial needles, when advanced to the point, 12, act as blades or sinkers for the yarn loops of the cylinder needles. Each set of needles is thus advanced to serve as sinkers for the yarn loops of the other set.

CLOTH AND SERGES IN JAPAN.

The imports of cloths and serges to Japan in 1912 were 9,180,928 sq. yards, valued at £690,385, or £375,231 less than in the preceding year. Great Britain is the principal supplier (£503,595 in 1912) and Germany second with £128,133. The notable falling off in imports is attributed to the fact that, in anticipation of the new customs duties, large purchases were made in 1911 far exceeding the requirements of the market. The result was an accumulation of stocks, comprising especially light fabrics of pure wool. This explains the decrease in imports of goods of this class and furnishes a reason for the circumstance that the imports of thick cloths are only slightly less than during the preceding period. Japanese consumers are showing an increasing preference for articles of superior quality, both in woollen and cotton goods though as regards cotton goods the decrease in imports of coarse fabrics may partly be attributed to the sale of goods from several native manufactories. The principal articles imported are those of pure wool, amongst which may be mentioned: winter cloths, venetian coatings, serges, black and dark blue serges for the summer, meltons, striped coatings, pilot cloth and stuffs for mantles. The progress made during the last few years has enabled the home industry to compete to some extent with foreign goods as regards serges, but pilot cloth and meltons manufactured in the country cannot compete with the imported cloths on account of their high cost of production and inferior quality.—Chamber of Commerce Journal.

Some Features of Mill Management

By ERNEST TAYLOR.

The margin between the cost of production and the selling price at the present day is so narrow that each item has to be taken into account in order to cheapen the cost of production. To get at these various items, it is necessary to practice a sound system of book-keeping. The firm aim of all mill book-keeping should be clearness; and in addition to the ordinary work of recording the necessary particulars relating to the different materials and processes, such things as the weaving output for each week, the expense incurred by each department, the amount of waste between spinning-frame and warehouse, and such like matters which have a bearing on the cost of production, should be supplied. In quoting the price for a certain article, it is necessary to know the cost of producing that article. Competitive prices do not form an accurate guide in fixing the selling prices, because the conditions in different establishments and districts vary so widely. Two factories selling the same goods, at the same price, may mean profit for the one and loss for the other. By means of a sound system of costing the manager is enabled to know, not only the results of competition, but likewise the profits of prosperous times and the losses of disastrous ones. It also enables him to see the weak spots in his organization, and to know when more economic methods and machinery can be utilized.

In determining costs, two classes of items must be considered:—

1. Those of a permanent character, known as fixed expenses, which are necessarily the same whatever the production, e.g., interest on capital, depreciation, rent, motive power, taxes, insurance, repairs, etc.

2. Those of a fluctuating character, known as contingent expenses, e.g., piece wages, and auxiliary materials, such as soap, dyewares, etc.

These items are totalled up for a given period (according to the class of trade), and having determined the output during that period, the cost may be apportioned as so much per pick, per piece. By applying this method to each department, the total cost of the piece may be definitely arrived at. Further, by keeping a chart showing the number of pieces turned out each week, the manager becomes at once informed of any variation in the output and can set to work to determine the cause. It will be understood, however, that the output in pieces will vary according to the number of picks per inch that are put into the cloth; therefore it is necessary to mark on the chart, alongside the number of pieces, the average picks per inch. It is also useful to draw a second line showing the total amount of wages paid for weaving such pieces.

In the fancy trade, one of the gravest problems to be faced is the control of the yarn store. The two great points to be considered are the control of the colors stocked, and the disposal of the colors which have become obsolete. It must be borne in mind that the final control of the stock of yarns rests with the designing department, as this department chooses, arranges and fixes the shades and yarns to be used. Until the ranges have been shown and taken up by the merchant, the question of stock does not exist, but the moment the first orders for pieces are received, the question of stock becomes important. Firms which do not keep a strict eye on the yarn store are at a severe disadvantage in the matter of prompt deliveries of repeats, and in keeping strictly to shade. The tendency nowadays is for the merchants to place their orders early, and demand patterns at once. They are afraid to confirm until the last moment, and require prompt deliveries. At the end of the season there are far more unconfirmed samples than there used to be. It will be seen that this all throws a great extra strain on the manufacturer. In order to get on with these late confirmations, it is essential that the yarns for them should be in the store ready, and this implies a careful speculation in yarns long before the goods are ordered. Unless this is done the manufacturer will probably be faced with the distressing condition of having a few months' work on hand, with half the looms standing. Now, if such speculation is to be carried on successfully, means must be taken on the one hand to guarantee that there is a reasonable certainty of the yarns ordered being used, and on the other hand, that some continuous outlet is supplied for using up those which cannot be got rid of in the ordinary way. In order to deal with these items, it is important that in choosing the range of shades on which the season's trade is to be based, a definite number should be as small as it is possible to work with, and must be chosen with an eye to every class of effect, from light to dark. When new shades are added, a corresponding number of old ones should be thrown out, so that the general range does not increase. By this means the stock of yarns will be brought more under control, as each individual color will be used more frequently in the ranges, and thus stand a greater chance of being ordered. The yarn foreman will be informed which shades have been thrown out, and so towards the end of the season, he will take care not to order more than he actually requires. In this way he will probably succeed in running down his list of thrown-out shades to a very small weight; and when the list is six months' old, he can proceed to use up the remains according to the methods adopted for dealing with old stock. The usual way is to make a quantity of stock goods, which have to be sold at a cheap rate; but in certain cases, a trade in piece-dyes may prove more satisfactory, as better prices may then be obtained for the yarn. Another way is to introduce darn-dyed black wefts into some of the ranges, the old stock being dyed up for this purpose.

Weaving Department.

Here it is not sound to aim at production only, for unless the pieces are well woven they will require extra labor to be spent in the subsequent departments through which they pass. One instance where output may be lost is in the looming of fresh warps. The usual method is that of twisting-in, an operation performed by young persons generally, who are paid at the rate of $3\frac{1}{2}$d to 5d per score of porties. It is generally performed in the loom, and often two twisters, one right and one left, are engaged, the weaver having to wait until the warp is ready. Now although this occupies only one or two hours, the machine is kept standing, and as it frequently happens that a number of looms finish at the same time, this means a loss or leakage in output. To remedy this, the warps may be twisted in a frame outside the loom, so as to be ready when the weaver finishes. This method will apply more particularly to the fancy trade where the gears require to be changed after almost every warp. In the making of some classes of goods, e.g., coarse tweeds, where only simple weaves are used, the gears are allowed to remain in the same looms for several weeks. However, in this case, if two short warps are intended to follow each other ,they may be twisted together and run onto the same beam so that it will only be necessary to draw the twisted portion through the healds when the first warp has been woven.

It is well to have a record of the looms that will finish in the course of, say, two days, as this gives a better opportunity for providing suitable warps to follow, and often saves a loom from being kept standing. In some cases, where both old and new looms are in use, a different kind of warp beam is employed for each type of loom. This often causes inconvenience if certain warps which are on new beams are wanted for old looms. To prevent such inconvenience arising, brackets should be provided, which may be bolted to the loom frame so as to carry either type of beam.

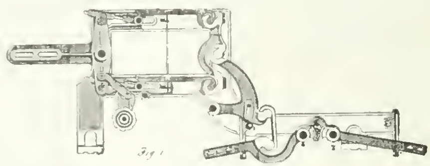
The object of manufacturing being to produce satisfactory goods economically, attention should be given to all details and routine which secure improved output with efficiency of results.

(From the Journal of the Leeds University Textile Students' Association.

Developments in Dobby Mechanism

By Weberei.

During the past few years the makers of dobby mechanism in Great Britain have been paying special



attention to the wearing parts. This have been forced upon machinists by the obvious defects of the old type

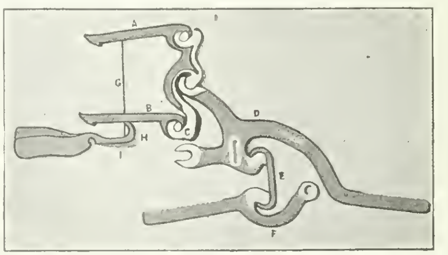


Fig. 2.

of double lift dobby in which the outer jacks were lifted by the inner ones through the medium of toothed segments. This feature is clearly illustrated in Fig. I. This is a sectional view of the ordinary type of dobby, of which there are thousands in use, showing the gearing of the two jacks A and B. Owing to the wear on the teeth of the segments there was a gradual "drop" in the lift of the dobby thus leading to trouble.

To obviate this defect many arrangements have been put forward. Fig. 2 shows a Lupton and Place system in which great bearing surface at the joints is obtained with perfect freedom of motion to all the levers. The joints are so arranged as to retain the oil, each catch working in a small well of lubricant. All the internal parts of the joints are hardened. The arrangement pre-

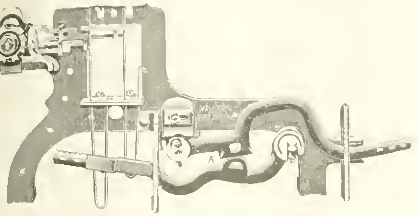


Fig. 3.

vents "drop" in the jack levers thus ensuring a continuous and regular lift at both ends. Moreover, in this arrangement of dispensing with teeth the number of working parts is reduced, one of the shafts being dispensed with entirely. As a result of this reduction in the wearing parts and the consequent friction the amount of power required to drive the loom is lessened. As will be seen from the illustration, the outer jack D when raised by the usual action of the dobby

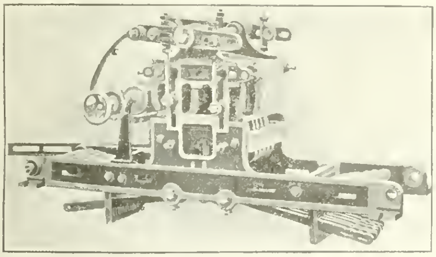


Fig. 4.

selecting mechanism takes with it the link E which in turn raises the inner jack F. The illustration also clearly shows the size of the bearing joints.

Another method of obviating the use of teeth is shown in Fig. 3. In this case the dobby is of a different type, but it will be noticed that the contact between the two jacks at A is a rolling contact and one for which good results are claimed.

Figs. 4 and 5 show a still further development. In this the system of lifting one jack by direct action from

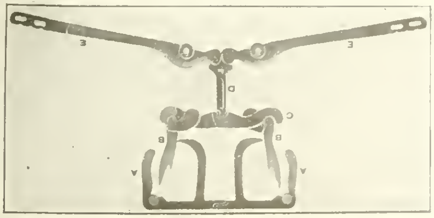


Fig. 5.

the other is dropped and in its place we have direct action on both jacks E through the central plunger D. This latter is worked from the catches B, which are caused to act upon the baulk C by the feeders A. This type of dobby works vertically and as it stands in the center of the loom it can be driven from either side equally well. Of course there being no teeth in the jacks no loss of lift can take place through wear and the construction of the dobby (Walker's) enables parts to be quickly removed and replaced.

Object of Measuring Motion on Openers and Scutchers

By "LECTUS" in "Cotton Factory Times."

Anyone acquainted with the operation of cotton spinning machinery knows the value of having the various portions of cotton that are put in the creels of the machines, lasting a uniform length of time. This applies to laps behind a card, sliver cans behind a draw frame, laps in a comber creel, bobbins in the creel of a roving frame, mule, or ring frame. The particular purpose of the full lap stop motion of an opener or scutcher is to automatically stop the feed and delivery of the cotton immediately a definite length of cotton has been wound upon the lap. Naturally, the placing of a definite and uniform length of cotton upon each lap implies also a definite weight of cotton so long as the cotton is being delivered in a uniform manner, the benefit of this uniformity of weight and length is realized in the fact of weighing the full laps as a test of the uniformity of the cotton in weight per yard, but it must be quite understood that the full lap stop motion does not influence the production of a uniform sheet of cotton any further than indicating to a certain extent whether the lap sheet is uniform or otherwise. As stated, the specific object of the automatic measuring motion is to ensure a definite length of cotton sheet being wound upon one lap after another all the day over. Practically all scutchers are fitted with one or another type of measuring motion.

Types of Full Lap Motion.

Many devices have been more or less used for the purpose, but at the present time three arrangements almost supply the market. These three are:—(1) The ratchet wheel arrangement. (2) The worm and worm wheel motion. (3) The Hunter cog motion. The last named motion has apparently increased in use during recent years, since several of our machine makers now apply it, a recent application may be described as follows: Upon the end of the second from top calendar roller is fixed a spur wheel to the side of which is secured a small projecting finger suitably notched. In front of this wheel is the measuring motion change wheel, sustained in a lever having its fulcrum higher up in the framing. The lower end of this pendulum lever is linked by means of a horizontal rod to the knocking off lever which supports the drop lever. A pointed stud is fastened to the side of the change wheel, and after a given number of revolutions of the calender rollers, this finger comes against the notch in the calender wheel, with the effect of overcoming the resistance of a spring, pushing the change wheel lever away, and removing the latch lever away from the drop lever. This latter lever then falls in to a lower position, and in so doing disconnects the pinion which drives the calenders, so that the latter are stopped as well as the cages which are driven from one of the calenders. At the same time the clutch box which drives the feed rollers is opened by the drop lever action, so that the feed of cotton is also stopped. The beater, fan, lap rollers, and cone drums are permitted to continue working, so there is no loss of time or power, and no variation in the lap, attributable to the constant stoppage and restarting of these parts. In setting out the wheels for this type of knockoff motion it is necessary to adopt two wheels which shall have no common multiple lower than their product, and their highest common division is 1. Then the rule for finding length of lap is very simple.

Rule.—Multiply the circumference of calender by the teeth in the change wheel, and reduce to yards.

Example.—Upon a calender 5½ inches diameter is a 41 wheel driving of 59 change wheel.

$$\frac{5.5 \times 22 \times 59}{7 \times 12 \times 3} = 28.3 \text{ yards in full lap.}$$

Worm and Worm Wheel Measuring Motions.

The worm and worm wheel knock-off motion is a favourite type with some firms, and has been fitted to very many openers and scutchers. The single worm for driving this motion may be fixed either on the end of the bottom plain calender or on the end of one of the two fluted lap rollers. In the opinion of the present writer the latter method is theoretically the better because it allows of a direct and simple calculation which takes into account the draft between the bottom calender and the fluted lap roller. On the other hand the plain calender has somewhat quicker revolution than the fluted roller, and this helps to give a slightly prompter knock-off. It would perhaps help the action of some of these motions if the leverages were altered so that a very slight movement of the latch lever at one end would give a bold movement at the holding point and thus eliminate any tendency to give a somewhat dragging release of the drop lever and a little variation in the length of lap. Such an effect, however, is of little value unless a check of the weight of the lap is regularly made.

Take an example of the worm being fitted on the end of the fluted lap roller. This worm has a single thread and drives a worm wheel of 25 teeth fitted on one end of a short side shaft. At the other end of the side shaft is a change wheel which we will assume to contain in this case 21 teeth. This drives a knock-off wheel of 48 teeth, which has fixed on one side of it a knock-off or releasing finger. The 48 wheel is calculated to make one complete revolution during the making of one full lap, and at the finish of its revolution the releasing finger moves a latch lever arrangement, so as to release the drop lever. This latter promptly falls and disconnects the parts which feed and deliver the cotton.

The short rule for finding length of cotton in one full lap is as follows:—Multiply the circumference of the fluted lap roller by the numbers of teeth in the worm wheel and the 48 knock-off wheel. Divide the product by the number of teeth in the change wheel, and also by 12×3 in order to reduce inches to yards. Assume the fluted lap roller to be 9 in. diameter. Taking the foregoing figures, we work as below:

$$\frac{9 \times 22 \times 25 \times 48}{7 \times 12 \times 3 \times 21} = 44.9 \text{ yards.}$$

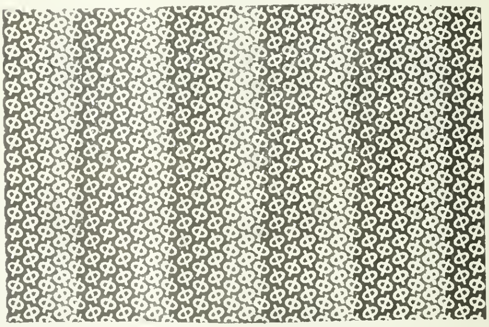
The change wheel is a driving one, and a larger wheel will give a shorter lap because it will drive the knock-off wheel more quickly round. To find, for example, the length of lap fiiven by a 22 change wheel, either the full length method as above could be adopted, or the shorter proportional method can be adopted as below:

$$\frac{44.9 \times 21}{22} = 42.8 \text{ yards.}$$

The rack wheel method of knocking-off is perhaps the most simple of all, but it is probably the least used of the three, and we propose to deal with it only in the briefest possible manner. On the end of the shaft of the bottom calender roller there is fitted a small cam or eccentric which gives one double vibration to an arm or eccentric rod at every revolution of the calender. Each vibration moves the ratchet wheel forward one tooth, and after one complete revolution brings a cam finger against the latch of the drop lever so as to release the drop lever and disconnect the feed and deliver parts of the machine as before explained. This motion is almost the simplest of the lot, but is less widely used than the other two. A change in the size of ratchet wheel, or an alteration in the position of the knocking-off stud in some arrangements, will regulate the length of lap.

PRODUCING SHADED PATTERNS.

For some time there has been a demand for shaded patterns in printed fabrics and in order to meet that demand the engraver of printed rollers has had to pay corresponding attention to his designs. The machines for producing these engraved rollers known as mill engraving machines could only produce engravings uniform in depth. Now a machine has been introduced for producing shaded work similar to the



pattern shown in Fig. 1. It will be noticed that the pattern or small design is the same all over the piece but the depth of the design is so varied as to produce a shaded stripe. This can, however, be altered at the will of the engraver and shaded checks and various styles of shaded stripes produced quite readily.

The special appliances adopted on this machine in addition to those found on the ordinary mill engraver are an arrangement for relieving and resetting the mill (this is the die that is engraved on the roller) without disturbing the pressure and also an adjustable disc and springs for giving various degrees of shading.

British exports of cotton machinery for the eleven months ended Nov. 30, 1913, amounted to £7,597,565, compared with 6,456,239 for the same period in 1912, and £6,219,181 for the same period in 1911.

New Drawing System

Description of Invention by M. Casablancas.

The following detailed description of the new system of drawing cotton fibers on ring spinning frames which eliminates the middle and back rolls and substitutes therefor a mechanism that gave so great a draft as to make it possible to spin direct from slubber or intermediate bobbin is taken from the "Textile Manufacturer," Manchester, Eng. The invention is that of F. Casablancas, Sabadell, Spain, announcement of which appeared in these columns several issues back.

"At the outset it should be mentioned that this mechanism for the drawing of rovings may be applied not only to the spinning of cotton, especially of the shortest fibers, including their waste, but also to all classes of fibers. This improvement not only refers to the mechanism for effecting the stretch, but especially to the technicality itself of the operation of drawing. The essential difference between Mr. Casablancas' improvement and the usual system is that in the latter the retention of the roving is effected by one or various pairs or rollers—two in cotton spinning machines—while in the arrangement of Mr. Casablancas it is effected by two straps between which the roving is compressed in an adjustable manner, as may be seen in Fig. 1, which is a sketch of the new arrangement.

"The two front drawing rollers A and B are of the usual form, while C and D represent two straps. Strap C passes round the rollers E, F, G, H, J, the latter acting as a drag and affording a means of regulating the tension of the strap C. The rollers E and F are positively driven, and transmit movement to the starp C, which by frictional contact drives the strap D. This latter is carried on the rollers K, L, M, the latter acting as a stretcher, being pulled in the direction of the arrow N by a weighted connection. The rollers H and K are both moveable, and their position may be adjusted so as to compress one strap upon the other to a greater or less degree, so as to exercise the requisite restraining influence upon the roving which passes between them. A guide plate P serves to guide the roving from the bobbin to the straps. It will be noticed that the rollers G and L are of very small diameter, even for ordinary staple, but when spinning cotton waste it is especially necessary to reduce the size of the rollers G and L to the least possible dimensions. Also the pressure of the roller L upon G is capable of regulation. By this arrangement it is possible to make the distance between the point of subjection at G L and the nip at A B much shorter than that which may be obtained with ordinary drawing rollers.

"A point of much importance, and one on which is founded the technical principle of the invention, is that the retention of the roving is not effected at one single point, as is the case in roller drafting, where the cotton is held only by a very small surface contact of the rollers. In the new arrangement the surface of retention is spread over a relatively large area of the straps, which squeeze the roving more or less at will by means of the adjustable rollers H and K, quitting the roving very close to the drawing rollers A and B, and allowing of the fibers sliding gently between the straps. It is worthy of note that the rollers G and L, being of very small diameter, quit the fibers more gently than the usual rollers of larger diameter; thus it is much more difficult for the fibers to lap themselves. With the new arrangement it is easy to see that the roving is held across the width of the strap in an elastic and regulated manner.

"Although the analysis of drawing rovings by straps is of a very complex and difficult character, a comparative analysis may be established between the usual arrangement and the improved system, by noting that the fibers in the roving may be (a) approximately uniform in length and super-position as at A, Fig. 2; or (b) unequal in length, but uniforly super-posed as at B, Fig. 2; or (c) unequal in length and unequal in super-position as at D, Fig. 2.

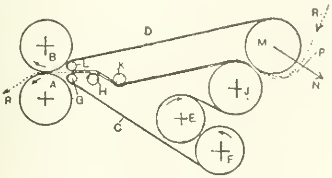


Fig. 1.

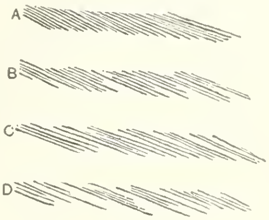


Fig. 2

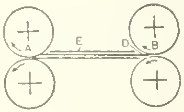


Fig. 3

"With the usual arrangement the fibers can only be held at the point A, Fig. 3, or at D, or floating between A and B as at E. Fibers of equal length, but a little shorter than the distance A B, have a movement determined and uniform, because as soon as they are set free at B they are caught again at A, while the free fibers, as at E, are moved irregularly, because their movement depends only on their adherence to the other fibers with which they are in contact. This adherence is variable during the drawing, and therefore the free fibers E are unequally distributed, and a roving which is uniformly on entry at B is no longer uniform at its exit at A. This is the weak point of the present system of roller draftin, and illustrates the necessity for equal length of fiber in a roving if a uniform stretch is to be obtained with a given spacing of the rollers, because all the roving after the drawing, and this proves further the great advantage gained by the operation of combing. If it were possible to obtain as uniform a roving as the one shown at A, Fig. 2, the drawing would have no greater limit than the relation between the number of the finest thread which might be obtained from the fibers available and that of the coarsest roving which might be introduced with security and uniformity between the holding rollers. For great variations of roving, as at B in Fig. 2, the present arrangement is not suitable, and much less so in C of Fig. 2.

"In the arrangement of Mr. Casablancas the retention of the roving may be effected in a very different manner, which permits of fibers even only one-third of an inch long being caught by the drawing rollers A, B, as soon as they are liberated by the retention rollers

G, L. Therefore, in no instance do loose fibers exist, not even when drawing the very shortest. Further, the adjustment of the reciprocal pressure of the two straps, although they gently hold even the shortest fibers while preventing their becoming loose, permits even the longest ones sliding between the straps without breaking as soon as they are caught by the drawing rollers A, B, thus obtaining great drafts from rovings composed of fibers of unequal length. This cannot be done with the usual system of roller drafting, and it may be understood that great drafts such as this call for an ideal roving, such as A in Fig. 2; but with the new arrangement this may be effected with rovings having fibers rather different in length, as in B, Fig. 2. It would appear, therefore, to be proved by this reasoning that with the new arrangement the importance of combing is much diminished.

"In rovings the fibers of which are not uniformly superposed, as in C and D, Fig. 2, although the advantage of the new system might not appear to be so great, nevertheless it is there, because in the thicker places of the roving this very thickness increases the resistance to slipping of the fibers among themselves and between the straps, which facilitates a more regular drawing than might be obtained from the usual system. These remarks show clearly why the new arrangement is capable of giving drafts of 60-80 and in some cases 100, a thing which would be impossible with the present system of drawing, and which gives to the new arrangement its great value and exceptional importance."

Our Old Country Letter

Short Time—Humidity in Weaving Sheds—Fast Prints —Export Trade.

WOOLLEN AND WORSTED TRADES—IMPROVED CONDITIONS.

(From Our Special Correspondent.)

The question of short time in the British cotton spinning trade is causing considerable anxiety and it is evident that business generally is not what manufacturers would desire. To close down mills on short time means that new orders are scarce and that depression prevails. For many reasons this depression may benefit Canada, as mills on this side of the Atlantic will not be in a position to "dump" all their surplus goods into the Dominion to the detriment of local manufacturers. Too much importance cannot be attached to this short time question in the mills in England from a Canadian point of view. These stoppages are driving trade from the country indirectly and the fact is admitted by more than one mill manager I have been talking to recently. Therefore, the Dominion should be on the alert for any stray business and manufacturers should not fail to advertise the crisis that exists in the old country at present. As an instance of what short time in the mills means here, a week ago the Master Cotton Spinners' Federation met to consider what action should be adopted. The meeting was an unusually long one and the pros and cons of the subject were debated in all shapes and forms. No decision was arrived at and meantime Burnley and other places are sending their mill-hands home each week minus several dollars in their wages.

On the question of artificial humidity in weaving sheds there is a good deal of discussion going on in England and it is now suggested that the subject might be properly taken up by technological professors as there is room for improvement in the heavy sizing. One practical man says that there is too much flour used in heavy sizing; if there was less there would be less artificial humidity required. As is known, flour along with chemical, has a very bad drying effect, and softeners have to be used largely to counteract the harshness on the yarn, and at the present time when yarn is so bad to size one cannot get the necessary penetration Therefore, the taps is called upon for more size to be put on and he is bound to get the harshness, so there has to be more moisture about the shed to keep the yarn soft. One gentleman states: "If you use a soluble starch along with the flour you convert a great deal of the harshness and you have more penetration and less lying on the fibre of the yarn. It has been proved that you get a more even size than with flour alone; the weight is more regular."

* * * *

The other night I heard an interesting paper read paper read by Dr. Herbert Levinstein, in which he described a new process of producing fast prints on textile fabrics. The prints are produced by a recently patented process, using an azo-dye stuff mixed with formaldschyde or some derivation of formaldehyde. Orange, black, blue and brown shades are produced which are very fast against washing. The process is remarkable on account of getting fast prints in such a simple and cheap way; it uses an azo-dye stuff containing resorcinol as a constituent. Dr. Levinstein also dealt with the derivation of indigo. The dyestuffs produced by the processes described possess properties similar to those of indigo, and they are generally produced by introducing into the indigo radich, substituting groups of the type of bromide, arsenic, sulphur, and telurinen.

* * * *

A majority of both spinners and manufacturers are now doing badly or indifferently in England and it is anticipated that a considerable falling off in the export trade will be experienced. There is no easy way of the present depression and demand is not so restricted as to compel drastic methods; perhaps we are not very far from a balance of demand and supply, though supply, if slightly, is definitely in excess. As to cotton supply we are between seasons and the reports of preparations for the new crop are not inspiring. The consumption of American cotton this season will inevitably be in excess of the season's supply, but prices are high and their stability should be an inducement to a large acreage next season.

* * * *

There is an improved change in the English woolen and worsted trades, and though the cost of production has considerably increased manufacturers now report that the outlook is not so gloomy as was the case in Feburary and the beginning of March.

This change for the better in the cloth manufactures of Dewsbury and Batley is giving increased confidence to makers and merchants, although the continued high price of wool suited to the trade is a cause of anxiety. With these places Canada has a big connection, but so far business on Canadian account is slow and is expected to be so for at least another month, by the expiration of which time there may be more active employment for workers in the Dominion. Up to now Canadian orders have been sluggish, as compared with some previous years at this time. The betterment is mainly in tweeds for women and men's wear. In the former some very pretty shades of blue, orange and other colors are seen and designs generally are stylish without being loud. Prices of all qualities are firm, with an advancing tendency. Men's tweeds show a good range of patterns both in low and medium fabrics. Business with the United States is fair, and it is believed that the cheap cloth produced in Dewsbury and Batley will become more popular there in the near future. The blanket trade of Dewsbury, Mirfield, and Earlsheaton is a little busier, but orders from Canada are small. Rug and flannel manufacturers are a little busier and prices are firm.

In Huddersfield manufacturers report that the volume of business passing is satisfactory. There has lately been considerably more animation and if there is scarcely the activity there was at the corresponding period of last year, the upward tendency which started a few weeks ago is fully maintained. It is fairly certain that wool values will not change and this has caused cloth merchants to place orders with considerable freedom and without asking concessions from Huddersfield millowners. Three large firms in this district are busy on grey and khaki woolens for the Turkish army. In worsteds the demand is graually improving, but these goods are not passing into consumption as quickly as tweeds and serges. The Canadian orders for tweeds to hand is reported not to be up to the average, but the manufacturers say the prospects are encouraging. For the States the demand is keen in high-class fancy goods, while the better class of tweeds are being more called for. In Huddersfield practically all the machinery is being run at full capacity and in a few cases in the Colne Valley manufacturers have had to resort to paying overtime in order to cope with the trade. The same may be said of the clothing factories.

Turning to Leeds I find that the wool sales have caused manufacturers to pay 7½ to 10 per cent more money, and as stocks are low, it goes into consumption at once. This will mean that for the cloth orders in future a readjustment of prices for the manufactured article will be necessary. All mills have become increasingly busy with confirmed and repeat orders and the woolen merchants say that orders are coming in better and for larger quantities, more especially for regular goods. The Canadian demand does not show any great improvement, but there is at present a fair trade doing in low and medium woolens and worsteds. At Hawick the mills are also well employed, but there are still idle looms to be found in the district. Here the fine make of cheviots are in demand and some small orders have arrived from Canada. Samples are being shown for spring season, but it is too early to say how they will be taken up. From all acounts the public taste is growing for Saxonies. The hosiery trade of Hawick is also well employed, but new orders are not pouring in steadily enough.

In Rochdale the opening of the new season's trade in March is keeping the mills well on the move. Merchants are examining the new samples and prices are firmly maintained in view of the dearness of wool. Taken all round, it may be said the flannel trade of this district is in an improved condition since my last report and the mills are adopting the policy of buying very little wool. The orders for sports flannels are said to be increasing and those mills which make them are getting busy. Canadian orders are increasing weekly, and millowners say they are above last year's demand. At Leicester there are many regarding the future with caution and anxiety in yarns and in manufacturing, as the position of wool and the advanced prices are attributed more to speculation and in a lesser degree to the increased demand for yarns and orders for hosiery and textiles. Hosiery mills are showing more activity, but the pressure is not to be compared in any way with this time last year. Fancy hosiery makers are booking new business, including a little from Canada, but the glove trade is very moderate so far. Just now many buyers from the States and a few from the Dominion have been seen in the market.

It is evident that a spell of prosperity has set in for the English woolen and worsted mills, and what has struck me very much is the all-round demand in the various markets on Canadian acconut, not to speak of the States which appears to be unusually great.

NEW CARPET YARN.

The "Carpet & Rug Trade Review," in a recent issue says:—

"Under the present conditions of lowered tariff, high cost of raw materials and low selling prices, the carpet and rug manufacturers are successfully experimenting with the new Textilose yarn. It has proven appropriate both as a stuffer and filling, and is said to improve the uniformity of pile fabrics. This Textilose yarn is resilient and elastic and has a woolly surface besides being free from slubs and weak spots, it being claimed that in these latter respects it is more satisfactory for weaving than some other grades of yarn now generallly used. The new yarn has a natural affinity for size and the various dye stuffs, and can be boiled without disintegrating. The base material and fibers used in manufacturing Textilose yarn are crafts pulp, combined with a carefully graded cotton fleece. The yarn is made in various sizes, the finest of which is equal to a No. 2 cotton yarn running about 1,600 yards per pound. This Textilose yarn can be sold at about the same price as jute yarn, with stability of prices assured.

STANDARDIZATION OF SILK.

At a recent meeting of the Bradford Chamber of Commerce a letter was read from the Silk Association of Great Britain and Ireland, suggesting that the time had arrived when, in the interest of the public purchasing silks, there should be a definite statement of the quality in degrees of purity, in a manner analogous to the carat standard of gold—that there should be, for instance, agreed standards of pure silk, standard silk, silk, and weighted silk, with the degree of weighting. The Council were invited to express their opinion as to the desirability of a regulation fixing such standards for the sale of silks. The opinion was expressed that, as regarded the use of silk in connection with Bradford goods, it would be impossible to make any distinction such as that suggested by the Silk Association. There were goods ofa silk warp and wool weft, but even if the goods were of all silk, the manufacturers would not be liable to tell whether they were pure silk according to the standard the Silk Association desired to lay down. As regarded Bradford goods, the proposal was not feasible, and he proposed a reply to that effect be sent. Mr. George Priestman seconded the resolution, which was carried.

Notes from the Eastern States

The Wool Situation—Mule Spinners' Strike in R.I.—Protest against present Tariff—The Textile Exhibition.

Providence, R.I., April 7, 1914.

A great deal of uncertainty prevails among the manufacturers of the United States at this time, due to the lowered tariff which has allowed a great deal of goods to come in from other countries, and to the general attitude of the Administration toward the larger business concerns. A peculiar feature of the whole business is that most of the mills are running at least 75 per cent at this time, and some of them have enough business to keep them going overtime, or with two shifts in some of the departments.

Taking the tariff off wools did not tend to reduce prices any, and at the present time the prices which are quoted in the Philadelphia and Boston markets is the highest that the mills have had to meet for some time past. The supply of domestic wools was practically sold out a month ago, and all that the manufacturers can secure now is foreign wool. The price is too high for many of the mills to take anything that they do not need for immediate use, and the market is very quiet.

Most of the sales that are made are of a miscellaneous nature, and during the past week there was a sale of 35,000 pounds of quarter blood made at 24 cents. Three-eighths and half-bloods are selling for from 21 to 23 cents, and there is practically none of it in the market. It is a far cry to the new crop of wools in this country, and the belief is expressed in many quarters that the mills will not be able to compete with the English mills on the new season's goods.

At this time there is a lot of uncertainty about the goods market, especially in New York. This is a reflection of the condition of the wool markets, and the mills are nearly between the devil and the deep sea. Most of the larger cutters-up have failed to place even fair-sized contracts with the mills, even at the low prices which the new goods were opened at. Those mills which are in the best condition to handle orders in a hurry are the ones which are securing the best of the business that is being given.

Most of the larger clothing houses are holding orders from the mills until they have secured orders from the trade throughout the country, and when an order is given to a mill for a certain amount of goods, the clothier generally wants it delivered the day before he places the order, to quote one of the manufacturers.

So far as the Boston wool market is concerned, the past month has seen nearly all of the available supply of domestic wools withdrawn, and the manufacturers of the East are hard put to secure desirable wools of any kind. Several of the dealers who have held a fairly large amount of domestic wools have secured an advanced price for them during the latter part of April.

The sales of territory wools has largely consisted of odds and ends during the great part of the last four or five weeks, and prices have ranged high. The result of the depletion of the domestic market has given an extra impetus to the scoured wool market, and there has been a good trade in these wools.

The condition of the cotton trade has been very similar to the woollen end of the textile markets. Cotton has ruled high during the greater portion of the past several weeks, and the mills are running out of orders. In New England there is a very small quantity of good white cotton to be obtained just now, and most of the trading that is being done is in the tinted and stained staples.

The mills of New England, especially those of the three great cotton centres of Providence, Fall River and New Bedford have been having their troubles, and at this time there is more uncertainty about the future than the owners have seen for a long while. Labor is restless, and several of the mills are having small sized strikes, one of these lasting for the past 16 weeks, and now threatening several other mills.

The strike mentioned is in the seven cotton mills owned by B. B. & R. Knight in the Pawtuxet Valley of Rhode Island. There a strike of cotton mule spinners started four months ago, and has been on since that time. The company refused to accede to the demands of the strikers which were not well made, and is taking all of the mules out of the mills and is replacing them with ring spinning frames.

The latest move in this strike is to have the spinners in the different mills of Rhode Island which are selling yarns to B. B. & R. Knight, strike in sympathy with the Knight spinners. This move has already tied up part of the Slater Manufacturing Company in Pawtucket, R.I., and the whole of the Warren Manufacturing Company in Warren, R.I.

One of the interesting features of the strike swhich have occurred in Rhode Island during the past month, is the fact that the employes of two of the plants which are under the control of Governor Aram J. Pothier, have struck against new working conditions which the management has requested in the Montrose Worsted Company plant. The workers in this plant are practically all out of work, and the spinners and helpers at the Alsace Worsted Company have struck in sympathy.

The workers in these mills have always profited by the fact that Governor Pothier's father had to work for a living in the mills of Quebec, and later of Rhode Island. The Governor was born in a small village near Montreal in 1854, and was educated at Nicholet College. He came here at 18 years of age, and worked up to become one of the leading manufacturers of New England. He has been Governor of Rhode Island since 1909, and before that held many pubic offices, both in his home city and in the State at large.

In his handling of mill operatives it has always been his policy to pay the highest wages and to make the working conditions the best that he could. In the Montrose plant, where the first strike originated, the weavers were paid higher wages than the average for New England, and were only required to run one loom. The management found that it would be necessary to have the weavers run two looms to compete with other plants running the same line of goods, and this was resented. The mills have not given in to the strikers, and it is said that the Governor will not re-open his plants until the workers are ready to give some real service in return for the many good things which they have enjoyed for the past 10 years. Most of the operatives and all of the overseers were formerly employed in mills of the Dominion, mostly those about Montreal.

There is much dissatisfaction in this country over the new tariff which was hailed as the one thing to reduce the high cost of living. In this it has failed miserably, and the Administration is growing in disfavor with all classes. The prices of ordinary food stuffs which are purchased by the working people, have gone up instead of down, and there are more people out of work than there has been for some time past.

In Rhode Island there has been introduced into the Legislature of the State, a resolution asking that "adequate protective tariffs" be put back by the Government. This resolution was adopted by both Houses without a great deal of adverse comment. This resolution shows the way the wind is blowing, and while it is the first to come from any State, and that State against the Administration as a whole, it is said that there will be more demands to follow.

The mills of all kinds are finding that it is almost impossible to secure business enough to keep them going with any great degree of certainty for the future. It is true that there is enough business to keep most of the mills going for the time being, but the selling agents in New York are not securing the business which they should.

When the recent selling season opened, prices were quoted the lowest that the trade in this country has ever seen. They were set low to keep out the foreign competition that was headed this way. But even these low prices were not enough to line up the clothiers and other large cutters'up for the American mills. Many of the cutters'up investigated the different fabrics which were being offered by both domestic and foreign houses, and the concensus of opinion was that the domestic goods were much better, price for price, than the imported goods. But there is that feeling about the markets that there is apt to be much adverse legislation passed by the Administration against business in general, and this keeps back every line.

The big event that is before the Manufacturers of the country for this month is the textile show in Boston. Already the American Association of Cotton Manufacturers is billed to hold its annual meeting in conjunction with the show, and other organizations are to hold special meetings during the week. Chester I. Campbell has received word from a number of Canadian mill men that they will be in Boston for the show, and it is expected that a great banquet will be arranged for all of the mill men who will be in Boston that week. These will include, also, a great body of men from the South, who are coming North in a specially chartered boat from Norfolk, Va.

The management of the show is making all arrangements to have the mill men see the whole of the city, and some of the near-by textile plants while they are here, and it is believed that the show will be one of the greatest ever held. There has been a slight movement on foot to have the show move to Montreal when it is finished in Boston, but so far this movement has not progressed. The principal reason for this, according to the association which is backing the venture, is the lack of co-operation on the part of the manufacturers of Canada as a whole. It is believed that with a united front, the manufacturers of the Dominion could secure most of the exhibits for Montreal.

After striking out the amendment legalizing pooling, the United States Senate, on March 28th, re-passed the bill to regulate trading in cotton futures.

The Canadian Chamber of Commerce in London has established a British manufacturers' section, composed of nearly one hundred firms, among them some of the most prominent in the country, for the purpose of conducting a campaign to capture a greater proportion of the import trade of Canada of manufactured goods. Another matter that will receive attention will be the Canadian transportation problem, taking into consideration the freight position as it will exist consequent upon the working of the Panama Canal.

The Situation in Toronto

Past Month More Satisfactory and Prospects are Brighter.

Unusually mild weather during the winter just closed coupled with general money stringency, has given those directly interested in the textile trade a bad jolt this year. Losses thus sustained cannot be repaired to any extent. The industry and trade have, however, entered upon better things, and already they have reason to look upon 1914 as a year of prosperity. From interviews with a good many manufacturers and wholesalers, your correspondent obtained decidedly contradictory views. Some said business was still quiet, while others reported trade exceptionally active during the past month. The diversity of opinions is doubtless due to the manner in which different firms have prepared for the vacillating wants of the ultimate consumer, for probably never have fashions changed so radically as this spring. Goods are wanted now keenly, but only those who have foreseen and taken risks in laying in stocks are prospering thereby.

Many retailers, whose custom it was to stock up heavily in winter goods, have been forced either to sacrifice in bargain sales or hold an unusually large surplus over for next winter. This has added to money difficulti es, in preparing for this summer's trade and the result is a general tendency to buy only for immediate requirements. But immediate orders have been heavy for those who have the goods desired. Last year the call was for knitted wear. This year, while the style of knited wear has changed to open fronts, and lapels, the chief demand has been and will be for woven goods. Woven spring coats have been a feature. The demand last winter was for light underwear, especially womens' wear, and heavy lines were largely neglected. One firm sold fifty per cent less heavy, and seventy-five per cent more light last winter, compared with the previous winter, and this was generally the case. A large local woollen concern stated on Saturday that whereas a month ago they were $23,000 behind 1913, at this date they were at least $23,000 ahead, the demand for woven goods being largely responsible. Women are going in for colored fabrics, checks and plaids. Yet plain dress goods ,such as blues and blacks, have not been neglected.

Most of the current demand is coming from Ontario points. The Canadian west is still behind in orders. It is from there that collections have been tardy, and this has put a decided check on buying power. All are agreed that general normal trade will not come until another good crop is assured, for finally the agriculturalist is responsible for commercial expansion or depression.

It is thought strange that prices have been maintained throughout the period in que stion. A Toronto buyer of cottons and other light dress goods, just returned from Britain, stated that latterly these lines could be bought a slight recessions, because the old land has shared in the general depression from which business circles are just reawakening. Woollens, on the other hand, have a firmer tendency, because the raw material has commanded higher prices at the great wool markets. The result has been that manufacturers in the old land have already issued statements warning the trade that advances in prices are in view, blankets beings specified.

In the eyes of local wholesalers and the trade, the products of Canadian mills have no superior. They are becoming more popular, and indications are that the sale of home-made goods in 1914 will not only be the biggest on record, but are destined to grow in favor in advance of imported manufactures.

Glove factories are becoming more active. Local concerns report large orders, which will keep them busy for some time. The call just now is especially for working men's wear, although fancier gloves are not being neglected.

Spring business is opening up satisfactorily in clothing factories. Quite a number are working full time, and stocks are not allowed to accumulate to any great extent. In this department too, the trade has suffered through climatic conditions, as well as from money stringency, and orders from the west are comparatively small to date. Knitting factories in Western Ontario speak disappointingly of business, but it is they who especially feel the tendency on the part of the trade to buy only for immediate needs, because a good deal of their product is for winter wear.

The character of the textile trade is "hand-to-mouth buying," but this has been, and promises to be large enough to more than make up for small early placing orders.

EFFECTS OF BOILING ON COTTON YARN.

The question often arises as to whether raw cotton yarn becomes increased or decreased in strength after undergoing a boiling out operation. The consideration of the question depends upon numerous factors. The boiling-out of cotton yarn with water does not usually bring about any appreciable alteration in strength though a slight diminution may come into evidence when sharply-twisted yarns made from short-stapled material are treated. Boiling-out, however, by the method generally adopted with alkali for the bleaching of cotton hanks, usually takes away some 5 to 6 per cent. of impurities, and correspondingly diminishes the strength of the single fiber.

The influence these alterations may exercise on the yarn itself depends on the twist of the yarn and the tearing strength of the raw fiber. As concerns a relatively light-twisted mule yarn, it should be remembered that the strength of the yarn depends not actually upon the strength of the fibers, but upon its resistance to friction. Upon boiling such a yarn with alkali the fibers become more or less raised, and are thus rendered proportionately weaker. Strongly-twisted warp yarns, treated similarly, and therefore not to be brought into comparison with the other fibers show a slight diminution in strength. It appears that it may be taken for granted that when the boiling-out takes out the fats natural to the cotton, the strength is weakened correspondingly; if for some reason it is desired to avoid this, one course consists in employing the cold method of bleaching, which effects only the removal of the coloring matter natural to the cotton.

Co-related to the question considered is one as to whether cotton yarns become stronger after dyeing, say with the mordant dyestuffs. It may be stated that increased strength to any pronounced extent can only be expected after dyeing when a partial mercerization has taken place at the same time. The influence of the mordant colors may cause a raising of the fiber of the yarn, but the precipitation of metal salts and the color lake thereon generally diminishes the strength.

SILK MAN'F'G. AT PANAMA EXPOSITION.

How the silk worm spins its cocoon and the manufacturer weaves this tread into fabric which is afterward made up into clothing will be fully shown in an exhibit in the Palace of Manufactures at the Panama-Pacific International Exposition in San Francisco in 1915 and the finished product will be worn by scores of beautiful women on a promenade in the Palace.

The entire exhibit will be made up of the various industries in the manufacture of the finished product but will be combined so that to the public it will appear as one exhibit arranged in sequential order.

First will be shown the worms in their cases actually spinning the cocoons and then the method of killing them so that they will not break a strand. In the next booth workers will catch up the filaments of the cocoon on a fine brush, wind them through an eyelet into reels of continuous thread from 800 to 1,000 yards in length.

These skeins will then be passed along to the next booth in which the weavers make the silk fabric and the cloth will be shown in its various stages of manufacture.

The finished product will be given to a department of America's most famous modistes who will measure, cut and fit it upon young women in full view of the public.

At the end of the exhibit will be a lnog promenade, the floor of which will be covered with expensive carpets and the walls with rare tapestries and velvet hangings. Here will promenade scores of beautiful women, wearing the latest models of modish gowns.

The legendary history of the discovery of the value of the silk worm as related by the Chinese chroniclers will be explained in an interesting manner.

It is told that about 4,550 years ago the Empress Li Ling Chi was walking in gardens surrounding her palace when her attention was attracted by a small, ugly green worm feeding upon the leaves of a mulberry tree. Day after day she returned to watch it as it grew to maturity, when it finally spun a silked body. At the suggestion of the Emperor, Hoang Ti, she took the cocoon, disentangled the filament and wove therefrom the first silk fabric.

If the story be true that was the beginning of the world's great silk producing and manufacturing industries. For more than 3,000 years China jealously guarded its monoply of the precious fabric and great caravans journeyed from the cities of the Celestial Empire to Syria and other parts of Asia, laden with woven silks and the raw filaments. The Persians became the intermediaries in this trade between China and Europe, supplying the Greeks and Romans until the middle of the sixth century, A. D.

How two Nestorian monks journeyed from China with a quantity of silk worm eggs concealed in their pilgrim's staffs is an oft-told tale. These eggs were delivered to the Emperor Justinian, who for a time monopolized the silk industry of the Occident, but after his death in 565, A. D., the production and manufacture of silk became widely disseminated.

Last year over 1,500,000 acres were under flax in Canada from which the farmers derived about $17,000,000 for seed alone. It is estimated that if some practical means were available for working the fibre the crop would have been worth at least $50,000,000 more. In Russia, in 1912, the flax area under growth amounted to 1,983,860 acres and the fibres exported, independent of home consumption, was valued at $37,000,000.

Proposition for Establishing Cotton Warehouse

System Represents Co-Operation Between J. B. Duke and Largest American Bank.

Loans Made On Security of Cotton Which Will Be Warehoused.

A special New York dispatch to the Daily Mail, Montreal, in a recent issue, makes the following comment on the proposition for establishing a cotton warehouse system in the Southern States:

"If the proposition for establishing a cotton warehouse system in the South, which represents co-operation between James B. Duke and the largest of American banks becomes fact, then it is deemed probable that, for the first time since cotton warehousing financed by large capital and banking institutions was proposed, the plan will be worked out successfully. Something of the kind has been in the minds of the cotton men of the South and the banking interests both in the South and in the North for years. About 30 years ago, a banking institution operating under a state charter was organized in Massachusetts to do exclusively a warehouse commodity business. The chief offices of this institution were in the town of Northampton, but a branch office was established in Boston, where it was presumed the largest part of the business done by the instiution would be carried on.

"This banking company was organized for the exclusive purpose of making loans upon visible commodities: these commodities to be warehoused until, by the payment of the loan, they could be released.

"The argument was a familiar one in banking circles—namely that there can be no better security for a bank if it negotiates a loan than commodities. Negotiations of that kind were, in fact, almost the exclusive occupation of the merchants' bankers of Europe a hundred years and more ago. If, for instance, cotton be taken as an example, it is safe to report that banking houses which make loans now look upon cotton as a prime security. It can be sold sometimes when bonds cannot. It is visible. It can be weighed. Its quality and its value can be accurately estimated.

"The Massachusetts institution was admirably organized. Its capital was increased from one hundred thousand to five hundred thousand dollars, and its executive officers were men who commanded confidence and respect. At first it seemed as though the business was to be reasonably profitable to the trust company and also of great accommodation. After a while, the discovery was made that the chief peril in the acceptance of a security of this kind was the risk that the commodities would not be appraised at a figure which would represent their safe security value. This did not imply dishonesty, but it did imply inaccurate or possibly incompetent judgment.

"It was something of this kind which Senator Hoke Smith must have had in mind when he recently spoke with reference to accurate and proper grading of cotton.

"A test long enough to give satisfactory results justified the officers of this Massachusetts institution in deciding to liquidate. It did do that honorably and very successfully. Some years later a trust institution of New York was organized for the purpose, in part, of facilitating cotton warehousing throughout the South. The institution did not last very long, although its absorption was not due to its proposed financing of cotton warehousing. The officers of this institution did learn speedily, however, that, outside of possible fraud, there was only one danger in accepting cotton which was in a warehouse as security for a loan. That was the peril of inaccurate appraisal of value and judgment of the quality of the cotton.

"Mr. Duke, who has had long experience in the South, and the managers of the National City Bank, have not been blind to the fact that it is essential that there be highly accomplished expert judgment as to the value and quality of cotton which is offered as security for bank loans. That Mr. Duke and the bank understand this peril is evident from a statement of some of the suggestions made by City Bank experts. One of these suggestions is this: When cotton is utilized as collateral security it should be done with such safeguard that the integrity of this collateral—that is to say the quality of the cotton—would be unquestionably accepted everywhere as assured.

"There are, of course, some minor details to be worked out, but the foundation of this propostion seems now to be pretty well established. The warehouse corporation will probably build a good many new storage houses and will, in addition, take over many warehouses now owned or controlled by large spinning interests. The corporation will operate the warehouses, will inspect the cotton as to weight and grade and issue warehouse receipt.

"If something of this kind had been possible for the Massachusetts trust institution which thirty years ago undertook to loan money upon the collateral security of warehouse commodities, it very likely would not have been compelled to liquidate. The warehouse receipts which were issued upon stored cotton which has been subjected to competent inspection so that its weight and grade could be determined would then be guaranteed by the great warehouse company itself or by responsible banking institutions. Thus guaranteed, the warehouse receipts will become possibly the best kind of collateral security for loans. The plan as put into operation, as it probably will be, should be of the highest advantage both to cotton spinners and to cotton growers. It will also be of great advantage to banks under the operation of the new national banking system. It should provide a large amount of the highest grade commercial paper of a kind which can easily be rediscounted and which banks all over the country would gladly buy. It was undoubtedly this feature of the plan which has persuaded the largest of American bank, and may hereafter persuade other banking interests to give cordial co-operation to the proposition."

CASSELLA COLOR COMPANY.

Diamine Aldehyde Scarlet GG is fully described in Supplement No. 6, to the Cotton Book recently placed in the hands of dyers by the Cassella Color Company.

This new dyestuff possesses very good fastness to washing and boiling in weak acids and is consequently a valuable addition to the well-known series of Diamine Aldehyde Colors of the Cassella Color Company. Owing to the level dyeing properties of this dyestuff it possesses distinct advantages when applied to the dyeing of cotton in mechanical appliances.

Diamine Aldehyde Scarlet G G appears to be particularly advantageous in the dyeing of union goods on account of the cotton taking up the color deeper than the wool, and which enables the dyer to cross-dye with acid dyeing colors to give brilliancy to the wool.

A Short Talk to the Employe for the Employer

By GEO. MacLEAN.

An employee who allows himself to be overworked, lessens his value to the man who buys his services.

But there are at least two kinds of "overworked" people; to which kind do you belong? Think this over carefully, for your decision, and the action, based on your decision are vital factors in your success or failure.

The first kind of "overworked" employee is altogether too common, every employer of experience knows him, and is on guard against the fellow. He is the one who never reaches his work a minute ahead of time, and who watches the clock all day long for the sole purpose of informing himself as to how many hours and minutes more it will be, before the day's toil is done.

This rather worthless fellow is almost invariably a grumbler and is never satisfied. He shirks as much work as possible and, he is always beginning a new task in a heartless manner, as though it was a terrible penalty, the worst of these fellows being that their "shirk and discontent" is a disease, which is infectious. Gradually he produces in others the same symptoms as he himself has. The worklessness that he displays is soon evident in his companions. This fellow is the kind who is sure he is overworked, and that he is worth more to his employer than he is getting. He ought to be; otherwise where would the employer's profit come in? You who hire your services to others must always bear this in mind: Your employer must make some profit in his business; if he does not do this he cannot afford to remain in business.

If he pays you all the profit you earn, then he does not make a cent out of your services.

If an employer understands what he is about he determines to make a certain profit out of employing you.

With that idea of profit fixed in his head, he wonders if it is possible to grant you your request for an increase in your wages.

In all justice to both parties, he should decide what you are worth to him per week, and deduct from that a reasonable amount of profit that he wants for employing you.

The difference is exactly what your weekly salary should be.

The cry, "He's got a pull," etc., all leading to the cry of favoritism, is heard everywhere. As a rule there is very little cause for the charge. Of course, there are some employers who are guilty of showing undue favoritism, but those who do are soon failures, or the man higher up inquires into a few things, then a capable man is put in the favorites place.

It is often heard corporations have no souls. Why should they have? It is not their line. They are engaged in buying materials and services on which to make a profit. And they want just the kind of services that bring them in a sure and large profit.

The man who has such services to sell is always in demand, and at higher prices than are paid to the shirker. In this country there are hundreds of men working for these corporations, who receive higher salaries than the President of the United States. Why? Because they are men who produce results and are in themselves successes, and help to bring the companies for which they work on a higher plane of success.

It is the grumbler, the clock-watcher, who wants all he is worth without allowing his employer any profit who is slated to go, when any discharges are to be made. Don't go on looking for something in return for nothing, and don't expect all you are worth; allow the other fellow a share of your value in return for putting up the capital that makes it possible for you to be employed. Cultivate a sensible view of the question, live up to that view, and you won't be long in discovering that there is a larger balance between your value and the employer's profit. Do everything you do with a vim; do it honestly, as well as industriously. Don't be afraid of overworking, wherever you work; whatever the number of hours, work for all there is in it. Then you will find that your employer will give you all he can afford to do. And the man who is known to work without a watcher, finds the securing of employment one of the easiest things in the world. Look for promotion systematically, and, quietly let your employer know from time to time that you are doing this. Don't take up too much of his time, discussing this subject with him, but continue to keep it in his mind that you are prepared with all your energies to demonstrate that you will be worth more money in a more responsible position.

Steel Belt Power Transmission

(From Our London Representative.)

In England there is a very interesting investigation being carried out into the use of steel belts for power transmission in textile mills. I find that these belts have to a great extent replaced cotton rope drives in a number of important applications, and also leather, and an inexpensive method of conversion has been devised whereby the conversion of a complete rope race can be undertaken on a Saturday midday and be completed with the steel belts ready for running for the following Monday morning.

According to one well-known authority on the subject, Mr. Bernard Kruger, of Manchester, the conversion usually increases the horse-power available at the driven shaft by 7 to 25 per cent and he says that assuming that the necessary conditions could be fulfilled, steel belting transmission is guaranteed to give the following advantages:—(1) An efficiency in power delivery of 99 to 99½ per cent, as against a loss of from 4 per cent to 15 per cent in straps and 6 per cent to 25 per cent in ropes. (2) Great Steadiness — a necessity for paper mills. (3) Favorable use of space. The distance of pulleys are optional to a great extent, depending on the speed; a perpendicular drive is no disadvantage for steel belt driving. (4) Absence of stretching. A steel belt does not stretch by use, as has been shown by five years' experience. (5) Even running and freedom from slip. Transmission by steel belt is uniform and invariable. (6) Narrower width. A steel belt is only about one-third as broad as a corresponding leather belt, consequently the pulleys would not cost so much. (7) Greater power under present conditions. In cases where the pulleys are limited in size it is often possible to get an increased power transmitted by the use of steel belting without any re-arrangement. (8) Cool bearings; (9) Cleanliness; (10) "Unwearability." Steel driving belts have now been in operation for six years, and tests made of the belts used at the first showed no signs of deterioration. It seems evident that the life of a steel belt is unlimited.

Dealing with the cost, Mr. Kruger says that owing to each steel belt-drive being priced on its own individual merits and conditions, it is not possible to give a statement of prices in the same manner as would be applicable to belting or ropes. "I give," he said, "particulars of a drive in which the costing has been calculated as against an equivalent drive by ropes and leather. The comparative initial cost, if new installation, is:—Ropes $1,152, leather belt $1,176 and steel belt $864.80. The minimum loss of power given with ropes and leather belting as against a maximum loss given by the steel belt and worked out on a financial basis showed the loss to be:—Rope $324 per year, leather belt $216 and steel belt $27.55 Mr. Kruger added that there is no question as to the practical success of the Eloesser system and it could no longer be considered to be in the experimental stage.

Recently a great deal of interest in paper and industrial circles has been manifested in this steel belting, and from what I can see and hear, I believe we are on the road to success now in adopting a system of steel belting for power transmission. Manchester and Lancashire men are elated over it.

TARIFF CHANGES.

The tariff changes of importance to the textile industry effected by the new tariff schedule submitted by the Finance Minister are as follows:

Garnetted wool waste, in the white, transferred to the free list instead of being dutiable at 7½, 10, and 12½ per cent.

Jute or hemp yarn, plain, dyed or colored, use limited to prevent free importation of twine.

Linen yarn for hose, is transferred to the free list where the general tariff was formerly 25 per cent.

Jute, canvas, uncolored and not finished, transferred from free list to 7½ per cent., 10 per cent. and 10 per cent.

Silk in the gum or spun silk for silk thread, transferred to the free list.

Buttons of vegetable ivory changed from 22½ per cent., 30 per cent. and 35 per cent. to five cents per gross plus 20 per cent., five cents plus 30.

The provisions for drawbacks include: Yarn, composed chiefly of wool, No. 30 and finer, in white, when used in the manufacture of socks and stockings, 99 per cent.

The imports of cotton machinery into Japan in 1913 were valued at 34,358,844 yen, compared with 28,289,431 yen in 1912. Exports of cotton yarn increased from 53,680,797 yen in 1912 to 70,997,538 yen in 1913. Woollen and worsted yarns, on the contrary expanded from 8,225,051 to 10,01,604 yen and woollen cloths from 6,911,278 to 10,501,803 yen. The exports of raw silk increased from 150,324,733 yen in 1912 to 188,884,182 yen in 1913.—Yen = .498.

Cotton valued at $2,500,000 was destroyed by fire on March 23rd at Bombay, India. It was stored in sheds ready for shipment.

The Importance of Good Winding

Good Winding is the First Essential to Good Knitting.

By F. L.

Some years ago while discussing the relative merits of various makes and designs of stop motions to an old-time practical knitter in one of our Canadian mills, he observed that the most efficient automatic stop motion he had ever seen was a good careful girl at the winder. And he was right. Years of observation have convinced the writer that good winding is the basis of all good knitting and most knitters will heartily endorse this. How then is the winding problem to be solved?

We have, here in Canada, probably every known type of winder. Most of the older machines are of American make, and there are also some English and German. Within recent years Canadian built winders appear to be in general favor and to command most of the business.

Generally speaking, all winder builders have adopted one standard bobbin as correct in size proportion. This is 17½ in. high with a 6 in. base and covered with red flannel. Various expedients have been adopted from time to time, even in so simple a matter as in bobbins and various sizes up to 19 in., various angles of base, various methods of driving the same with a groove across the bottom or with a hole engaging keys and pins have been adopted. It is doubtful, however, if a position drive is desirable because this means that the yarns on a matted skein instead of drawing tightly and indicating trouble to the attendant, will break and continue to break until the source of trouble is removed.

The writer has seen bobbins covered with corduroy, flannel and felt, while others again have been serrated or filled with grooves with the evident intention of holding the yarns, and others have the head of the bobbin beaded for the same purpose. It appears, however, as if the standard flannel covered bobbins were giving the best results.

Tensions, heart cams and variable speeds are the vital features of the winding problem. Nearly every knitter has professed at some time or other to have discovered a new and improved shape for heart cams that would solve all the trouble, but in most cases they have fallen back on the cams supplied with the machines. This is a quite plausible field to exploit, and the writer confesses to having been carried away by the mechanical lure.

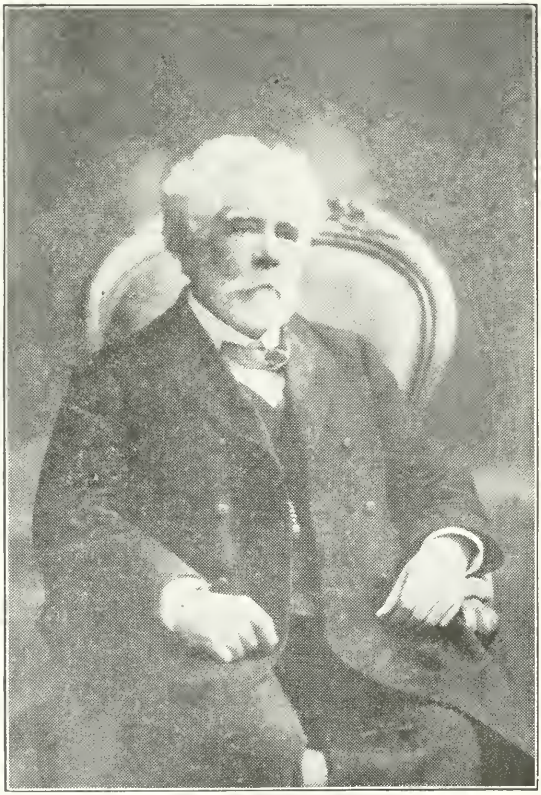
Two causes of bad winding are very common, and both can be put in order very easily. In the first place who is chosen to run these machines—no one; any girl who proved inefficient at knitting, looping or running an overseamer. The smallest, cheapest and least intelligent help that can be found is promptly consigned to run the winder and the result is bad winding, bad knitting and waste. Poor winding comes from a poor operator and poor knitting ensues.

Apart from the various defects incidental to poorly designed and proportioned bobbins one fault common to all types is that holes through the centre of the bobbin that should fit the spindle reasonably well are bored or burnt out with a heated iron rod until they are as much as ¼ inch too large. This invariably leads to trouble, and is one of the chief causes of soft nosed bobbins.

Variable speed devices have been designed since winders were first built, but with the band driven types of machines a convenient form of variable speed was never acquired. The attachments were ungainly and required as much additional power as the running of the machine itself. Belt driving between taper cone pulleys get opposite one another in reverse position, seemed the only method until the friction drive of spindle was adopted. This has led to a vast simplification of the trouble and now the driving shafts float backward and forward across the face of the friction plates in perfect accord with the rise and fall of the cop rail, gradually increasing the speed of the bobbin as the buider rises to the top so that uniform consumption of yarn is attained and consequently uniform strain on the yarn. This is, of course, absolutely necessary in all proper skein winding, and is also desirable in winding from cop spindles, jack bobbins or in rewinding cones.

The Late D. K. McLaren

Few men not actively engaged in textile manufacturing in Canada were better and more favorably known to the industry than the late David Keay McLaren, who died March 18th in Montreal. As president of Messrs. D. K. McLaren, Limited, belting manufacturers, of Montreal, the late Mr. McLaren was closely in touch with the manufacturing interest of the country and always maintained a close acquaintanceship with these interests, until his name has become a by-word throughout the Dominion.



He was born in Perth, Scotland, Feb. 20th, 1835, son of the late Wm. McLaren. He came to Canada in May, 1852 and went to Southern Vermont, where he was engaged in the boot and shoe business under the late James Linton, boot and shoe manufacturer . He returned to Montreal in 1864, and since then has been a resident of Montreal. On his return he continued in the same line associated with his brother under the name of Wm. C. McLaren & Co., for some years. Mr. McLaren later became connected with his brother, the late J. C McLaren, in the belting business for about eighteen years, and founded the present business in 1896, which was incorporated as D. K. McLaren, Ltd., in 1907. He was president of the same up to the time of his death.

Associated with him were his two sons, Mr. W. Fred and R. M. Walker McLaren. He was an active member end supporter of the First Baptist Church, and Y.M.C.A. of this city.

Mr. D. K. McLaren is survived by his widow, two daughters, Mr. D. S. Wood and Miss Grace McLaren, and two sons, Mr. W. Fred and Mr. R. M. Walker Mc Laren, and one brother, Mr. Wm. C. McLaren, of Guelph Ont.

MILL AND GENERAL TEXTILE NEWS

Messrs. Bates & Innes, Ltd., Carleton Place, Ont., have recently installed an additional set of cards.

E. C. Short has resigned his position as overseer of finishing with J. A. Humphrey & Son, of Moncton, N.B.

Harry Twigg has resigned his position as foreman dyer with the Standard Woollen Company of Toronto.

Messrs. Joseph Simpson & Sons of Toronto have installed four sock machines and will manufacture plain wool socks.

Charles Lewitt, who has been in the West during the past few years, has joined the Hamilton and Lewitt Knitting Co. of Amherstburg, Ont.

The new plant of the Canadian Flax Mills, Ltd., at St. Catharines, Ont., is now under operation. Power was turned on for the first time on March 21.

H. T. Robinson, late overseer of carding with the St. Anne Branch, Dominion Textile Company, has accepted a similar position with the Otis Company, Ware, Mass.

The Northern Knitting Company of Winnipeg, Man., are erecting a factory at north-west corner of Austin Street and Selkirk Ave., East, in that city to cost $17,500.

The Excelsior Needle Company, Torrington, Conn., plan to erect an addition to the business plant of the Corey Needle Company, at Bedford, Que., recently purchased by them.

A. H. McManus, late superintendent of the Magog Branch Dominion Textile Co., has been appointed chief clerk at the Hochelaga Branch, succeeding Geo. Hartley, who is now chief clerk at the St. Anne Branch.

J. W. Willis, of the New Brunswick Woollen Mills Co., Golden Grove, N.B., has installed several machines for knitting stockingette. This company was incorporated in 1903, and the equipment includes two sets of cards and 600 spindles. Blankets, flannel and homespuns are still manufactured.

Messrs. Boyd, Caldwell & Co., Appleton, Ont., have recently installed one Harley-Kay Winder, 25 Harley-Kay Sock machines and 3 Beattie loopers, supplied by the Harley-Kay Knitting Machine Co. of Georgetown, Ont. Wm. Grahame, formerly with Messrs. John McMurchy, of Huttonville, Ont., is in charge of the knitting department.

Harry Harrington, a foreman in the employ of the Oxford Knitting Co., Woodstock, Ont., was recently fined $40.00 for stealing underwear and patterns from the mill. Harrington, who drew a salary of $30 a week, was foreman of the finishing department, and as such had the opportunity of selecting the best grade of goods the factory made. When he appeared in court he stated that he had taken the garments to use as samples for a factory which he intended to start near Buffalo, and for which he had already commenced selling stock in Buffalo and other American points. He was let off on suspended sentence, after being fined $40 and costs and upon returning the stolen goods.

Charles Neidner Sons Co. of Montreal, manufacturers of linen and cotton hose, have removed their office, warehouse and factory to Coaticook, Que. The town has granted certain concessions to the company for the erection of a factory. This concern is a branch of Charles Neidner Sons Co. of Malden, Mass., manufacturers of cotton electric tubing and linen fire hose.

W. R. White has resigned his position with the Canada mill, Canadian Cottons, Ltd., Cornwall, Ont., to accept a position with the York Mills, St. John, N. B. Mr. White was tendered a banquet by the overseers of the Canada Mill who presented him with a club bag together with an address testifying to the esteem in which he was held.

Flax Towels, Limited,

This new company has just been organized to erect a plant at Gravenhurst, Ont., for the purpose of manufacturing linen towels and coarse linens. A linseed oil mill will also be built. The company has a capital of $100,000, most of which has been subscribed locally. The directors are: Dr. J. A. C. Grant, D'Alton Campbell, Geo. E. Clipsham and A. C. Meldrum, all of Gravenhurst. The latter is the managing director.

Wallaceburg Knitting Co. Extends.

The Wallaceburg Knitting Company, Wallaceburg, Ont., have recently installed some additional equipment including 1 set cards, 1 mule, 1 winder, and 8 knitting machines, and have thoroughly reorganized the business. Geo. Kirby is in charge of the knitting and John Fligg of the carding and spinning.

Colin C. Denoon, Dead.

Mr. Colin C. Denoon, proprietor of the knitting business on St. James Street, Montreal, operated under his name, died at his home in that city on April 3rd last. The late Mr. Denoon was well known in the industry, and his death is greatly regretted.

Will of Wm. Algie Probated.

The will of the late William Algie, proprietor of the Beaver Woollen Mills, at Alton, Ont., has been admitted for probate. The document is a very brief one containing only one page of typewritten matter. The two sons of the deaceased are not mentioned in the will at all. Deceased left property amounting to $87,000, of which $48,929 is personalty and $37,960 realty. The stock on hand in the mill is valued at $39,155 and the equity at $37,960. All of the above property is equally divided among the widow and four daughters of the deceased, Mrs. Dorrington, Mrs. McIntyre, Mrs. Mason and Miss Phoebe Algie, with the exception of a legacy of $500 which is bequeathed to Miss Margaret Moore, forewoman of the mills, for faithful services.

Oxford Mfg. Co., Annual.

The annual statement of the Oxford Woollen Mills, Oxford, N.S., showed an increase in sales of twenty-five per cent, and a satisfactory year's business in general. All accounts had been promptly met and the outstanding bills payable at the time of the declaration of the thousand dollars. Allowing for dividend distribution five per cent dividend were computed at less than two there was still a cash reserve in the bank, instead of an overdraft. During the past year a bond issue of $25,000 reached maturity. This was not entirely provided for by a sinking fund, a large portion being met out of the earning power of the industry.

The board of directors stand as appended: President J. A. DeWolfe, Oxford; Vice-President, J. S. Hickman, Oxford; Secretary Treasurer, R. R. Hickman, Oxford; Directors T. W. McLellan, Mrs. May Cameron, Oxford, and Albert H. Buckley, Halifax.

Arprior Felt Co. Extends.

The Arnprior Felt Company, which, as announced in our last issue, has operated the woollen mill at Galetta, Ont during the past few months are now preparing plans whereby a new mill will be equipped at Arnprior, Ont., for the purpose of manufacturing paper, pulp and sulphite felts and mangle cloths. Three sets of 48 in. cards will be installed, as well as spinning and finishing machinery and several felt looms. The plans and specifications are not yet complete. J. T. Griffith, formerly general manager of the Lachute Knitting Co., Ltd., Lachute, Que., and an experienced manufacturer of felt goods, is manager of the Arnprior concern.

Horn Bros. Acquire New Addition.

A by-law was carried in Lindsay, Ont., on March 24 fixing the assessment of the Horn Bros. Woollen Co., Ltd., for a period of ten years and allowing for the purchase of the Cornell Brewery by the Town, for the sum of $7,500.00. This property will be turned over to the Company which will erect a new addition, and will have a railway siding run into their works. The work will be commenced at once and considerable new machinery will be installed. The Company will employ 300 hands when the extensions are completed. The vote was one of the laregst ever polled in Lindsay and was almost unanimous.

Smart Woods net Profit $214,883.

The financial statement of Smart-Woods, Ltd., presented at the annual meeting of the shareholders some weeks ago, and which was not given out for publication at the time has now been made public.

Net profits amounting to $214,883, equal to 14.32 per cent on the preferred stock and 7.64 per cent. on the common stock, is shown for the year. After paying deferred dividends amounting to $99,808, and common dividends of $74,944, a surplus of $40,131 was carried forward and with the previous surplus of $126,591 makes the total surplus on December 31 last $166,722.

The balance sheet for the year places the total assets at $4,890,643, the principal items in which are: Real estate, plant, etc., $1,112,438, as compared with a value of $758,144 placed upon it in 1912. Stocks on hand amount to $1,004,614. Investments are $1,131,100 and goodwill is covered by an item of $890,924, as compared with $831,207 for the same item in 1912.

Monarch Knitting Co. Annual.

The description of business during the last few months of 1913 had a serious effect on both the volume of business and profits of the Monarch Knitting Company. With net profits to November 30, 1913, of $171,-492 the company earned 22.8 per cent on the $750,000 prferred stock issued. The profit and loss balance brought forward of $140,278 is equivalent to 18.8 per cent on the preferred issue. Mr. F. R. Lawlor, the president, points out that "owing to the unseasonably mild winter weather the trade is carrying over considerable stock and will, we believe, be conservative in their bookings for 1014." Under these conditions the directors considered it advisable to discontinue payments of the common stock dividends (which in 1913 called for a disburseemnt of $61,750) and to build up a substantial reserve.

Hewson's Likely to Re-Start.

Although the report of the committee of shareholders of the Hewson's Pure Wool, Limited, of Amherst, N.S., has not yet been made public, it is understood that a practical form of reorganization will be suggested. The committee will report that the business has been adversely affected by bad trade conditions, and insufficiency of working capital, but that fundamentally the business is sound and the plant and mills in excellent and efficient condition, and that it is therefore justified in recommending the addition of further working capital and the future operation of the business. It is understood that some feasible scheme of providing capital will be presented at a special meeting of shareholders, to be called early this month, for the purpose of considering the committee's report, and taking such action thereof as the company may decide. The report will probably call for a further issue of bonds or first preferred stock if the company is to be continued. Otherwise it will be a question of foreclosure by the bondholders, who have a good plant to offer and little else. The outcome will be watched with much interest, and the censure on the directors, if any, will be scrutinized with more or less curiosity.

Reliance Knitting Co., Enlarge Plant.

We understand that the Reliance Knitting Co., Ltd., of Toronto, are installing a plant for the manufacture of hosiery—silk, lisle and cotton. The capacity to start will be 200 doz. per day, and samples of spring lines will be ready for the trade in a few weeks. This firm now manufacture an extensive range of sweaters, men's ribbed underwear, combinations, and hosiery.

Messrs. R. G. Long Co., in New Quarters.

The damage done by fire to the plant of R. G. Long & Co., Toronto, as stated in last issue, has not deterred this firm from getting started again. The company has secured very suitable quarters at 439 Wellington St., West Toronto, and expect to be in full operation in a few weeks.

Scott & Williams New Showrooms.

Messrs. Scott & Williams, Inc., 88 Pearl St., Boston, Mass., manufacturers of kniting machinery, announce the opening of offices at 366 Broadway, New York, where there will be an operative showroom with a full line of knitting machines, and a complete assortment of hosiery and underwear samples. Any officer or representative of the company may be met there at any time by appointment.

THE FLAX FIBRE INDUSTRY.

The Hon. W. T. White, in his budget speech, stated that the Government would make an investigation to determine whether or not the flax fibre industry could be advantageously developed and whether a bounty should be granted.

The United States Census Bureau reports the 1913 crop grown in that country at 14,767,151 bales of lint and linter coton, which had an aproximate value of one billion dollars. This includes the value of the seed. The 1912 crop was worth $920,000,000, and that for the year 1910, which made the previous high record, $963,-000,00. For the first time, the figures for last year's cotton crop do not include linters. The Bureau has given up its old method on theg round that with the installation of modern machinery closer delinting of seed has largely increased the quantity of linters, and at the same time lowered the average quality of the fibre, so that now only a very small part is used as a substitute for lint cotton.

The number of running bales of lint cotton, counting round as half bales, was 13,964,981, and of linter cotton 629,019 running bales. This compares with 13,-488,539 running bales of lint, and 602,324 running bales of linters last year.

THE MARKETS

THE BRITISH MARKETS.

(By Our London Correspondent.)

It is quite evident that stocks of wool are low all round, and the advance of 7 to 10 per cent at the London wool sales for crossbreds has clearly shown the existence of large requirements. Great firmness has been the main feature of the sales and all good greasy and scoured merinos have often distinctly stiffened. As to cross breds the best styles fully maintain their ground, America and Scotland being particularly interested in them. Ordinary sorts no longer find the same eagerness on the part of Yorkshire topmakers and consequently sold slightly at a lower level. The chief complaint of the manufacturers now that the sales is over is the dearness of the wool, resulting in smallness of profit, and this dearness has hung orders up all over the country to such an extent that now, when they are let loose, so to speak, the mill find it difficult to cope with the work as delivery is urgently wanted.

The East India wool sales in Liverpool produced a poor selection this month, but the demand is good, so much so that prices have jumped another 5 per cent. The Glasgow and Leith wool sales showed a very slight advance on home wools, but this was to be expected as they have been very little affected of late. There was a good demand, and sellers seemed satisfied. At Dewsbury, Huddersfield, Rochdale and other places all classes of wool have been exchanging hands on the hand-to-mouth scale. It is quite evident that users must come in now and purchase to fulfill the orders on hand. Quotations are about as follows:—

Tops.

40's Colonial tops, prepared	33	cents.
40's Colonial tops, carded	29	"
46's Colonial tops, prepared	29	"
40's English tops, average	33	"
40's Devon tops	33	"
36's Devon tops	32	"

Yarn.

1-36's Demi lustre (40's-44's) English per gross	8s	0d.
2-32's Worsted (40's crossbred, per lb.	1s	9d.
2-16's Worsted (40's) crossbred, per lb.	1s	7½d.
3-12's Hosiery white (40's), per lb.	1s	8½d.
3-12's Hosiery white ((46's), per lb.	2s	0d.

BRADFORD WOOL MARKET.

(Special to Canadian Textile Journal.)

Bradford, March 22, 1914.

Everything may be said to be marking time, though some of the best features which have been the reassuring element recently are still visible. The struggle over prices is still somewhat undecided and consequently business is slow and dull. A slight decline occurred in crossbreds and merinos in the London wool sales and this new feature tempted users to do their level best to secure tops at cheaper rates. Topmakers, however, were firm and any sales they record have been effected at the highest prices yet made. There is no doubt stocks in Bradford are low—much lower than one could ever guess at this time of the year when trade is showing an improvement all round. The position in regard to crossbreds is now unchanged. Spinners are of the opinion that they will be able to buy very shortly medium and low descriptions at a slightly lower rate if a definite offer was made, but topmakers insist that there will be no room for concessions. The greatest need which is being felt is more business, for though particulars for yarns are coming in regularly there is little other encouragement. Yarn prices are generally steady; the tendency would seem to be a little easier, but more enquiry would soon tighten them up again. English wools are all being quoted at full prices, but no amount is being sold. Holders persist in asking prices above the Bradford level and as this way of doing business is likely to continue Bradford market is featureless. In Mohair there is just a small steady trade in fine and low sorts, and users are nibbling at the medium qualities, but reject substantial weights.

With regard to yarns, merchants are doing very little either with the Continent or any other place. Particulars, however, are coming in well for warp yarns, and delivery is usually wanted quickly. Business in mohairs is quiet. In the Botany trade, spinners cannot dispose of their full production, but they are not sacrificing the advance they recently obtained from buyers.

DUNDEE JUTE MARKET.

(Special to the Canadian Textile Journal.)

Dundee, March 22, 1914.

A quieter feeling has again crept into jute branches of the market, consequent upon raw material showing a slightly easier tendency. Further curtailment of production in weaving is also notified and the movement is spreading in that connection. Sellers of first marks are prepared to pass contracts at £31 10s to £31 15s. March-April shipment, daisee middles for the same position are going at £33 5s. The new position in jute has had a detrimental effect upon jute yarns and cloth and here, too, quotations are slightly lower. In yarns common 8 lb. cops are named at from 2s 6½d to 2s 7d, and medium spools at from 2s 10d to 2s 10½d. Only small quantities of hessians are being taken off. Quotations for 10½ oz. 40 in. range from 3 14-48d to 3 15-48d, with 8 oz. at from 2 39-48d to 2 40-48d. Everything depends upon the views of speculative sellers, and bids are necessary definitely to determine the lowest rates practicable.

In London diminishing supplies and a good demand from the Calcutta mills gave the opening of this market a more active appearance. Trading, although not particularly strong, was sufficient to keep prices on the up-grade for both spot and shipment until an advance of about 20s per ton was recorded. The subsequent withdrawal of support from industrial centres led to a set-back in shipment quotations, Native First Marks now being offered, although sparingly, at £31 15s. The spot position, however, has remained practically unchanged. First Marks continue to change hands at from £33 to £33 5s, according to quality; Medium grades, top numbers £30 10s, lower number £27 10s. Heart SCC grade is plentiful and difficult to sell; top numbers offer from £20 to £23 10s and lower numbers from £18 to £22. Ordinary Native Mixing Cuttings have been sold at £5 10s on the spot, and £5 5s has been accepted for forward.

Spot values are about as follows:—

	£	s.	d.		£	s.	d.
Good White to Best	33	0	0	to	40	0	0
Good	25	0	0	to	33	0	0
Medium	21	0	0	to	24	0	0
Common	16	0	0	to	20	0	0
Rejections	10	0	0	to	15	0	0
Cuttings	6	10	0	to	11	10	0

THE COTTON MARKET.

The dullness which kept the cotton market in a rut during the month of February was suddenly followed by the greatest activity during March. We mentioned in our last issue that a squeeze of the March shorts seemed very probable, and they surely were squeezed to the limit.

March was quoted 12.06 on the 3rd of March, and went up steadily until it reached 13.40 on the 31st, an advance of nearly $7.00 per bale. Outside of the very evident manipulation, this rise is in line with the statistical conditions. The takings of the mills are still larger than last year (about 200,000 bales more on the 4th of April). The visible supply of American cotton is less than 200,000 over last season. The scarcity of good grades is felt more and more every day, and the news from the next crop, as far as planting conditions are concerned, are not too good.

Under present conditions, it looks as if the advance could very easily be sustained, of course, with fluctuations up and down. The old crop months are held very firmly by very strong interest. The Southern merchants do not show any sign of weakening. There is now no more cotton left than last season to be distributed to consumers, and it is certain that the quantity of bad cotton, bollies, low grades, bad staple, stains, etc., is very large, leaving less good cotton than last year to be bought by the mill.

The May option is now the spot month and, from the way it is acting for the past few days, it will, no doubt, be carried up like March.

The New York stock is not very big. It is insufficient to protect the large short interest outstanding. Very little cotton was shipped to New York when March was selling around 13c, and it is not likely that the south will ship there with May at 12½. We may, therefore expect the same display of strength, unless something new devlops regarding the planting of the new crop.

We consider the situation dangerous for the summer months. Any serious set back to the planting of this crop would certainly create a stampede of the shorts. On the other hand, we need a very large and good crop next season to compensate the poor quality of the present one. Therefore we consider that prospects should be exceedingly fine to have a decided offset on values. Even with such problematic brilliant prospects, we think that only the value of fall months would be influenced by them, as it will be fully six months before the new crop becomes available.

THE PRESENT WOOL SITUATION.

The chief interest during the past month in the market for raw material was centered in the Colonial sales where prices advanced all along the line, due to the heavy demand from British and American buyers. The sales closed with Cape wools 5 per cent higher, merinos 10 per cent, and crossbreds 5 per cent dearer than the closing prices at the previous sales in January. Prices during the course of the sales had gone higher, but the last week found the demand somewhat restricted owing to the fact that buyers had satisfied immediate requirements. Since the close of the sales, prices have maintained for merinos, and crossbreds bought toward the end of the sales are selling in fair volume, a good deal of buying being for American account.

Local dealers have done some good business during the month as a number of mills have been forced to come into the market. Conditions have improved very satisfactorily during the month with the result that most of the woollen mills are now comfortably filled with orders, sufficient to carry them over to the fall season. Several concerns are still working short time, but it is expected that these mills will have been put under full operation before the end of this month. Those knitting mills on men's wool underwear might be said to be moderately busy, but the sweater trade continues very slack and a number of mills on these lines are working short time. The wool sock trade continues very active, and several mills were compelled to call in their samples during the past week or so, being filled with orders up to their present capacity.

Manufacturers are confident that little improvement will be shown this season over the present situation, and are not disposed to manufacture for stock. In this they are upheld by the present high prices for raw material and the general trade slackness. There is likely, however, to be a large volume of repeat orders, and a big fall business. In the meantime a good many of the mills will have a chance to re-organize some of their departments.

THE MAIN DRIVE.

Belts are an item of considerable importance in textile mills, so that the more information one acquires on the subject of belting and drives the better. "The Main Drive," issued by the Federal Engineering Company, Ltd., of Toronto and Montreal, is one means of obtaining some of that information. After a description of the belts made by this firm the book contains photographs of and information regarding the many conditions under which these beltings—Scandinavia, Lanco Belata and Yeon—are running at the present time, thereby giving the reader such information as is necessary to guide him in the best selection of belting. The belting supplies handled are illustrated and described, and the latter half of the book is given over to general information on the subject of belting and other lines handled by the company. The booklet is full of useful information, and may be obtained on application.

"Correction."

In the article on "The Cosmos Cotton Company" in last months' issue, the author gave the number of spindles as 12,000. This should have read 21,000.

Change of Address.

Messrs. Charles F. Taylor, successor to the Burgess Cop Tube Company, sole manufacturer of Burgess or Taylor Cop tubes for cotton, flax and silk spinners, winders, etc., announces change of address from 15 Custom House Street, to 57 Weybasset Street, Providence, R. I.

London advices state that India promises to have a bumper cotton crop this season. The latest estimate places the area under cotton at 23,900,000 acres, or 3,-0000,000 acres ahead of last year's figures, which means an increase of 14 per cent. On the other hand the total outturn is expected to reach 4,900,000 bales of 400 pounds each, against 4,300,000 bales last season.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

New York Office, 206 Broadway.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI — MONTREAL, MAY, 1914 — No. 5

CONTENTS.

TRADE PROSPECTS

An optimistic tone prevails throughout the trade, but little improvement in business has taken place so far. However, most of the mills that were closed a month ago have commenced operations on short time and are now in a fairly good position.

The slackness is general. In the cotton industry most of the mills are working short time and orders have fallen off some twenty-five to thirty per cent. Some of the largest houses have curtailed their orders as much as eighty per cent. No improvement is looked for this season, and in the meantime the proposed extensions are being held in abeyance.

The knit goods trade has felt the slackness perhaps more than any other branch of the textile trades, the majority of the mills having been working short time for the past few weeks. In several cases mills have been closed entirely for several weeks past with hardly an order of any size on hand. Prices have been cut to a rock bottom basis and those mills that are in any way filled with orders have had to accept such low prices that profits are practically out of the question with the high prices for yarn and raw material now ruling. Wool half hose and wool ribbed underwear are the only lines that have been selling in any great volume and even on them a good many cancellations have been coming in during the past few days.

The woolen and worsted mills are in little better condition and most of them are working short time. The Government orders have been fairly well distributed, and these are helping out the situation quite noticeably, but the slackness of the clothing trade has practically cut off the demand from that quarter, so that the mills have not many orders ahead. The large clothing factories have been curtailing all spring, working short time and short handed and just now several of the larger factories are closed altogether.

Business in a wholesale way in dry goods has not fallen off to a noticeable extent, but the stocks of fall and winter goods are quite heavy all over the country, so that little improvement is anticipated this season and the mills have settled down to a quiet summer.

Business men all over the country are looking for a big and successful crop from the West, and if this materializes it will not take long for business to pick up. T he financial and business status of the West is now much better than it has been any time during the past few years. A lot of accounts have been straightened out and surplus stocks got rid of. The summer will clean up things pretty well, so that if there is a good crop there should be a big trade next season.

ASSISTANCE TO WOOL GROWERS

The live stock branch of the Dominion Department of Agriculture is offering assistance to wool growers this year in the preparation of their wool for market. Expert graders are being supplied by the branch to mutual organizations of sheep-raisers of ten or more members. Graders will classify and pack wool only and endeavor to see that it reaches dealers in condition they graded it, but in no way will they act as selling agents for the growers. This should provide a means of stimulating breeders to take greater interest in the preparation of a clean product, for it is definitely understood that wool graded under the auspices of the branch will be severely, and impartially, treated.

In the announcement of this policy it is stated that fleeces tied with binder twine, containing paint locks or filled with chaff and straw will be discarded to the rejection class and the sacks plainly labeled as such. Western range wool will be separated for quality into three grades: fine, medium and low, and into combing and clothing lengths. Five grades will be made of the Eastern wool and wool of a medium character raised on the small farms in the West. Washed and unwashed will be carefully designated. Associations are now being formed for this purpose and much interest is already being awakened amongst farmers throughout the entire Dominion. A uniformly graded wool will act equally as a boon to growers, dealers and manufacturers and may serve as the beginning of a rather greater appreciation of the real character of Canadian wools.

The action of the Government is undoubtedly a move in the right direction and should pave the way for the placing of the wool industry on a sound financial and scientific basis.

Canadian manufacturers should endorse and encourage these efforts because any good accomplished will work to their benefit. They are able to give valuable assistance to the men who are carrying on the work in the way of information as to the best grades of wool for the industry here and by pointing out the defects and suggesting remedies. The Department is anxious to secure this information and would welcome suggestions.

TO ENCOURAGE FLAX FIBRE PRODUCTION

That some encouragement will be given by the Government to those seeking to develop the production of flax fibre in the West appears somewhat certain. In his recent Budget speech the Finance Minister said, in part: "There has been placed before us recently, in fact since the beginning of the year, the question of the development in Canada of flax fibre production. I think that the development of the industry of flax fibre production would be of great advantage to certain parts of Canada provided it could be carried on successfully here. But the success of manufacturing flax fibre will depend upon the efficiency of the flax pulling machines and the flax fibre manufacturing machines. I am unable at present to express any opinion as to whether the flax industry is one which, having regard to the labor conditions that prevail in this country, and the stage of invention of the machinery required, should be regarded as a possible industry, but during the summer it is our intention to look fully into the matter and see whether such an industry is possible of development in Canada, and whether a reasonable bounty would have the effect of contributing to its institution and development."

When asked by whom the inquiry would be made, Mr. White stated that the first inquiry would be made by Mr. Brock, of the Mines Department, and that a second inquiry would be conducted by the officers of the tariff branch of the Finance Department.

In other countries steps have already been taken in the way of giving bounties to encourage the production of flax fibre and vast sums are being spent annually for experimental work. In those countries where cheap labor can be had present methods of preparing the flax for the fibre are practicable, but so far no feasible process has been perfected that will do away with a great proportion of the labor now necessary and thereby make it possible to utilize the vast quantities of fibre that is annually destroyed in the West. Government assistance would undoubtedly do much to encourage experimental work and the trying out of processes lately on the market.

MANILA FIBRE TESTS.

The Bureau of Agriculture at Manila is conducting extensive tests to establish scientific standards for the Phillippine fibre production. The method followed is to select average samples of the fibre, cut them into metre lengths, weigh each sample to the fraction of a gram, and then ascertain the breaking strain of each strand. The average breaking strain per gram metre, secured by dividing the registered breaking strain by weight of the sample being tested, is the accurate index of comparative strength and quality which is being used. Tests for single fibres are varied by tests with twisted fibres. The weight method is followed, because a thick single fibre, which will stand a strain of three kilos (6.6 pounds), for example, may not be so strong, comparatively, as a thinner fibre breaking under much less strain.

CHAIN DRIVING IN TEXTILE MILLS

By H. T. HILDAGE, M.Inst.C.E.

Read at a meeting of the Textile Institute, held in Manchester, on November 25th, 1913.

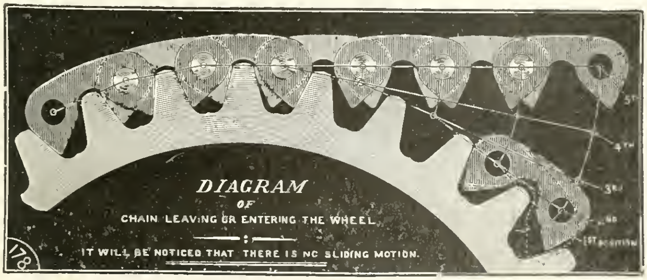
The object of submitting this paper for the consideration of the Institute is two-fold. In the first place, it is hoped that it will be a means of attracting the attention of everybody engaged in the textile trades to a comparatively new means of transmitting power, which seems to have many advantages over the older methods, at any rate as these are usually applied, and also to open up great possibilities in the way of economy, efficiency, quality of product, and certainty of result. Although driving chains were invented some 30 or more years ago, and have been in fairly extensive use for 10 or 15 years, it is only very recently that any organized attempt has been made to apply them systematically and extensively to industrial driving, and still more recently that it has been possible, in an organized manner, to try to spread useful knowledge and information concerning this means of transmission, of the character that is found in text books and pocket books everywhere, with regard to other forms of transmission.

The second object is to ensure that the discussion which has been initiated by an excellent series of papers on the different methods of generating power for use in textile factories, and which will probably be continued with the discussion of the different methods of transmitting this power to the machines, shall contain a statement of the case of chain driving. It is neither possible nor desirable at this time to say all that can be said on the subject of the history, the design, and the use of these chains. To do so would be to obscure, and probably to defeat the main object of the paper, which is, as has been stated above, to attract attention, and, having done so, to give some general indications of what driving chains are, what their characteristics are, how they may be applied in textile factories, what may be expected to be gained and lost by their application or substitution for other transmissions, what has already been done in this direction, and how the development of their use may be expected to affect the claims of the advocates of different prime movers. It is not, therefore, proposed to do more than touch upon the design of chains, nor to give any detailed instructions, either as to their use, or as to the selection of suitable chains for specific purposes.

What Driving Chains Are

The chains referred to are those made from mild steel, and consisting of plates, pins, bushes and rollers, which parts, when assembled, give a perfectly flexible band of fixed length, which is capable of running upon wheels having suitable teeth cut on their periphery. The flexibility is obtained by knuckle joints, each consisting of a properly-ground pin or stud, turning on or in a properly-prepared bearing or bush, and implies no bending or straining of the material. There are two main types of chain of this character commonly in use—the Silent type and the Bush Roller type.

Silent Chain.—The Silent chain consists, as will be seen by the diagrams and illustrations, Figs. 1, 2, and 3, of flat plates threaded on studs of some form or other. The plane tooth faces of the links engage with the plane tooth faces of the wheel (Fig. 1), and as the chain enters and leaves the wheels with the same peripheral speed as the wheel teeth, and almost the same angular velocity, there is very little impact at entering, and no sliding whatever. In consequence of this action the silent chain runs very quietly and smoothly, and it is to this quality that it owes its name. It is necessary to say, however, that the term "silent" in this connection is merely a comparative one. Some silent chain drives are in truth as nearly silent as could be wished, while others, principally those where small pinions and very high speeds are used, are rather noisy than otherwise. The pins which form the joints in silent chains are made of different shapes by different makers, but it is not necessary in this paper to say more than that the main object in the design of these pins is, or ought to be, to render wear, and consequent elongation and alteration of pitch of the chain, as slow a process as possible. As this elongation of pitch takes place, the chain rides up the teeth of the wheel and automatically adjusts itself to a larger pitch circle (see Fig. 2), until ultimately the chain is too much extended in pitch to gear with the wheel at all. This type of chain lies on the face of a wheel just like a belt, and there are several methods, corresponding to the crowning or flanging of a belt pulley, for keeping it in place.



The silent chain is made in various pitches from ½ in. to 3 in., and the pitch used depends largely upon the speed of the shafts. Where the speed is high a small pitch is used, in order to keep the diameter of the sprockets small, and so keep the chain speed within limits, and the width of the chain is made sufficient to give the necessary strength to transmit the power required. It is very undesirable to use a wheel having less than 15T., or many more than 120T. The silent chain is principally used for high speeds, or for low or moderate speeds where exceptionally smooth turning is required.

Bush Roller Chain.—The bush roller type of chain is so called because it consists of a series of pin and bush knuckle points, each of which has a roller running on the outside of the bush to relieve the friction between the chain and the yheel teeth at entering and leaving. The chain consists of inside and outside elements. An inside element consists of two side plates with two bushes fixed or keyed into them, and two rollers running loose on the bushes. The outside element consists of two side plates with two pins fixed or keyed into them, and these pins pass through the bushes of the inside element, forming, with them, the bearing of the chain. This construction is shown in Fig. 4, which is a photograph of a short piece of bush roller chain, together with its component parts.

The bush roller chain is a very satisfactory and durable means of transmitting power between shafts running at moderate speeds. Provided the speeds and power are such that wheels having a sufficient number of teeth can be used, the turning is very uniform. It is also specially useful in difficult situations, and in damp or dusty atmospheres. On account of the substantial character of its construction, it is also used for exceptionally high speeds, especially where a little noise is not objectionable. In general, the roller chain is used in preference to the silent chain when durability and long service are more important than mechanical refinement, and where the avoidance of noise is not the most important consideration.

Characteristics of Chain Gearing.

In speaking of the characteristics of chain transmission it is necessary to do so in terms of comparison with other forms of transmission.

(1) It is a positive transmission, inasmuch as the chain cannot slip over the wheels as a belt does, and there will consequently be no lost motion. In the long run the periphery of the driven pulley will have travelled as far as the periphery of the driver pulley. Notwithstanding this, it is a fact that a chain drive has a certain small amount of elasticity in many cases, and this is often a very valuable property. When the drive is horizontal, or inclined at a small angle to the horizontal, the weight of the chain which hangs between the wheels may act as a spring in tending to smooth out any sudden impulse. In any position of the drive the film of oil in the bearings, and, in certain cases, even the shapes of the links themselves, add to this quality. The effect of this elasticity is to reduce considerably the vibration and noise which is inseparable from most positive power transmissions. It also has the effect of rendering unnecessary the microscopical accuracy of erection and alignment usually essential to obtain high efficiency with tooth gearing of any type. On the other hand, this elasticity is insignificant compared with the elasticity of a belt or rope, and is not sufficient, in consequence, to interfere materially with the evenness of turning of the shafts. It is sufficient, however, to render it of great importance in certain cases of impulsive loading or driving.

(2) The theoretical efficiency of a chain drive is well over 99 per cent. The importance of this figure lies in the fact that it proves the futility of attempting seriously to increase the efficiency of a driving chain by modifying the design of the bearings. Such experiments as have been made, show that the actual efficiency of a chain drive lies somewhere between 97 and 98.5 per cent. The nature of the action of the chain upon the wheel is such that the efficiency is maintained until the chain is worn out, and the construction of the chain is such that minute inaccuracies of erection do not seriously detract from it.

(3) In general the distance between the centres of the shafts connected will be much less than is usual with ropes or belts. The most suitable distance is from 2ft. to 9ft., according to the power to be transmitted and the lie of the drive. The minimum distance will be fixed, to some extent, by the speeds and the speed ratios, and represents the sum of the radio of the smallest wheels that can be used, plus a small allowance for clearance. In silent chain drives, as a rule, the centre distance should not exceed 12 ft. or 15 ft., unless the drive is almost vertical, in which case the limit is set by the weight of the chain, and the ease or difficulty of obtaining adjustment for tension. Vertical chain drives, with the silent chain, have been quite successful up to 36 ft.. centres, and horizontal ones up to 20 ft. centres. With the roller chain longer centre distances are permissable, except when there is difficulty in obtaining adjustment, or when the drive is subject to impulses. It is obvious that small variations in the centre distance are of no consequence whatever, i.e., in any particular drive it is immaterial whether the centre distance be 7 ft. or 7 ft. 6 in.

(4) The speed ratio between the shafts, in ordinary good practice, may be anything up to 6 : 1. In exceptional cases ratios as high as 10 : 1 are possible. The penalty of using excessive ratios is that the life of the chain will be correspondingly short.

(5) Driving chains are capable of running satisfactory at any speed usually found in textile factories. Drives of small power are commonly used at speeds up to 3,000 revolutions per minute, and large drives up to 400 h.p. or 500 h.p. can be used for chain driving are revolutions per minute.

(6) In general the wheels used for chain driving are smaller in diameter than with other forms of transmission. It is thus often possible, where the direction of rotation is not of much consequence, to substitute chain drives for spur wheels. By virtue of this same fact, it is also very often possible, in confined situations, to use much larger ratios of reduction than can be used with rope or belt drives.

(7) In ordinary cases it is not necessary that there should be any initial tension in the chain. If the load is fairly steady there is no possibility of the chain slipping over the teeth, and provided it is not in the

way, or is not liable to get wrapped round the wheels and cause troubles if that kind, there is no objection to running a chain drive very slack indeed. Drives in which impulses occur, however, either from the driver or driven end, are an exception to this. In such cases the chain must not be permitted to accumulate any slack, and, in some cases, must even have an initial tension.

(8) Driving chains require rather more care and attention for ordinary working than is usually necessary or at any rate is usually conceded, to belt or rope drives. The erection requires to be a little more accurate. Faults in erection will not cause the chain to run off the wheels, but will cause it to be damaged. It will be obvious from what has been said of their construction that chains require to be lubricated, and this usually implies that they must be covered or cased in, in some way or other, in order that the lubricant may not be spread about. A little more care is also required in selecting the most suitable chain for any specific purpose than is required in the case of belts or ropes.

How Chain Drives Can Be Applied in Textile Factories

It will be readily understood that driving chains cannot be crossed, and consequently can only be used for driving between parallel shafts which are required to rotate in the same direction. In drives of moderate speeds, however, and under conditions that are suitable for bush roller chain, it is possible, by the use of three wheels, to obtain a reverse of the direction of rotation. Right angle drives are usually out of the question, and the limitation of the centre distance must, for the present, be regarded as precluding the use of chain gearing for the driving of line shafts from engines in spinning factories. The remaining applications can be treated as follows:—

(1) Driving lineshafts in spinning factories from electric motors.—Chain drives furnish a very convenient means of transmission from electric motors to lineshafts. They are very convenient for this purpose, and their high efficiency, positiveness, and the quietness and absence of vibration with which they operate go a long way towards obviating the necessity for the directly coupled motor. The limit of power can be taken at about 250 h.p., and the limiting speed ratio about 1 : 6. The motor speed permissable varies with the power.

(2) Driving of lineshafts in weaving sheds.—It would probably be quite possible to drive from a steam engine to one or two of the lineshafts in a weaving shed, and from these to the remainder by chain gear. It is very easy and convenient in the case of electrically driven sheds to connect the motors to the lineshafts by chains, and two alternative methods of doing this are shown in Figs. 5 and 6. In the first case a single motor is placed about the middle of the shed, and power taken by chains to each of two adjacent lineshafts. The remaining lineshafts are connected with these first two by chain drives. This method of driving is convenient where the motor is already in existence, and spur gearing or bevel gearing is being used. It is not, however, so efficient as the other method, which consists of connecting one motor to each of two lineshafts.

(3) Driving from lineshafts to machines.—In many cases it is possible and advantageous to substitute a chain drive for the belt drive at present in use from the lineshaft to the machine. This generally involves the use of a friction clutch to take the place of the fast and loose pulley, and, of course, is only possible where the drive is a straight one, between parallel shafts, and the belt open. This method of substitution would have many advantages, which will be discussed later, and would be rendered much easier if the lineshafts were under the floor instead of under the ceiling. The cases in which chains can be substituted for belts immediately, with the greatest possibility of profit, are given below, and the advantages that should be obtained are mentioned in conjunction.

(a) Mixing Room in Cotton Factory.—The drives in these cases are generally of comparatively small powers, say up to 5 h.p., fairly low speeds, and intermittent, or perhaps, impulsive. The presence of floating dust, as well as the above-mentioned conditions, tend to a fair amount of loss of production by slipping, which would be entirely obviated by the use of chain gearing where this can be conveniently applied.

(b) Blowing Room in Cotton Factory.—In this department the speeds are higher, the power still under 10 h.p., and the conditions are probably more suitable for belt driving than in the mixing room, but even here there would be a considerable advantage in steadiness of drive and consequent increase in production, and better quality of product, from the substitution of chains.

(c) Card Room in Woollen Factories.—A very severely-felt disadvantage of the present method of driv-

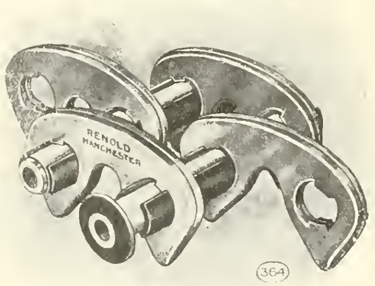


Fig. 3.—Bush Roller Chain.

ing scribblers and carding machines is introduced by by the dust in the atmosphere. It is sesential that all by the dust inthe atmosphere. It is essential that all the various units should be driven at exactly the same speed, and any departure from this results in delay, trouble in the later processes, and deterioration in the quality of the product. Sometimes the units are driven all from the same lineshaft, and sometimes from different shafts. The speeds are moderate, and the the power usually below 10 h.p. The bush roller chain is an ideal method of transmission in this case, and if the drive be fitted with a friction clutch, considerable advantage will result from the substitution of this form of drive for the present one.

(d) Card Room in Cotton Factories.—The adaptability of the bush roller chain to the driving of carding engines is as great in cotton factories as in woollen factories, but the principal advantages obtained will be those due to the absence of slip, and the consequent increase of steadiness of the drive. The remainder of the machines in the card room can usually be advantageously driven by chain gearing, with the same advantages. Those machines, however, which, on account of their shape and the shape of the building, are usually driven by a half-crossed belt from a lineshaft at right angles to the axis of the machine, would have to be re-arranged. This is worth while considering in new buildings, and sometimes even in old.

(e) Spinning Rooms for all Materials.—Spinning rooms in existing mills are usually driven from a line-

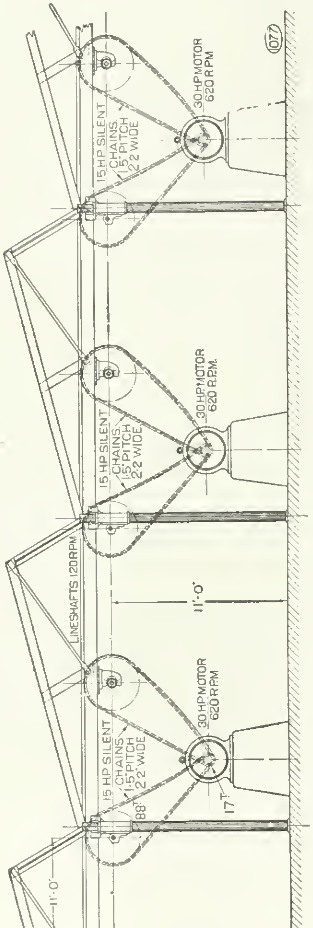


Fig. 4.—Method of Driving Weaving Shed by Chain Gearing

shaft at right angles to the axis of the frames. For chain driving the machines would have to be arranged with their axis parallel to the lineshaft. The drive from the lineshaft to the countershaft for mules can be advantageously carried out by chain gearing. Where the present drive is a crossed belt the chain drive will have three wheels instead of two, but this presents no particularly difficulty.

(f) Loom Driving.—At first sight it appears that one of the most profitable places to substitute chain drives for belts, from lineshafts to machines, is in the weaving shed. The drive is a very impulsive one, and the greatest impulse occurs just at the moment when it i srequired, for good quality, that the drive should be positive, namely, at the beating up of the weft, and it is just at this point that the belt will slip. There are several difficulties from the chain point of view. One is that with an impulsive drive it is necessary that the chain should be kept taut. Another is that half the drives are reversed, and the chain drive is consequently required to have three wheels instead of two. A third difficulty is introduced by the necessity for a friction clutch, which must be so adjusted as to refuse to slip at the peak load. This difficulty can easily be overcome. Perhaps the greatest difficulty, however, is the rough character of the machinery. The best way to apply chain gearing for loom driving would be to have the lineshafts under the floor, and between two rows of looms. A short chain drive, one each side, from the lineshaft to the loom, each drive having three wheels, one of them adjustable, would be a very satisfactory arrangement. The advantages that would be obtained, could this substitution be made satisfactorily, would be so great that it is worth while making considerable efforts to overcome the difficulty. Experiments in this direction are being undertaken, and I hope to be able to make a communication to the Institute on the subject later.

(g) Finishing Trades.—The speeds used are generally moderate, but the powers vary very considerably. In general the conditions are bad for belt driving, on account of the atmosphere, and, in many cases, on account of the low speeds. These disadvantageous, however, do not affect the use of chain gearing, and in consequence the saving by the use of this method of transmission is usually very considerable.

(4) Machines for individual motors.—Sufficient has been said to indicate that practically every machine that can be driven by an individual motor can advantageously be connected thereto by a chain drive. The saving of floor space is usually a consideration of primary importance in these cases, and the compactness of the arrangement, where a chain drive is used, makes it highly advantageous. For somewhat similar reasons belt drives in these cases are very unsatisfactory.

(5) Internal drives on the machines themselves.—There are very many cases where the substitution of chain gearing for some other drive in the machine itself will remove serious disadvantages in the working of that machine, which have only been tolerated on account of the difficulty of removing them, and because those who use the machines have become so accustomed to the disadvantages as to regard them amongst the ordinary incidents of life. This can best be illustrated by mentioning one or two examples, some of which are already in successful operation, and others which still require to be tried. Of the first, the one that comes most readily to mind is the substitution of a chain drive for the swing gears on a speed frame. This substitution was found very considerably to improve the running of the machine by reducing noise and vibration; to reduce the power consumption, in a particular case tested, by about 18 per cent., and to increase the production by 4 per cent., by virtue of the fact that it relieved the driving belt of so much load. In addition

to this, it is well known that the spur gears used for this purpose are liable to break, especially in roving frames. This difficulty is entirely removed by the use of chain gearing.

A possible application, which has not yet been tried, is the driving of the flyers and bobbins on speed frames. A horizontal chain gearing, with wheels attached to each of the spindles, would make a continuous drive which would be perfectly regular, highly efficient, and much less noisy than the present arrangement. Again, the bowls on fulling mills are at present connected by spur wheels with specially deep teeth to permit of motion of one of the bowls. This drive is highly unsatisfactory, as one would naturally expect. The substitution of chain gearing would eliminate most of the troubles and breakages that are so common at present.

The substitution of chains for belts for driving from the flyers and twisters in rope-spinning machines has resulted in great economy of power, great increase in production, and improvement in quality of material. The belts in this case were only about 2 ft. centres, ran at a high speed, and over comparatively small pulleys A great deal of slip took place.

These circumstances are mentioned only for the purpose of indicating in a general way what has and can be done in this direction. There are many other cases where serious disadvantages could be eliminated by the substitution of chain for belt or spur gearing, in the construction of machines themselves.

Textile machinery users will do well, from now on, to satisfy themselves that any disadvantage from which they are suffering in the operating of any machine, cannot be eliminated by the substitution of chains for some other form of transmission, and to bring pressure to bear upon the manufacturers of these machines, with a view to having such points investigated. If they have any difficulty in this connection, they will find chain manufacturers ready and willing to co-operate with them. On the other hand, textile machinery manufacturers may well consider whether it would not be profitable for them to seek out such cases as these for themselves, without waiting to be urged to do so by their customers.

Effects and Advantages of Using Chain Gearing

The effect of substituting chain gearing for some other form of transmission will naturally depend, to a great extent, upon the form of transmission for which it is substituted, and the circumstances under which the substitution is made. It is not necessary to speak very fully on this aspect of the matter, because the description of chains, and the enumeration of their characteristics which has been made with studied moderation and impartiality, will enable anyone to decide for himself what will happen in any particular case. However, the advantages usually expected from a substitution of chain gearing in textile factories, are as follows:—

(1) Improvement in quality of product due to uniformity of turning.—It is impossible to exaggerate the importance of the fact that a chain drive will transmit, with perfect uniformity, a uniform turning-effect; will, if anything, reduce impulses from the driving end, and will steadily overcome impulses at the driven end, without permitting the speed to vary, and yet will not give rise to the distressing and troublesome noise and vibration so common to most kinds of tooth gearing. In fact, it will take some considerable time to realize what an important quality this is. In many cases the present running speeds in textile factories are limited by the uniformity of turning obtainable with present methods of transmission. How far these speeds may be increase without affecting the quality of the product, or

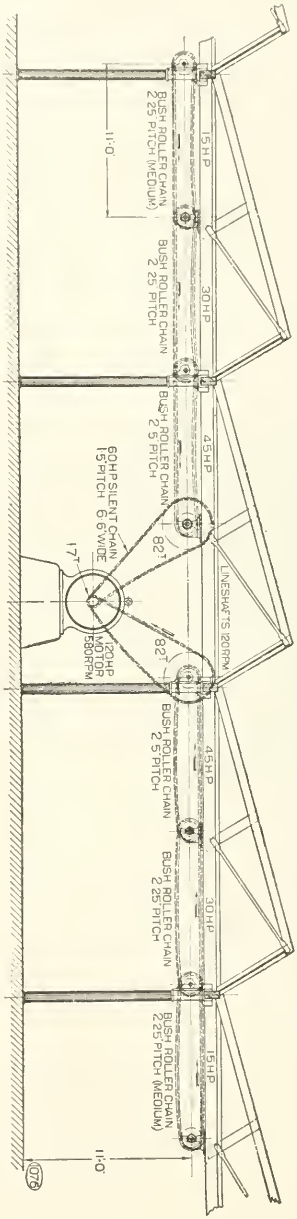


Fig. 5.—Improved Method of Driving Shed by Chain Gearing.

causing other troubles, when the machine is driven with perfect uniformity, is a matter for experiment and investigation. Non-positive methods of transmission at present seem to affect the uniformity of turning of the driven shaft in two ways:—

(a) By their ability to stretch and slip they permit and magnify the action of impulses on the driven shaft, in accelerating or retarding, momentarily, its motion.

(b) They may originate variations in turning by the ease with which they swing and stretch. This matter will be further discussed later.

(2) Increase in production.—This may be produced in one or all of three ways, as the result of the substitution for positive for non-positive methods of driving. These are as follows:—

(a) Overloads cause no reduction in speed. The transmission is positive, and is capable of being operated at considerable overloads without any serious disadvantage. The efficiency remains the same, and the strength is always sufficient to withstand any ordinary overload, i.e., up to 100 per cent. The effect of this is that the additional demand for power, usually found in a textile mill after stoppages, does not cause any reduction in speed of the lineshafts, with consequent falling off in production.

(b) Production is increased, owing to the elimination of the ordinary slip of belts or ropes. A belt drive is only at its best for a limited time. The slip, which

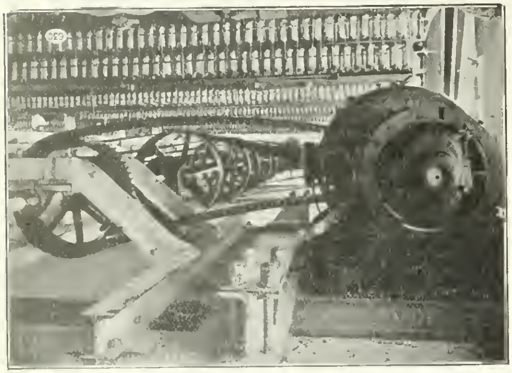


Fig. 6.—Chain Drives in Flax Spinning Factory.

always occurs, steadily increases as the belt increases in length, and production falls off. It is only when a mechanic takes up the slack that the drive is restored to its original efficiency. With a chain drive there is no slip at any period, the production is regular, and whilst neglect of the chain will possibly enough cause trouble, it will be trouble that will make itself obvious at once, will give warning that it is occurring, and will prevent the occurrence of considerable losses that cannot readily be tracked and remedied.

(c) There are some cases in which, on account of the improvement in the uniformity of turning, it is possible to speed up the machines. Such cases will readily suggest themselves.

These remarks are specially applicable to the driving of machines by belts in finishing works, and in other places where the temperature and humidity of the atmosphere vary considerably.

(3) Space saved.—In many cases there is a considerable saving of valuable space, by virtue of the fact that the distance between shafts can be much less than with belt or rope drives. In other cases the latitude that is given in the placing of motors or machines, by the general adaptability of the chain drive, results in further economies of the same character.

(4) Lower first cost.—If a belt drive is properly designed to transmit, without slip or excessive tension, the power required in any case, and a durable belt is used, the first cost will exceed the first cost of a chain belt. Quite often, double reduction belt or rope drives are used where a single reduction chain drive would have sufficed, or a combined drive of belt and spur wheel is used. When electric motors are used in confined spaces, and double reductions and large pulleys are not possible, a single reduction chain drive and a high-speed motor will give a higher efficiency with a lower first cost, than a slow-running electric motor with a single reduction belt or rope drive. It occasionally happens that very extravagant arrangements are made to connect two shafts, simply because they are too far apart for spur gears, and too close together for satisfactory rope or belt driving. Chain gear should always be considered for such cases.

(5). Economy of power.—Over an extended period of running, there is an economy of power of at least 5 per cent obtained by the substitution of a well-designed chain drive for any rope or belt drive. If the conditions are not suitable for ropes or belts, or the drive is badly designed, this economy will be greatly increased, and may be as high as 30 per cent. Spur gearing and machine-cut helical gearing, when erected with perfect accuracy, are perhaps as efficient as an average chain drive Any departure, however, from this accuracy, which is exceedingly difficult to obtain under commercial or factory conditions, results in a very great falling off in efficiency. Where it is possible to substitute chain gearing for a transmission by bevel gears and intermediate shafts a great economy of power is obtained. The difference in efficiency beteen chain gearing and ordinary cast spur, helical, or bevel gearing, may be anywhere from 10 to 40 per cent.

The reason for the superior efficiency, under commercial conditions, of chain gearing, becomes obvious after a moments' thought Consider the case of two shafts connected by spur gearing. The connecting links are each of them absolutely rigid, and it follows that for the ideal transmission of power, that is, for the equivalent of rolling contact to be obtained, exquisite accuracy, not only in the shape but of the relative position of the tooth surfaces, is essential. Any departure from this will cause rubbing instead of rolling, with a subsequent loss of power. This consideration alone ought to be sufficient to rule out entirely the use of plain cast gearing of any description for power transmissions of any importance. Machine-cut gearing of a very high degree of accuracy is now so readily obtainable, and so reasonable in price, that there is little inducement to use cast gearing, and no reason to fear loss of power due to badly formed tooth surfaces. The relative positions of the tooth surfaces that have to work together, however, which are equally important with their shape, is a much more difficult thing to obtain to the required degree of accuracy. Play in the bearings, a certain amount of which cannot be avoided, lack of rigidity of the shafts, errors of erection, either in alignment, parallelism, or distance between centres are very difficult to avoid in factory work, and will cause great falling off in efficiency, and in many cases will entirely neutralise the advantage obtained by the substitution of machine cut for plain cast gearing.

Now consider two shafts connected by chain gearing. There is a rigid link on each shaft, and a perfectly flexible link between them. Every joint or bearing in the chain has a certain amount of play and this is sufficient to permit perfect gearing between the chain and each wheel, in spite of any small looseness in the shaft bearings, eccentricity of the wheels on the shafts, faulty alignment of the wheels, or lack of parallelism of the shafts. In a word, this flexibility will bring the attainment of the highest possible efficiency much more easily within the scope of practical factory conditions

What has already been done.

It will be difficult, if not impossible, to convey an accurate impression of the extent to which chain driving has been adopted in textile mills. Generally speaking, the tendency has been to resort to this form of transmission only in cases in which other forms of transmission, for some reason or other, are not are not suitable or have given trouble. The idea that chain driving is a standard method of transmitting power, of very great value, and of almost general applicability; that it ought to be considered whenever a new plant is being put down, or an old one remoddled, has not received proper recognition either from engineers or from textile manufacturers, and it is only when chain manufacturers have been unusually pushing, or when consulting engineers or mill owners have been unusually enterprising, that the matter has been considered in this way. It can be assumed, however, that in every one of the cases mentioned hereafter, the application of chain gearing has been

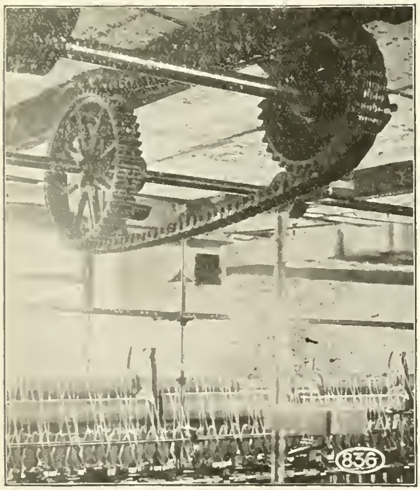


Fig. 7.—Chain Driving from Main Shaft to Countershaft for Mules.

thoroughly tested and found satisfactory, and may therefore be regarded as one of the standard drives for the future It will be convenient to arrange these cases under similar headings to those used in dealing with "possible applications."

(1)—Driving lineshafts in Spinning and Weaving Factories.—In only a few cases has chain gearing been used to drive direct from the engine to the lineshaft, and in these cases the power has not exceeded 100 h.p. It has however, been very extensively used for driving from electric motors to lineshafts, and its suitability for this purpose has been very completly dedemonstrated. Perhaps the best example for us to take now is the electric conversion of Mr. Robert Clough's mills at Keighley, carried out by Mr. W. O. Pepper.

A cross-compound Corliss engine driving by ropes to the head shafts in the usual way was replaced by a turbo-alternator as a prime mover and electric motors without any other alteration in the structure or arrangements of the factory. In every case the shafts were driven from the motors by means of silent chain gearing, and specialists in chain transmission were consulted from the outset, and, as far as latitude was possible, arranged the drives so as to be entirely suitable for chain gearing. The conversion was carried on without any interuption whatsoever to the daily work of the factory. The chain wheels were mounted on the shafts alongside the rope pulleys, and no other alteration to the shafting or mill gearing was made.

As Mr. Clough's installation embodies many novel features, it has naturally been kept under close observation by those directly interested, and now, after considerably more than a year's running, it is possible to say that, as far as chain gearing is concerned the results have proven more satisfactory than was originally anticipated.

Another drive that is interesting, because it shows another form of construction is in a flax spinning factory, and the rooms were formerly driven—before electrification—by vertical shafts and bevel gearing. After electrification spur drives from the motors were first used, but the vibration and noise was so great that they had to be taken out.

(2)—From lineshafts to machines—For several reasons the substitution of chains for belt driving from line shafts to machines has not been very much taken up by textile manufacturers. In the first place, it is rather a radical proceeding, and mill owners are conservative. The advantage to be obtained from a single substitution appears very small, and extensive substitution could naturally only be taken up after experiment and experience. Chain manufacturers on the other hand, have not devoted much attention to pushing this kind of business, because in the present state of the knowledge of chain gearing they realised that they had tremendous difficulties to overcome, and a much more natural line seemed to be to push the sale of heavy drives, which gave them the business that they wanted immediately, and served a useful purpose in educating those interested in the subject of chain gearing. There is no real reason, however, why it should not be taken up very extensively indeed, and with very great advantage. There are some cases which present no difficulty whatever from a chain point of view and immediate benefit would be obtained.

One of the cases in which it has been applied is of striking interest to woollen manufacturers, namely, the driving of scribbling and carding machines. The designers and builders of these machines have been at very great pains to ensure that all the various swifts of each unit should be connected up by a positive transmission, for the obivious reason that the product of one unit is the raw material of the next, and must consequently be supplied at exactly the correct rate. In other words, each unit must be capable of taking the product of the machine before it, just as fast as it is produced. In spite of this obvious necessity, and the great pains taken to meet it, the units are usually connected to the line-shafts by belts, and the condenser connected to the swift of the last unit by belts or bands. These belts or bands, which all slip to some extent, are often of different lengths and differently loaded, and even if they were all the same length and equally loaded, their condition as regards the presence of "fly," or as regards tightness, would cause them to slip differently.

Messrs. William Lawton Ltd., of Huddersfield, were the first to conceive the idea of using chain gearing for the purpose of driving these machines. They tried it on one set in their own mill, with entire success. A comparison was made between this set of machines and another set with belt drives, running under, as far as possible, identical conditions, for a period of 21 days, and there was found to be an increase in production of 4.3 per cent. Mr. Lawton also said that a considerable improvement in the quality of the material was found, which showed itself in the reduction of the number of broken ends in the spinning room.

In a more recent case, when the change was first made it was found, after 15 minutes running, that the scribbler was overmaking the carding engine, and the feed into the latter had to be speeded up to 7 per cent. In the two days previous, the feed on this particular machine had to be changed four times to allow for the varying slip of the main belt on the scribbler. During five hours running, after the conversion to chain driving, two ends came down in condenser ,whereas the average before the conversion was made was in the neighbourhood of three per hour.

No modifications of the arangements in the carding room are necessary for the purpose of making this kind of conversion. A friction clutch mounted on the lineshaft is substituted for fast and loose pulleys on the machine, and if desirable, on account of the heavy starting torque, to use a gradual engagement device for operating the clutch. The chains can then simply take the place of the belts.

(3)—Machines from individual motors—There have been many isolated cases of the application of chain gearing to driving from individual motors to machines and this method of driving is developing.

An Italian firm have driven scutchers and combing machines in this way.

A firm in Leeds have driven carding machines (six in number) in this way.

Several firms have driven spinning and doubling frames by chain gearing from individual motors. Generally speaking there has been something special about the arrangements, either for the purpose of obtaining dtachability of the gear, or change of speed, or for some other reason. In the finishing trades there have been many examples of individual drives to mangles, back-filling machines, drying machines, calenders and printing machines. The advantages usually obtained in these conversions will have been sufficiently indicated by my earlier remarks.

Summary.

The position of chain gearing, then, as far as the driving of textile mills is concerned, can be briefly summarised as follows:—

(1) It is a possible solution of any transmission problem which does not exceed 300 h.p., in which the distance between the centres does not exceed say, 12ft., and in which it is possible to use wheels of such diameter that the linear speed of the chain does not greatly exceed 1,300 ft. per minute.

(2) Chain gearing is a highly efficient transmission. It is at least equally efficient, under parllel conditions, with any other form of gearing, and much more efficient, under bad conditions, than any other form of gearing. Its high efficiency is maintained until it is worn out.

(3) It is a positive transmission, with enough elasticity to prevent serious vibration, and withal is rigid enough to transmit, with perfect uniformity, a uniform turning.

(4) As a direct consequence of the above qualities, the substitution of chain gearing for other forms of transmission can be made to give reduction of power consumption, increase of output, improvement in quality, as well as freedom from noise and vibration. To some extent it is open to the user to choose in which of these directions he will use the improvement.

(5) These facts have been sufficiently proven by the extent to which chain gearing has been used, to justify its being regarded as a standard transmission, and taken into account when transmissions are being considered.

As regards the part chain gearing will play in the controversy as to which general system of driving is the best the position of chain gearing can be summarised under four heads:—

(1) In existing mills which are driven from a main engine by ropes, as a general rule the only applications possible for chain gearing are from lineshafts to machines or from lineshafts to countershafts. If the transmission from the engine to the lineshaft is not a straight rope drive, but a complicated one, or if it be a drive through vertical shafts and bevel gearing chain gearing can often be substituted with great advantage.

(2) In existing mills which are to be electrified, it is impossible to overestimate the value of the newer transmission. It enables the engineer to make his conversion without any change in the existing structure of the mill, and usually without any stoppage whatsoever of any part of the machinery. In old mills where floors are nearly fully loaded, and weight is a consideration, lighter motors can be used if the transmission is by chain.

(3) New mill that is to be driven from a main engine. —The remarks on the subject of existing mills driven from main engines also apply in this case, except that it will be advantageous to depart from the preesnt standard arrangement and put the lineshafts under the floors instead of under the ceilings. It will also be advantageous to arrange the lengths of speed frames and, if possible the shapes of rooms, so that a straight drive from the lineshaft to the frame will be practicable. In many cases this can be done without any cost of floor space, and without any greatly cost of shafting, and the gain in improved quality and increased production will be very great. Apart from radical changes in the relative position of the engine room and the various manufacturing rooms, there is not much point at present in considering the use of chain gearing oetween the engine and the lineshafts Weaving sheds however, are an exception to this.

(4) New mill that is to be electrically driven.—In new mills that are to be electrically driven under the group system, the advisibility of chain gearing for the drive from the motor to the lineshaft gives increased latitude for arranging the mill purely and simply from a production point of view. The motors can be put in a small annexe at the end of each room, they can be hung from the ceiling, they can be put on the floor in the middle of the room, if space is not valuable or they can be arranged in any other position

that seems desirable, from an efficiency point of view. If chain drives from the lineshaft to the machines are used, and some little more attention paid to the mounting of the lineshafts themselves than is now usual, it will probably be found that the difference in efficiency between individual driving will not be in favor of the former, and even if it is, the difference in first cost and up-keep charges is likely to counterbalance it

Conclusion.

After a careful study of this problem of transmission in mills, it is almost impossible to avoid the conviction that most of the troubles experienced are due to three causes—the use of non-positive drives; the use of drives which though positive, are badly constructed or roughly erected; and the use of shafting, hangers and bearings of crude character.

From the point of view of electrical engineers, it may be conceded that these factors materially help to strengthen the case for electric driving, by furnishing them with "bad cases": nevertheless it is equally true that these very factors prevent them from reaping to the full the benefits potentially attainable from electric driving—unless, indeed, they adopt individual driving, and thus eliminate gearing altogether. Loose and badly aligned bearings, eccentric and twisted shafting, badly-made and badly erected gearing, destroy uniformity of turning, and waste power

On the other hand from the millowner's point of view, it is hardly worth while to use well-made and well-fitted bearings or to go to considerable expense in the alignment of shafting and careful erection of gearing, if this refinement is at once nullified and liable to be quickly destroyed by the defects and faults of the instruments of transmission, viz., tight belts, tight ropes, and rough-cast gearing. With the use of chain gearing, however, many refinements throughout the mill become, not merely possible, but profitable, for these refinements will easily be maintained, and will greatly improve the quality of the product, not merely not increasing its cost, but generally definitely reducing it, by lowering the power and repair bill. Finally, therefore, I would urge electrical engineers, no less than the mill owners themselves, in their own interests and those of their industry, to weigh very carefully the claims made in this paper on behalf of chain gearing, and the evidence put forward, and to ask themselves whether they can any longer afford to look on the motive power and the transmission system as two separate problems, the second a matter of comparative indifference to them: whether the two are not, in point of fact, almost equally important parts of the same problem—the problem of mill driving.

THE FOURTH NATIONAL TEXTILE EXHIBITION

(Special to the Canadian Textile Journal.)

"The largest and best exhibition of textile machinery ever given" was the unanimous verdict of everyone who visited the Fourth National Textile Exhibition in Mechanics' Building, Boston, last week. More machines were shown, greater interest was manifested by the manufacturers, and greater crowds were handled than ever before. The show was an unqualified success from every view point, and when a movement was started to have the show given in Atlanta, Ga., next year, it met with the endorsement of everyone interested.

In connection with the textile exhibition was given the second annual Power Show, this being held in the basement underneath the large exhibition halls. Here, as in the show above, interest was at its height all week long, and many of the associations connected with the using of power held meetings during the week.

Six acres of space were used in showing the various machines and other things that are connected with the textile industry, and visitors were registered from all parts of the country, including not a few from different sections of Canada. Most of the machinery was shown in operation, this pleasing both the manufacturers and those who visited the show out of curiosity as to what cotton machinery looked like.

The exhibits included everything that an interested person could wish for, from the ancient forms of carding, spinning and weaving to the very latest machinery made by the best machinery makers in the world. Much of the machinery shown was the latest orders that have been finished in such plants as the Draper Company of Hopedale, Mass., the Woonsocket Machine and Press Company of Woonsocket, R.I., the Potter and Johnston Machine Company of Pawtucket, R.I., and other companies of like size and reputation.

The big event of the week in connection with the show was the annual convention of the National Association of Cotton Manufacturers, which was held in Paul Revere Hall in Mechanics' Building on Wednesday and Thursday. At this meeting Albert Greene Duncan, of Boston, who is Treasurer of the Harmony Mills of Cohoes, N.Y., was elected President to succeed Edwin Farnham Greene, Treasurer of the Pacific Mills of Lawrence, Mass.

The other officers elected were as follows: Vice-Presidents—William M. Butler of New Bedford, Mass.; and Grosvenor Ely of Jewett City, Conn.; Secretary and Treasurer: C. J. H. Woodbury of Boston, Mass.; Directors, for three years: Philip Dana of Westbrook, Me., William A. Mitchell of Lowell, Mass., W. Frank Shove, of Fall River, Mass., John Sullivan of New Bedford, Mass., and Alexander Makepeace of Fall River, Mass.

Many of the manufacturers had been in attendance at the annual meting of the American Cotton Manufacturers Association which was held in New York on Monday and Tuesday. They spent the remainder of the week in looking over the various exhibits which were spread out for their edification at the show.

The most notable exhibits from the viewpoint of both the mill men and the outsiders were those by the five companies who style themselves the textile machinery specialists, viz.: the Woonsocket Machine and Press Company; the Potter & Johnston Machine Company; the T. C. Entwhistle Company; the Easton & Burnham Machine Company and the Fales and Jenks

Machinery Company, all of these being set side by side; the Draper Company, the Stafford Looms and the machinery exhibit of the Crompton & Knowles Loom Works.

There were many other notable exhibits shown, but those mentioned were larger and attracted more interest than any of the others, with the possible exception of that of Mrs. Jackson, of Dorchester, Mass., who showed several old time spinning wheels, an old loom and several old hand cards. This exhibit, which was set upon the stage in Machinery Hall, attracted much attention because of its character and its age, all of the articles shown being more than an hundred years old.

Taken in order as a person entered the exhibition hall from the streets the best of the exhibits were to be seen as follows:—

In spaces 10 and 11 were shown some of the machines made by the Klauder-Weldon Dyeing Machine Company of Amsterdam, N.Y. This exhibit included a raw stock dyeing machine, a 28-stick all bronze combination cotton and worsted skein dyeing machine and a 21-stick combination cotton and worsted bronze spider. Two of these machines were turned over by a motor, but had no stock or dyestuffs in them.

William Firth of Boston, Mass., had an exhibition of small portable machines in space 16. The Grosser Knitting Machine Company of New York City had a number of their knitting machines on view. These machines were their regular stock such as are shipped to customers and were shown from every side, giving visitors at the show a good opportunity to see what a knitting machine looks like, and what it can do.

David Gessner of Worcester, Mass., had a complete line of his textile finishing machinery on view, and the chief exhibit in the space was that of three-string 24-roll double acting napper for cloth. This machine because of its size and the mechanical skill displayed in its manufacture was a center of attraction among the mill men present.

In addition to the exhibit which was set with those of the other "textile machinery specialists," the Woonsocket Machine & Press Company had a separate exhibit, showing a special machine for cotton waste shoddy and wools. This machine was recently finished for a New England mill, and it was receiving its tuning up runs at the Textile Show. Much interest was displayed by those present in the machine, and it is reported that several other machines of the same type were sold during the week.

The Universal Winding Company had one of the most attractive exhibits at the show. This was due partly to the fact that a corps of young ladies were employed to operate the various winding machines which were on view In addition to having a complete line of machines, the company also had samples of the various styles of winding which can be done. The company occupied spaces 22, 23, 24, 28, 29 and 30.

One of the most attractive exhibits for the laymen at the show was that of the Roessler & Hasslacher Chemical Company of New York city. Practical bleaching was carried on in small glass tanks under the view of the public, and samples that were submitted were handled at once. The small vats were heated by electricity. In addition there were a number of samples from various mills of bleached textiles of every fibre.

The G. M. Parks Company of Fitchburg, Mass., had on view a complete humidifying plant in miniature. This attracted a great deal of attention from mill men and others. There were also shown air compressors, air hose and other specialties for mills which are made by the company. All of the latest improvements to their Turbo Humidifiefirs were shown, as well as their latest effort, a small outfit for isolated installations, this being designated as their Turbo Cluster Tank.

The Steel Heddle Manufacturing Company showed a full-sized Simplex Auxiliary Drawing-in machine which was kept in operation a great deal of the time to satisfy the curious and those really interested in the work for which it was designed. Various advantages to be obtained from flat steel heddles were also demonstrated and there was a complete line of the products of the company on view.

Several knitting machines were shown by E. O. Spindler of New York city, these machines being in operation and for the most part fashioning sweaters. This space was split with the Dubied Machinery Company of New York.

The Stafford Company of Readville, Mass., showed many of its Ideal looms all in operation. This exhibit was in charge of W. Wood Smith, sales manager of the company. At one end of the exhibit was a minature reception room this being also fitted with desks for the convenience of those who wished to make the space their headquarters while they were at the show. The looms wre arranged along one side of the wall of the large exhibition hall and some of theme were weaving narorw goods while others were working on wide goods. All of the looms shown were automatic and the exhibit was one which had crowds around it all of the time during the week.

Almost across the aisle of the exhibition hall was located the exhibit of the Crompton & Knowles Loom Works of Worcester, Mass., and Providence, R.I. This exhibit consisted wholly of automatic magazine looms nearly all of which were equipped with dobby and Jacquard heads. This exhibit contained the following looms, working on various textiles: two gingham looms, one two color, and one six color; a Terry towel loom with a four-color magazine, three colors of which were used in making the body of the towel and the fourth only in the border; a cotton blanket loom with a Jacquard head, weaving a cotton figured blanket; a duck loom, with an automatic shuttle changer instead of a magazine full of filling; and two types of the woollen and worsted looms made by the company, the first a 2x1, 25 harness heavy worsted loom. This latter loom was weaving a high grade worsted heavy-weight suiting at the show, the yarns and pattern being furnished by the W. T. Tillotson Manufacuring Company of Pittsfield, Mass.

The Draper Company exhibit at the show included eight Northrup looms, a twister, a spooler, two beam warpers, one warper with baller, a single thread testing machine and samples of various small machines and parts that are made by the company. The exhibit held the interest of all who attended the show the looms being in operation, girls coming in from the factory for that purpose.

The looms shown were as follows: One M model, 40-inch loom weaving fine goods and using a 6¾ inch magazine filled with filling on cops; an E model 36-inch loom with a filling magazine filled with 8¾ inch bobbins of extra large size; a P Model for 36-inch goods, with the same size magazine as the previous model; a K model loom for 36-inch goods for 7⅞ inch filling cops. This machine was fitted with a 20 harness Crompton & Knowles dobby of the Stafford pattern; an H model with filling battery for eight inch bobbins, this loom being fitted with a special corduroy take-up and side cam harness motion for eight shade and nine throw for corduroy weave. It was also fitted with a special heavy selvage temple. One E model 40-inch loom for eight inch bobbins; and one E model loom for 30-inch goods fitted with a magazine for eight-inch bobbins and with special attachments of various kinds. All of these looms were driven by individual motors.

The other machines in the exhibit of the Draper Company were fitted with various special attachments of varying patterns, that the manufacturers might see the whole of the line in operation, and see what would fit in any particular mill best. Each of the other machines were driven by small individual motors.

Messrs. John Hetherington & Sons, Ltd., through their American agent, Stephen C. Lowe, had on view a 12½-inch lap Nasmith comber, fitted with a Roth Aspirator and Waste lattice. There was also shown a camless quick-traverse cross winding machine. The first machine, the comb, showed the immense improvement which has come with the aspirator as designed by Roth. The attachment keeps the machine clean, and collects the waste by a suction device, this tending to keep the machine clear and running nearly 100 per cent of the time. The company claims that the comber needs cleaning but once a week instead of twice a day, as is the genral rule, and the machine ran all week at the show, working on 1 1-16 American cotton. The waste is collected and coiled in sliver form in cans making it ready for the drawing frames, and saving additional carding and the making of more waste. The winding machine attracted considerable attention also.

The "textile specialists" had their five exhibits arranged in regular handling order as they would be in the mill. The first in the line was that of the Potter & Johnston Machine Company of Pawtucket.

The principal thing in the exhibit of this company was the recently acquired waste mixing attachment for use in connection with breakers, openers and like machines. The new attachment was shown working, and opened, and mixed raw staple, card and drawing sliver and comber lap waste, together in a perfect blend. The company also showed a regular stock model of their 40-inch revolving flat top card, fitted with all of the latest improvements which have been made on the machine since it was last shown at an exhibition.

Next was shown the exhibit of the Woonsocket Machine & Press Company, recently changed hands. These great machines for roving and drawing were a show in themselves, and as the operatives worked about them there was always a crowd of spectators present to see the "wheels go round."

Then came the exhibit of the T. C. Entwhistle Company of Lowell, Mass., which consisted of warping and beaming machinery. The principal machine shown was a standard slasher complete with ereel, the latter fitted with porcelain step. They also showed one of their balling machines, a traverse grinder for grinding the doffers and cylinders, and a roll grinder for grinding revolving flat tops.

The Easton & Burnham Machine Company of Pawtucket, showed a skein winder, a reel and a stand of spinning spindles. The winder and the reel attracted a great deal of attention because of the simplicity with which they were made.

The last member of the group of specialists, the Fales & Jenks Machinery Company of Pawtucket, R. I., showed their spinning and twisting machinery and these machines in operation most of the time showed the public that their machines were the last and most effective word in spinning of cotton.

A full sized model B special carpet dyeing machine was shown by the John H. Giles Dyeing Machine Company of Amsterdam, N.Y. This machine a 25-stick skein dying machine was specially shown because of the fact that there is no iron used in the inside construction of the machine. All bolts, rivets, hoops and tie rods are made of Monel metal and this is said to add much to the effectiveness of the machine. One of the claims of the demonstrator was added dyeing with the same amount of dye liquor.

The Philadelphia Drying Machine Company of Philaphia, Pa., showed the very latest word in drying machinery of various kinds. The company showed several fire-proof drying machines with panel insulated with Air-Cell asbestos; the Hurricane circulating drying machines, ventilating and heating apparatus. These machines all of which meet the requirements of the fire underwriters in every respect, were the center of interest to many of the mill men who were at the show, and it is reported that several good sales were made by the company during the week. The concern also showed a hot and cold plate press with either hydraulic or power screws attached.

The same company also showed a special singeing machine which was equipped with indestructible metallic forms and special burners, and also with extinguishing apparatus. This machine was designed for the purpose of singeing cotton hosiery, and is compactly built so that it effects a saving in floor space as well as in other respects.

A novelty from the other exhibits of dyeing machines which were on exhibition was shown by the Morris & Company, Inc., and the Hussong Dyeing Machine Company of Groveville, N.J. Instead of the regular stock models as shown by the other companies, this company showed their machines in minature and also showed several models of duck baskets.

The American Kron Scale Company showed two of the platform scales of the company, one of the portable platform type and the other of the counter type, both equipped with automatic dials.

Dyeing machines formed the exhibit of the Franklin Process Company of Providence, R.I. A large exhibit was that of the Fairbanks Company of Boston, scales, trucks, cars, roving cans and pulleys and shafting being among the things shown.

A. W. Buhlmann of New York City showed several napping and fleecing machines for sweaters, and also had a large amount of mercerized yarns shown on cones and skeins.

The Brown Spin Wright Company of New York City showed several models of spinning frames, most of which were kept in operation during the show.

The American Moistening Company ,of Boston, Mass., showed a complete moistening aparatus for various purposes, and also a complete humidifying apparatus.

For sewing on various kinds of knit goods, the Union Special Machine Company of Boston. Mass., showed several sewing machines. These machines performed several different operations on knit goods.

A spindle spooling machine was shown by the Spool Cotton Company of New York.

The American Tool & Machine Company of Boston, showed a number of different hangers and couplers, several hydro-extractors, steel pulleys of various sizes, a centrifugal oil separator, idler pulelys and a belt tightener.

A card clothing machine in operation making narrow card clothing was shown by Ashworth Brothers, Inc., of Fall River, Mass.

Stuart W. Cramer, recently President of the American Cotton Manufacturers Association, and owner of the Cramer system of air conditioning had a complete outfit of humidifyers working in his space.

The Davis & Furber Machine Company of North Andover, Mass., showed a 36-roll double-acting ball-bearing napper, not in operation.

The Westinghouse Electric Company and its rival the General Electric Company had exhibitions of lamps, motors and other apparatus of an electrical nature. In addition the two companies furnished the individual drives which were used by the various machinery builders in displaying their machines. The General Electric Company also had a Draper Northrup loom working with an individual motor which was capable of being run at varying speeds. This motor was attached direct to the loom.

The Psarski Dyeing Machine Company of Cleveland, O., had a full-sized dyeing machine which was surrounded by samples of textiles which have been dyed on machines owned by the company.

Thomas Leyland Company of Boston, Mass., showed a cloth expander of the usual type, and another with a center support scutcher. There were also two power sewing machines.

A cell drier was shown by the Cell Drier Machine Company of Taunton, Mass. The Carrier Air Conditioning Company of America, showed a section of a two-story mill with humidifying apparatus working, and also a full set of machinery.

The Howard Brothers Manufacturing Company of Worcester, Mass., showed a varied line of card clothing, and also a card clothing machine at work. The background for part of the exhibit was a great model of a hand card that was approximately 12 feet in length, everything being built in proportion.

The United States Bobbin & Shuttle Company of Providence, R.I., showed many different kinds of bobbins and shuttles, the latter being all self-threading, as is required by the mills of New England at this time.

To enumerate the whole of the exhibits shown at the Textile Exhibition would take up more space than can be made for it, and so only those exhibits that stood out from the rest have been mentioned. In all there were more exhibits at the Fourth Exhibition than have ever been gathered in one place before.

For a very short while there was an attempt to have some of the machinery shown taken to Montreal for exhibition there. This movement died out because of lack of support, and in the face of the competition of Atlanta, Ga., to have the next show given down there.

This latter movement was backed by the whole of the body of Southerners who came North in a special boat from Norfolk, Va., and who had one whole day set aside for their benefit.

Among the exhibits which should be mentioned in passing, however, were those of the three textile schools which sent down samples of the work of the students. These were the Lowell, Mass., Textile School, the New Bedford Textile School and the Clemson Agricultural College of Clemson, S.C., the latter devoting most of the exhibit to the growing of cotton and the diseases that are found in the plants.

THE COMBING MACHINE.

"Combing Machine" was the title of a lecture recently given a meeting of Textile Society connected with the Manchester School of Technology. The lecturer, Mr. T. Ross, after dealing with the various machines used in the cotton trade, pointed out as a remarkable fact that the device of Heilmann, the original system of combing, was still in practical use after 60 years almost unaltered. He had no doubt that if Heilmann had lived to see his machine used commercially he would have discovered the most natural means for remedying its defects, the chief of which were a low productive power, and inability to deal with cotton of very short staple. More modern machines modelled on Heilmann's had overcome these difficulties. Attention was also drawn to the reintroduction of the Alsatian combing machine as a four-head system. In its original form of a one-head system it could not compete with other types; but it was possible that the new machine, though it was now unknown in Lancashire mills, might win some favour on account of its high productive power. In his remarks on the working of combing machinery, Mr. Ross showed the inadvisability of maintaining high speed.

WORLD'S COTTON STATISTICS.

The International Federation of Master Cotton Spinners' and Manufacturers' Association, in accordance with its annual practice, has collected from all over the world, where cotton is spun, statistics showing the stocks of cotton in spinners' hands on March 1. Returns have been received in respect of 132,059,812, out of a total (estimated) of 144,704,012 spindles, and it appears that the total of the stocks on March 1 was 4,862,494 bales. This is larger than the total at the corresponding date of any of the last five years, and we shall probably be justified in saying that it constitutes a record. The total a year before was 4,769,535 bales, in 1912, 4,200,413 bales; in 1911, 4,060,740 bales; and in 1910, 4,166,688 bales. It should be explained that these are actual bales, regardless of weight. The Canadian returns are for 855,059 out of 860,000 (estimated) spindles. The stocks are given as 48,368 (compared with 465,015 in England, and 1,726,000 in U. S. A.), actual bales, these fiugres being made up as follows: American, 48,172; East Indian, none; Egyptian, 143; Sundries, 53. As to mill stocks, and consumption of all kinds of cotton on the basis of spinners' returns, calculated per 1,000 spindles, Canada's stock (actual bales) on March 1, is given as 56.56, compared with 77.93 in 1913; 42.71 in 1912; 71.05 in 1911, and 59.55 in 1910. The consumption (actual bales) for the year ending August 31, 1913, is 132.70; 1912, 148.29; 1911, 138.83; 1910, 150.08. The world's totals for six years are as follows:—

	Spinning Spindles.	Spindles In Mills.	Totals.
1914 ..	144,704,012	132,059,812	4,862,494
1913 ...	142,186,308	126,714,982	4,769,535
1912 ...	139,312,870	123,564,126	4,200,413
1911 ...	135,596,724	122,226,091	4,060,740
1910 ...	133,121,004	119,154,411	4,166,688
1909 ...	130,795,927	113,752,697	4,266,927

These figures are estimated, and the cotton stocks given are actual bales, regardless of weight, at mills, from which returns were received.

BLENDING AND PREPARATORY PROCESSES IN WOOLEN SPINNING.---XI

THE ELIMINATION OF VEGETABLE MATTER.

By JOHN W. RADCLIFFE.

Some knowledge of the elimination of all vegetable matter from either loose wool, pulled waste, or rags is very highly essential in the manufacture of pure woolen yarns or fabrics. The process by which this is accomplished is either mechanical or chemical, according to the form the vegetable matter assumes in the material to be dealt with.

The mechanical burr extractor has already been dealt with, so that we may now confine our attention to the elimination of vegetable matter, by means of chemical re-agents in the process known universally as carbonization.

It may be mentioned that even the best type of mechanical burr extractor known is unable to cope with some types of very profusively infested wools, whilst the extracting of cotton and other vegetable threads from rage or yarns is entirely out of the question by such a process.

The term "carbonization" is derived from the carbonized appearance of the vegetable matter under chemical treatment, and which, if properly carried out, converts the cellulose of such organic matter into hydrocellulose, which can be easily removed afterwards.

The action of chemical re-agents on the wool fibre is more or less harmful to its physical structure, but by the exercise of much care during each stage of the process, there need not be any appreciable deterioration in the material carbonized.

There is no doubt but what materials of various quality require various strengths of chemical re-agents, to enable the process of carbonization to be carried out the least harmfully, but if the foreman responsible for the process will carry out simple tests with samples of the stock to be carbonized, his observations might be very helpful in ascertaining the most ideal conditions for dealing with the bulk lots. This could be done by taking samples and subjecting them to the carbonizing re-agents at different strengths, then by means of a small laboratory oven, the most desirable temperature could be determined as well as the most suitable strengths of the neutralizing agents afterwards.

It is obvious also, that in carbonizing loose wools, the type of burr or rather vegetable impurity with which the wool is infested is to some extent a determining factor of the strength of the chemical re-agent used, as the harder the vegetable matter is physically, the stronger must be the chemical re-agent applied.

In any case, however, these points make it clear that the foreman in charge can, in an experimental way, do much that will assist him in finding out the modus operandi for dealing with the bulk lots of the material for which carbonizing is essential.

Carbonization involves two methods of treatment, one known as wet carbonization, and the other as dry carbonization.

In the former the material to be carbonized is treated with some chemical solution, whilst the latter necessitates the use of some gaseous acid such as hydrochloric.

The re-agents most commonly used are as follows:

Sulphuric Acid, H_2SO_4

Aluminum Chloride, la_2cl_6

Bisulphate of Soda or Sodium Hydrogen Sulphate, $NaHSO_4$

Magnesium Chloride, $MgCl_2$

Hydrochloric Acid or Muriatic Acid, H C L.

In well organized carbonizing plants there are six operations in dealing with burry wools. First, the materials are subjected to the action of one of the acids re-agents, either in solution or gaseous state, to destroy the vegetable matter which the material contains. Secondly, the superfluous acid should be removed by some such device as the Hydro Extractor, which will be subsequently dealt with. Thirdly, the drying or baking of the material, which at a suitable temperature reduces the vegetable matter to a hydrocellulose state. Fourth, mechanically crushing and shaking out the carbonized matter in the form of powder. Fifth, the saturating of the extract wool in clean water, to weaken the concentrated acid upon the wool fibre. Sixth, the immersing of the wool in an alkaline bath, to neutralize all the acid that remains.

On the continent the theory is held that wool should be carbonized in the grease, as the latter tends to preserve the fibre's delicate structure from the effects of the acid.

It must be remembered, however, that the acid acting upon the grease liberates the fatty acid, and fixes the grease more upon the fibre, making it more difficult to get rid of in the subsequent scouring operations, and retarding the neutralizing effect of the alkaline solution.

All the re-agents given are used in this country, as well as on the Continent, and in America, but the most common is the Sulphuric Acid treatment.

All the re-agents given, except the hydrochloric acid, are applied in solutions, and the various strengths of the different solutions are obtained by the use of Hydrometers, and indicated by the specific gravity of the same, or in degrees Twaddell or Beaume.

The strengths of the liquids vary according to the material to be treated, and whether the vegetable matter is hard or tender.

The strengths used in practice vary considerably, from 3½ to 8 deg. Be. or about 5 to 10 deg. Tw. When the higher densities are applied, then the temperatures must be lowered, or the time for baking reduced.

It will be found that strengths for the acid, 4 to 5 deg. Be., or from 6 to 8 Tw., will be most useful, and sufficient for the majority of wools, without any appreciable detriment to them.

It is always better to employ a fairly high temperature and weaker acid than vice versa.

If an acid solution of 4 deg. Be be employed, then the temperature must be from 70 to 80 deg. centigrade or 160 to 170 deg. Fah., but should the strength of the acid be reduced 2 deg. Be, it will be necessary to raise the temperature in the baking process to 100 deg. Cen. or 212 deg. Fah.

The temperature and duration of the process is governed by the re-agent and its strength, and to a smaller extent on the quantity of vegetable impurity to be removed. It is well to remember that a mean temperature must be applied until the superflous moisture is driven off, and then to gradually raise the temperature until carbonization is complete.

Sulphuric acid has a great affinity for water, a fact the most elementary student of chemistry is cognizant of; also substances containing cellulose (C_6 H_{10} O_6) are mainly composed of Carbon, Hydrogen, and Oxygen, the latter occurring in the same proportion as in water. By adding Sulphuric Acid to such substanes, it acts upon them in such a manner as to remove some of their Hydrogen and Oxygen, leaving a portion of the water of hydration in less stable combination with its other constituents.

Thus, by the application of heat, the vegetable matter (which is made up largely of cellulose) is caused to lose some of its hydrogen and Oxygen, and it is thereby converted into a friable hydrocellulose of a brittle be removed from the wool by agitation.

If the carbonizing process is accomplished effectually, the vegetable matter will be removed in the form of brown carbon.

It is essential in the first place to impregnate the wool containing the vegetable matter with the acid, either by steeping in lead-lined tanks, or by passing through a machine, similar in construction to any ordinary scouring machine, but essentially lead-lined to preserve the machine from the effect of the acid. When the wool has become thoroughly saturated it should be whizzed in an hydro extractor to remove the superfluous acid, which can of course be conducted back by means of lead pipes to the steeping tanks.

The acidified stock may then be passed to a drying machine, and subjected to a mean temperature, to remove the ordinary moisture, after which the temperature is raised to reduce the organic matter to ashes.

After baking in the manner referred to, the organic matter will have been converted into hydrocellulose, which should then be pulverized or crushed and got rid of by shaking. It is advisable at this stage to pass the stock through a bath of pure water, prior to subjecting it to the neutralizing agents proper.

This is not essential, but it will be found that weaker alkaline solutions will suffice for neutralizing than otherwise.

The stock may then be neutralized by the alkaline re-agent, and rinsed again in pure water to remove any alkali that may be present, as this will, if allowed to remain, be as disastrous as the presence of acid.

Although the Sulphuric Acid treatment has been popular for many years, the other re-agents have been and are very largely employed.

One of the most recent re-agents used for carbonizing is bisulphate of soda and is known as Spennarth's process. One advantage in using this re-agent is that the sodium hydrogen sulphate salt used is about 40 per cent. cheaper than Sulphuric Acid, and as the friable hydrocellulose formed is of a white compound, the purity of color in white materials is fully retained.

In addition, it is claimed that this re-agent actually increases the strength of the materials carbonized, although the burrs are more difficult to crush if too long an interval is allowed between drying and crushing.

In any case its merits seem to be such as to deserve a little research and experimental work by those interested commercially.

In carbonizing this re-agent the density of the bath is greater than in the sulphuric acid treatment, and varies from 5 deg. to 6½ deg. Be. or 6½ deg. to 10 deg. Tw., also the material is immersed for a longer time owing to the reduced strength of the re-agent.

The aluminium chloride process has been in operation since the year 1874, and is known as Joly's process. The material to be carbonized is steeped in a solution of this re-agent, the density of which should be about 6 deg. to 8 deg. Be., the material being allowed to steep for about forty minutes. After removing some of the superfluous chloride by whizzing in an hydro extractor the material is dried to a temperature of about 50 deg. Centigrade or 112 deg. Fah., after drying, the temperature for baking is raised to about 105 deg. C. Magnesium chloride is also used at a strength of about 5 deg. to 8 deg. Be, the temperature for drying being similar as in the aluminium chloride treatment, though for baking the temperature will be required at about 115 deg. Centigrade. The reason for this high temperature is that the hydro-chloride acid gas is not liberated from these chlorides at temperatures lower than those given, and it may be mentioned that aluminium chloride gives off a much higher percentage of the H C L gas than does magnesium chloride, though the former is the more costly to use.

At very high temperatures both these chloride salts from oxychlorides, which have a somewhat injurious effect upon the material if allowed to pass unnoticed.

The oxychloride formed by the heating of aluminium chloride possesses an acid reaction, whilst when magnesium chloride is heated, the reaction is strongly alkaline.

The chief advantages of the chloride treatment may be summed up as follows:—

There is no disagreeable smell, as is the case in H_2 SO_4 acid treatment.

The danger of staining the wool with iron rust is eliminated, as the chloride does not attack the iron of the machines.

The wool by this treatment retains its elasticity, softness, and natural handle to a greater extent than when carbonized with acid solutions.

Wool carbonized with aluminium chloride after being stored a short time gains about 5 per cent in weight.

Its chief disadvantages are as follows:—

The chlorides may suddenly lose their carbonizing strength, so that the process becomes somewhat uncertain, and H_2 SO_4 is unfailing as regards its carbonizing strength.

Stock carbonized with chlorides do not seem to take certain colors as well as stock carbonized with sulphuric acid (oil of vitriol).

The chlorides also have a tendency to decompose into a sticky compound that coats the inside of the dryers and dusters and must be periodically scraped off.

(To be Continued.)

London board of trade returns for April show exports of worsted yarns to the United States of 172,000 pounds, compared with 8,800 a year ago; woollens 464,000 yards, against 116,000 a year ago; worsteds 2,031,000 yards, compared with 795,000 a year ago.

Hewson Pure Wool Affairs

The special committee appointed to investigate the operations and business of the Hewson Pure Wool Textiles, Limited, Amherst, N. S., filed their report last month. The committee censured the management because of the condition that has come about, and recommended a plan of financing in the hope of at least partially saving the investments that had been made in the company. They suggest that the bondholders, and preferred shareholders appoint a committee, or select some reliable trust company, to act as trustee, and arrange to deposit with that trustee all the bonds and preferred shares, with instructions to bid in the property. If the property were purchased by this trustee, a new company would have to be formed. From $100,000 to $150,000 additional working capital would have to be provided. This money might be raised by issue of short term notes, say ten years, or debenture stocks. An arrangement then could be made to give common shares in the new company, at par, to holders of the present preferred shares, upon terms which could, no doubt, be made satisfactory. So far as the old common shares are concerned, the committee has no suggestion to make, as every one is aware that they are valueless."

At the meeting of shareholders held on April 22, to consider the report, there was a remarkable expression of desire for co-operation, and it is felt that if it is at all possible that the industry can be saved it will be. If what the committee profess to think of the old management is correct, they will all have to disappear. If a new directing force is secured, equal to the occasion, and the proposed issue of $150,000 bonds is secured, there is no reason why, when times improve and trade conditions are better, the company should not yet become the success which the orginal prospectus anticipated it would have become before this.

Eastern States Notes

(From Our Special Correspondent.)

Conventions of bodies connected with the cotton was held in Boston during the week have held the attention of all men connected in any manner with the textile trade in the Eastern States. The conventions have been held in New York, where the American Cotton Manufacturers' Association met; in Boston, where was held the annual gathering of the National Association of Cotton Manufacturers; and in Augusta, Ga., where the conference called by the Augusta Cotton Exchange and Board of Trade is meeting this week.

The latter meeting is the one which it is hoped much relief will come from for the growers and the buyers of cotton. The methods pursued by some of the Exchanges, notably the New York Cotton Exchange, will probably be adopted reforming the present methods, before the adjournment of the gathering in Augusta.

Tracy I. Hickman, was elected President of the American Cotton Manufacturers' Association on the closing day of the session. He is President of the Graniteville Manufacturing Company of Graniteville, S.C., and last year was vice-president of the association. The other officers elected were as follows: Vice-President, Scott Maxwell, agent of the Indian Head Mills, located at Cordova, Ala.; Secretary and Treasurer, C. P. Bryant.

National Association of Cotton Manufacturers.

At a meeting of the National Association of Cotton Manufacturers which was held in conjunction with the Textile Show in Mechanics Building, Boston, Mass., Albert Greene Duncan, of Boston, Treasurer of the Harmony Mills of Cohoes, N.Y., was elected President. Mr. Duncan has been active in the affairs of the association for some time.

The other officers elected at the meeting were as follows: Vice-Presidents, William M. Butler of New Bedford, Mass., and Grosvenor Ely, of Jewett City, Conn.; Secretary and Treasurer, Dr. C. J. H. Woodbury, of Boston; Directors (for three years), Philip Dana of Westbrook, Me.; William A. Mitchell of Lowell, Mass., W. Frank Shove of Fall River, Mass., John Sullivan of New Bedford, and Alexander Makepeace of Fall River.

Canadians in Attendance.

Among the members in attendance at the convention of the National Association were the following from various mills in Canada: Alexander A. Adams, manager of the Canadian Cottons, Ltd., Hamilton, Ont.; William V. Boyd, manager of the Canadian Cottons, Ltd., Cornwall, Ont.; John B. Cudlip, manager of the Cornwall and York Cotton Mills Company, St. John's, N.B.; F. G. Daniels, general manager of the Dominion Textile Company, Ltd., Montreal; Arthur O. Dawson, of the Canadian Cottons, Ltd., Montreal; J. Whidden Graham, Superintendent of the St. Croix Mill, of the Candian Cottons, Ltd., Milltown, N.B.; John Lowe, Jr., general manager, secretary and treasurer of the Montreal Cotton Company, Valleyfield; Charles H. Potter, Superintendent of the Empire Cotton Mills, Ltd., Welland, Ont.; and James M. Young, manager of the Hamilton Cotton Company of Hamilton, Ont.

Curtailment of Production.

An effort was made during the past two weeks by certain of the New York brokers and converters to secure an agreement among the cotton mills of the Eastern States for a curtailment of about 50 per cent during the month of May. This movement was received with favor in some parts of the States, but other manufacturers stated plainly that there would be no curtailment if they could avoid it.

Among the cotton spinners of the South there has been some curtailment, but there has been no attempt on the part of the manufacturers to work together for a general shutting down of plants during the month. Several of the cotton yarns commission men of the Northern States have been notified by their Southern mills that orders for June delivery would only be taken subject to enough business to re-open the mills.

Most of the cotton men of the States are sitting tight waiting for the business which it is hoped will be secured during this month and next. They do not care to close their mills if they can avoid it, because there has been a movement on foot among the manufacturers for some months past looking toward the betterment of the conditions under which the help work and live. This has been put into words by one of the leading mill men of New England, President Henry Clinton Dexter of the Southern New England Textile Club as follows: "We have come to realize at last that we owe something to the people who have settled in our villages and who have worked for years in our mills. No longer must we look upon our mills as a means of revenue only, to be closed at any time when we are not able to make the best of profits, but we have come to look upon our employes as our brothers, and as such they are entitled to the best that we can give to them. To this end, we are going to keep our mills going, even if we have to suffer some material loss beside that of lost dividends, and just so long as we can stand the strain, our employes will share with us just what we get."

The foregoing statement was made at a meeting of the club recently, and was heartily concurred in by all of the members present. These members represent more than $500,000,000 worth of mills in New England, and for that reason the words are taken at more than their face value.

The Wool Markets.

The wool situation both in Boston and Philadelphia has been quiet during the past month. Domestic wools are exceedingly scarce and have been so for the past two months. The total trading during the weeks has been small, and one week the total sales of domestic wools of all kinds amounted to but 1,500,000 pounds. Foreign wools have been arriving freely and there has been some little trading, but the wool dealers have found the mills pretty well filled up with domestic grades, and loth to pay the high prices asked.

During the past two weeks the principal trading in wools, in the Boston market especially, has been in the foreign staple, and the supply of Territory in the grease, pulled and scoured wools of various kinds, and Ohio fleeces, Texas and California fine clothing wools have been almost taken entirely from the markets. New Utah and Nevada wools have been offered to the mills recently for 20 and 22 cents a pound in the grease, the estimated scoured basis being 53 to 55 cents.

There is not much demand for foreign wools from the majority of the mills at this time, because it will be impossible for them to use these wools until the beginning of the new heavy weight season in most cases The most conspicuous wools in the movement which has been noticed in the foreign wools have been the Australian merinos and cross breds, with a very fair business being done in Montevideo and New Zealand wools. Full prices have been realized in the recent sales which have been made.

Arrivals of new wools from the West have been slow, cold and wet weather having held up the shearing of the sheep to a large extent. Some new Arizonas arrived in the Boston market last week, and the opening prices were at 21 and 22 cents. This brings the scoured prices up to 53 and 55 cents. Moderate sales have been announced on the above basis, and a good-sized transfer of Territory half-blood was announced last week, the scoured basis being 53 cents. Last week's arrivals of foreign wools at the port of Boston were the smallest since last December with the exception of two previous weeks.

The following are some of the prices at which foreign wools are held on the scoured basis: Sydney 64s-62 and 63 cents; Port Philip 64s-64 cents; Sydney 60s-58 cents; Geelong 60s-61 cents; Australian 50s-52 cents; 46s at 40 and 42 cents; and 36s to 40s at 35 and 40 cents; Buenos Aires high quarters are quoted at 25 cents in the grease, while low quarters are quoted at $23\frac{1}{2}$ cents in the grease; Lincolns are quoted at 23 cents in the grease

Foreign tops are being tested by several of the manufacturers here and the position that they will occupy in the coming season is uncertain as yet. The reports that come from the different mills are interesting in their diversity, some of the mills having found them wholly unsuited to their needs, and unreliable in the extreme, while other mills report that they are very satisfactory. Labor cost is the only difference between the prices of foreign and domestic tops, and the small duty on the former about equals the difference.

PROPOSED ASSISTANCE TO ASSOCIATIONS OF WOOL-GROWERS.

The Live Stock Branch of the Dominion Department of Agriculture is prepared to offer practical assistance this year to Associations of Wool Growers in the preparation and display of their wool clips for market. Associations, in order to receive this aid, must be organized in accordance with the regulations of the Branch, and membership is limited to actual owners of sheep. West of Fort William an Association must contain at least 3,000 sheep, or sufficient to comprise one car-load of wool; east of there, a relative number. The services of expert wool classifiers, who will take charge of and perform the grading classifications and preparation of the wool, will be provided.

This proposal represents much more than a mere continuation of the work undertaken last year, when two wool classifiers, in the employ of the Live Stock Branch, visited the Western Provinces and gave practical instruction and advice to sheep-raisers upon wool growing. Rather it means the introduction of a definite scheme whereby wool producers may be actually assisted in preparing and presenting their wools upon the market in the most acceptable fashion, and thus be in a position to cater more directly to the requirements of the market. Moreover, it should prove effective in developing and improving the general status of sheep-raising and in creating an impetus to the production and preparation of an improved grade of wool and indirectly a better class of mutton.

The Branch will also provide the means for the establishment of a central bureau for the distribution of current information respecting domestic and foreign markets of wool, so that the Associations may be constantly in command of complete knowledge concerning the source of the demand and the ruling price of all grades. Reliable information of this nature will serve as an excellent asset to an Association in directing its policy of placing it in closer relationship with the demands of the trade.

In Saskatchewan the Provincial Government is also preparing to give assistance to the wool growers of the province in the way of marketing the wool. A bulletin has been issued giving directions as to the proper method of preparing wool for market, and each producer who follows these directions can market his clip through the Department of Agriculture at Regina, where warehouse facilities have been provided, and where it will be graded. A liberal advance will be made as soon as possible after receipt of the wool, and a final settlement will be made when all of the wool has been sold, after deducting the cost of twine sacks and other necessary expenses.

Warp Threads and Fabrics

Warp knitted fabrics are now extensively used in the manufacture of both plain and fancy knitted goods, and with the possible exception of hose and half-hose —although, even in this case, warp knitted legs and insteps have been made—all classes of garments are made, to a considerable extent, from warp knitted fabrics.

It is somewhat surprising in these days to find that there is still a kind of half-expressed prejudice against the manufacture of warp knitted goods. Manufacturers who cannot help admiring the qualities of a warp knitted fabric, who openly express their approval of the many excellent designs that can be made on warp knitting looms, and who are frequently asked for warp knitted articles, are still reluctant to add warp knitting looms to their plant of knitting machinery. They may be heard to remark that there is too much preparation; that it does no pay to make small orders; that there is a difficulty in obtaining the right sort of labor, and that there is a scarcity of capable designers, but the fact that these remarks are passed seems to show that there certainly is scope for the extension of the warp section of the knitting industry, or otherwise some of the above remarks could not logically be made.

It is true that in some lines of warp fabries, as with other classes of knitted fabrics, prices may be cut owing to the fact that these goods have been made for a number of years, but the manufacturer is not advised to take up lines in which he must meet with severe competition of others who have been in the trade for a considerable time, and who, in consequence, know that particular branch of the business from A to Z.

Quite to the contrary, the manufacturer should say I am producing underwear, jerseys, coats, shawls, scarves, ties, or what not, on weft knitting machines, and in some branches I am considered a specialist. Can I, with advantage, make other lines of similar articles on a warp principle? Is the warp fabric suitable, and, if so, can I produce cheaply? In many cases the answer will be in the affirmative ,and there seems no doubt that for well-established firms specialising on certain articles, the addition of a range of warp samples, would add to their prestige, and it is only where a manufacturer is in a small way and totally non-technical that the addition of warp machinery is not advisable.

Perhaps one of the points which a manufacturer objects to in the making of warp knitted goods that of the prior warping of the threads. Warping necessitates the winding of the yarn on to a number of bobbins and then transferring the multiple threads on to a beam For this purpose a warping stage and mill is required. The stage is simply a convenience for holding a number of bobbins, an average number of which may be taken as 72. These threads are then wound on to one part of the mill which may be likened to an extended reel. The threads are passed through holes in a warp plate or between vertically disposed points in order to evenly distribute the threads, and in some cases a slight traverse motion is given so as to spread out the warps. After a definite number of turns have been given to the mill, the stage is shifted so that a similar warping can take place adjoining the first set of warps, and so on until the whole of the threads are on the mill. The threads are then worked off the mill on to the warp roller or rollers of the warp knitting loom. The advantage of the intermediary warping mill will readily be seen, as owing to the large diameter of the reel a large amount of warp can be put on at an equable tension.

There has been much discussion lately about the warping of artificial silk, as owing to its constitution and structure it does not lend itself so readily to the process of warping. This weakness of artificial silk, point, as in many cases the artificial has been warped however, has not been considered from the right standwith the same amount of sangfroid as is practised in the case of worsted. It should be borne in mind that the warping of artificial silk yarns must be effected with great care, due notice being taken to keep it under tension and see that the knots are properly tied and placed. Porcelain or glass guides should be used in the winding, and knots kept at the bottom of the bobbins.

The mounting of the warp rollers and the drawing in of the thread is the next operation. The beams should be placed in position and the threads drawn in through the holes in the guide bars in the prescribed order, and finally through the holes in the guides themselves, a hook similar to the binding-off rollers, being attached to the strings of the latter in sets. Care must be taken to preserve an equal tension on all the threads. The exact methods used in starting are naturally dependent upon the particular type of loom that is being used. Bearded needle and double rib latch needle looms are practically self starting, although the latter must have the requisite drawing-off power applied, as also are single rib latch needle looms with sinkers. Single rib latch needle looms without sinkers require the first lap to be taken below the latches before the making of the second lap. The first few laps should be watched carefully so that it can be seen whether each needle is taking the thread properly. Selvedge threads supplied from bobbins should be drawn in where the guides do not lap continually round working needles.

The setting up of the loom is, after all, a simple matter, and given proper instructions, an intelligent worker, although unskilled in the manipulation of a large number of threads, soon becomes proficient It is well known that in the weaving trade where warping is the trade basis, that loom mounting is a specialised operation, and even in warp knitting, if sufficient looms are in use, it may be found profitable to subdivide the labor in a similar manner. In this way the question of obtaining the right sort of labor would soon be overcome, and by introducing specialised labor for warping, mounting, and operating, it would then become necessary to possess an experienced designer who could adapt himself to the manufacturer's specialities, who could make the design in accordance with the use of the intended article, not as has so often been the case; revive an old design for a new article

Would the organization of the warp knitting trade on these lines give an impetus to the industry? In this age of specialisation, and given a numerical sufficiency of machines, there is no doubt that this would be the most rational method of procedure.—Hosiery Trade Journal.

PERCENTAGE TABLES

Under the above title the Cassella Color Company has published for free distribution to dyers a table for conveniently and accurately calculating into pounds, ounces and grains the percentages on given weights of material to be dyed. Such a table is almost of hourly use in a dyehouse, and as it is of ample size, being 8½ by 16 inches, it can be tacked to the wall of the drug room to advantage or mounted near the dyer's desk.

TEXTILE MACHINERY EXHIBITION IN MANCHESTER

(From Our London Correspondent.)

If an exhibition does anything for the advancement of an industry it certainly brings to light the latest improvements in machinery, and that is what the Manchester exhibition has been notable for. My visit to it was of short duration, but sufficiently long to prevent me from dealing extensively in the Canadian Textile Journal with all the spinning, weaving, winding and finishing machinery, not to speak of fibres, hosiery machinery, filters and fans, etc., etc., that came before my notice. Manufacturers turned up in their hundreds at the exhibition, and Sir Arthur A. Howarth, Bart., who performed the opening ceremony, said there were people to-day who took the view that labour saving appliances were not altogether good. He wondered if people who thought like that ever allowed their minds to go back and imagine what would have happened to Lancashire if their forefathers had held such opinions. Lancashire would have been, comparatively speaking, a desert county to-day.

A tour round the stands showed up some good exhibits. Messrs. Hans Renold, Ltd., had a model woollen carding engine side with chain-driving applied. The firm, which belongs to Manchester, says this method of driving the scribbler, carder and tape condenser, is certainly an advantage in securing regular condenser ends, and it has been proved by tests that actually a 10 per cent. higher production is secured from the mule owing to the regularity thus obtained. Several other examples of chain driving were also shown. In hosiery machinery some excellent samples were seen on the various stands, and probably one of the most attractice was the Terrot machine, which is a French circular frame with bearded needles. Its characteristic parts are the large loop wheels (placed obliquely), containing movable sinkers. Behind each loop wheel the knocking over motion is placed, with a small presser wheel, and as soon as the sinkers of the loop wheel have brought the stitches between the beards and in front of the heads of the needles the beards of the needles are pressed by the small presser wheel, and the old stitches are at once knocked over the new ones by the knocking-over motion with vertical jacks, so that the new stitches have no time to slip back. For this reason it is claimed for the Terrot machine that worsted cashmere, wool, silk and other fibres can be worked like cotton, without being moistened, steamed, or oiled, which in itself is a great saving. Another attractive exhibit was a patent baling press, which is designed to give a maximum pressure of 25 tons. It possesses several advantageous qualities. An improved roller stamping machine has been designed to meet the increasing demand for a superior style of stamping trade marks of intricate design on dhooties, jacconettes, etc., for foreign markets.

In weaving machinery, Messrs. Hacking and Co., Ltd., installed a battery of six plain looms, 44 in. reed space, weaving two and two twill, 40 in. wide, 82 picks per minute. The weft used was No. 22's, wound by the International Winding Co., Ltd., on to pirns, 7 in. long by 1¼ in., containing 2,140 yards. The looms were bushed in all bearings, and it is interesting to note that three of them were fitted with "skefko" ball bearings. The looms were running at 200 picks a minute. Messrs. Barlow and Hocknell, of Huddersfield, were showing wire healds for all classes of work, and a rather interesting form is that for weaving wire gauze, whereby should a trap of the shuttle occur the healds will give way, and thus obviate breakage of the wire warps. Amongst the other specialities may be mentioned a new machine for twisting-in This machine works across super-imposed warp threads of an old and new warp, it selects the correct one in each, and twists them together in such a way that the join will easily withstand the strain placed on it when drawn through the healds. I am told this machine can displace six operatives. Another good machine is that for leasing. It forms a lease in dressed warps. The mechanism, although not so intricate as that in the twisting-in machine, is modern and ingeniously constructed. A detector selects a thread and by moving the thread in a direction opposite to the travel of the leasing mechanism, operates a trip lever which actuates a threading needle. This actuation of the threading needle can only be effected by the selection of a thread. Amongst the winding machinery I noticed an automatic knotter, by which manufacturers can reduce winding costs and operatives can secures considerable advantages. Besides the increased production there is the advantage of evenly tied knots with short ends, which is of very excellent service in the production of all kinds of fabrics.

In the spinning, weaving, and winding machinery the stands contained numerous examples that are to be seen in Canada and America to-day, and what made the exhibition more attractive and interesting was the fact that fully 80 per cent. of the exhibits were working. This enabled one to study the good points of the numerous machines. Incidentally Sir Arthur Haworth, Bart., explained that a vast majority of the spindles and looms of the world were made by the British machinery makers. In 1900 England exported some £19,500,000 worth of machinery, and in 1913 that had increased to £37,000,000. Great Britain today had over 58 million spindles, and in the United States, where they had cotton on the spot, there were only 32 million spindles. Germany came next with 10 millions. It had been stated that Japan was coming, and would increasingly become England's most formidable rival in the cotton trade. So far there were only 2,-200,000 spindles in Japan. As for looms, Great Britain had 786,000, the United States over 700,000, Germany 230,000, Russia 213,000, India 88,000, and Japan 20,000.

Canada might very well take a pattern from the book of promoters of the Manchester exhibition It was organized to secure exhibits, each of which should represent some new movement in the textile industries, and it may fairly well be said that the object was fully accomplished. Demonstrations of the effectiveness of grey weft winding for looms, the better treatment of cotton waste, the increasing employment of chains for driving, the application of ball and roller bearings, new methods of humidifying, ventilating and heating sheds were all to be found in the exhibition which closed on the 15th April, after being open since the 27th March.

English Woollen and Worsted Trades

(By Our London Representative.)

London, April 28, 1914.

Most of the British manufacturers are complaining that new business is difficult to get in the woollen and worsted trades, that present prices seriously reduce their margin of profit, and that the cost of production continues to increase. A larger output would be some compensation against these difficulties, but so far the volume of business passing has fallen much below that of the early months of 1913. Comparing, however, the state of trade in April with that of February and March in this year, there is a decided improvement, and the undertone is reported to be good.

At Huddersfield the cloth trade is in a quiet state, due to the decreased home demand, while a serious coal strike has upset business. Canadian shipments of tweeds are reported to be barely up to the average of other years, but manufacturers are under the impression that the demand from the Dominion is likely to be more extended within a month or six weeks' time. Generally there is at Huddersfield a beter demand for tweeds than for fine worsteds, the former trade being augmented lately by a steady flow of orders for Whitsuntide and summer, and there appears to be no change in the popular taste as far as patterns and designs are concerned. Greys and browns in a great variety of shades lead the way, and styles are quiet. The United States' demand for high-class worsteds and woollens, which has now reached very large dimensions, is still expanding. But worsteds and woollens of thin web are shipped in small quantities to Canada and South America. While there is an absence of rush in the mills, tweed producers are better employed than fine worsted makers, and in several Colne Valley mills full capacity is resorted to.

In Batley, Morley, and Dewsbury, the woollen cloth trade, especially in low grades, has improved and from Canadian sources orders are to hand for tweeds for ladies' wear in larger quantities than was ever expected, while there is also a good demand from the Dominion for stylish patterns for suitings in stout fabrics. Manufacturers are firm as to prices ruling, the cost of wool, they maintain, and other raw material allowing of no reduction. Batley and Morley are likely to suffer in trade with Turkey, as the Ottoman government propose to raise the tariff on cheap woollens from 11 to 15 per cent., and, of course, other markets will have to be sought to make up for losses. There is a fair demand for white blankets and rugs, particularly coloured rugs for motorists. Carpet manufacturers in the Spen Valley and Dewsbury are only moderately employed, and orders from Canada and the Colonies, in addition to London, are not up to the usual mark. Liversedge flannel manufacturers are doing rather better, and business with the Canadians is reported to have slightly improved since the beginning of April. Prices are very steady.

The Rochdale flannel trade, I am informed, is in a flourishing condition, and there is every indication that manufacturers will work full capacity for many months to come. The booked orders, although not so large as in previous years, are quite as numerous, and business with Canada is fair, but not up to expectations. From all accounts, stocks of flannels in England and other countries are very low just now, and the policy is to carry on a "hand-to-mouth" trade during the spring and summer. Sports flannels are going well. There is a shortage of flannel weavers in Rochdale, and it is feared that the execution of orders for the home and shipping trades may be delayed. In Leeds the high price of goods is causing buyers to act with caution, and they are only buying what they cannot do without, and avoiding any risk in speculation. Manufacturers say they cannot give any concessions. There is, however, a fair average trade being done, and most of the mills are kept going pretty well. Mills making tweed sand serges suitable for the clothing trade are the busiest. The worsted manufacturers, are not so brisk owing to the high prices. From Canada the demand is about on the same average as this time last year, while the orders from the States show a marked increase. Manufacturers in the Hawick district report a slight improvement in trade, but there is not much to look forward to in the near future. Orders for October and onwards are being received in fair bulk, but on the whole it will take a very considerable increase to bring matters up to a fair average. Spinners have a fair amount of work on hand, but there is no great demand for yarns. The hosiery branch of the trade is in a good condition, and better than has been experienced for some time.

Turning to the linen trade, in Barnsley and Belfast there is a moderate amount of business being done. Buyers are cautious and show little disposition to place bulk orders, except at unworkable prices. The market appears to have moved a step forward, and if the business now held in abeyance in the hope that lower prices comes out, it would quickly respond.

For the information and guidance of Canadian mill owners, I append a notice that has been circulated by the London Chamber of Commerce journal to the British manufacturers. The notice says: "The trade in articles of hosiery in Canada is very important. There is a large sale for silk hosiery, including wool and silk mixed, and for stockings, underclothing and men's scarves. Cotton hosiery is sold to a still larger extent, the articles in greatest demand being stockings, socks and underclothing. There is an extensive sale for ordinary qualities of these goods. Payment is usually made 30 days after receipt of the goods with discount, or at 60 days net." Manufacturers in the Dominion would do well to make a note of this, and so prevent as much trade as possible from being taken out of their hands.

WOOL DYEING.

We are in receipt of Supplement Number 50 to the Cassella Color Company's book of Wool Dyeing, descriptive of two new products, designated respectively Brillian Milling Red R and B. These two new dyestuffs will be found of particular value and interest to dyers of blankets, flannels, yarns for shot effects, and selvedges, on account of their remarkable fastness to Alkalis, stoving and carbonizing. For wool printing, these two new Reds appear to possess the remarkable advantage of yielding prints of particularly good fastness to washing, which should prove of interest to manufacturers of printed fabrics.

The Supplement is illustrated with a series of eight dyeings, showing the colors on yarn and slubbing. Copies may be obtained without doubt upon request made to any of the branches of the Cassella Color Company.

Methods of Reducing the Fire Hazards of Cotton Convoyers

Read Before the National Association of Cotton Manufacturers at the recent Convention Held in Boston, Mass.

By H. A. BURNHAM,

The writer had the pleasure of presenting at the last New York meeting of the American Society of Mechanical Engineers a paper describing the safeguards usually applied for the prevention and control of fires starting in connection with cotton conveying systems. The paper was quite closely limited in its scope to the arrangeemnts of the various parts of the conveying systems necessary for the greatest degree of safety, and in this connection interesting discussion was brought out, touching on the fire hazards present in cotton airing rooms and in picker and dust rooms.

The very close relationship of this subject to the work in which the members of your Association are engaged encourages me to present this matter to you with the hope hat there may be further discussion of the advantages, possibilities or difficulties attending the use of these systems.

The paper describes briefly methods of limiting the number and extent of fires such as occur from known causes in connection with the preparing processes of opening and picking. The methods described are the results of the experience of many of the best known cotton mills in America, whose continued co-operation with the Associated Factory Mutual Fire Insurance Companies has been instrumental in developing this class of apparatus up to its present standards of greatest safety and efficiency.

such fires form from 50 to 75 per cent of all cotton mill fires reported and the key to the problem of preventing them is the removal of foreign substances from the stock, it being well known that this large percentage of fires is caused by such substances as bits of metal, stone, or matches which find their way into the cotton and that the vigorous treatment the cotton receives i nthe pickers is sure to seek out such material with troublesome and perhaps dangerous results in the form of fires.

None of this foreign material is more difficult to remove than matches, as they are too light in weight to separate readily from the cotton by ordinary means. In this matter more than in any other, preventing the matches from entering the stock is the only true solution of the problem. This has been actually accomplished in effect in many mill properties by providing the help with safety matches to the exclusion of all other kinds.

The particular point in these preparing processes to which attention is directed is the mechanical arrangement of the conveying apparatus used for transferring cotton from the bale opening room to the picker room. By proper arrangement of its parts, this apparatus has proved to be an excellent means of removing nearly all of the heavier foreign material from the cotton. There are records of many instances in which, by the observance of the simple precautions described, troubles from fires occurring with great frequency and regularity have almost entirely disappeared.

Pneumatic Conveyors.

It is hardly necessary to describe to you the machinery commonly found in opening and picker rooms, ther than to say that we are, in this case, concerned chiefly with the bale breaker in the opening room, the automatic feeder in the picker room and the conveyor operating between them, which may be of the pneumatic or of the mechanical type.

The pneumatic cotton conveyor, as it exists to-day, is the outcome of attempts made in earlier days to save the labor of trucking baled cotton from the storehouse to the picker room. Mills having storehouses separate from their manufacturing rooms, and especially the larger mills, found this labor a considerable item.

At that time it had been common practice to convey damp cotton from dye house to drier by blowing it through a long sheet metal pipe attached to the discharge outlet of a pressure blower, the stock being fed in through the suction inlet of the blower. In applying this method to dry cotton fed by hand, however, fires in the blow pipe were common, and the air blast made them so intense that the arrangement in this crude form was considered far too risky for general use.

In many kinds of work the action of the air on the cotton in transit was found to be beneficial to subsequent working of the cotton; so much so, indeed, that manufacturers who had not at first thought it worth while wished to use the blowing system.

The causes of these fires were found to be foreign substances in the stock, or the wedging of the cotton in the fan casing, due to the feeding in of masses which were too large to pass through. In some cases this fault was aggravated by the too small clearance in the fan between the blades and easing. The number of fires with this arrangement was considerably reduced in some cases by using blowers having bronze blades. The introduction of the bale breaker or opening machine above mentioned to take the place of the irregular hand feed also contributed materially toward the elimination of fires from these causes.

The general use of the cotton condenser in its present form, however, furnished means for avoiding the objectionable blast of air and coton in the bin or room, and of operating the entire system under suction instead of under pressure. This advantage of operating under suction entirely, however, was not at once recognized, and many systems were installed with the stock blowing through the fan, discharging to the condenser, or with an auxiliary smaller fan beyond the condenser and known as a dust fan.

The final step to the present practice was to eliminate the blow fan, and to make the dust fan large enough to produce the necessary air current, so making the cotton-carrying part of the system operate entirely under suction. This arrangement is known as a "suction" system.

The condenser consists of a slowly revolving cylindrical screen in a metal casing, with air pipe connections so arranged that the air current in passing through deposits cotton on the outer surface of the screen, from which it is removed by a small roll, the cotton dropping lightly from this roll.

Suction Systems.

Under the most favorable conditions, pneumatic systems arranged under suction have been successfully operated through pipes up to 900 or 1,000 feet in length, handling quantities up to 4,000 pounds of cotton per hour. The limiting distances and weights of cotton are determined by local conditions, such as size and tightness of pipes, number of bends, uniformity of feed, and adjustment of air passages through the condenser.

The sketch, Fig. 10, shows a modern safe cotton conveying system taking cotton from an opening room through a condenser on to a mechanical conveyor by which the cotton is carried to a number of automatic feeders. This combination represents the best modern practice in the larger mills. In mills handling various staples, the discharge is often into bins instead of into machines.

In planning a new system for cotton conveying and distributing, or in remodelling an old system, the following essential features of this arrangement should be obtained, as far as possible:

Removal of Foreign Substances.—Provision should be made for heavy substances to drop out of the stock before entering the conveyor pipe. This can be done by having the cotton pass vertically upward into the conveyor pipe, shaping the inlet like an inverted funnel or box over the feed table or apron, and making the vertical part of the pipe about 12 feet high. To obtain the desired vertical height it is sometimes necessary to use a long radius inverted U.

Location of Fan.—The fan should be so located that no cotton will pass through it. In cases of extreme length this condition can be met by installing two separate systems in series with a relay station at which the condenser of the first system discharges to the inlet of the second.

Disposal of Air Vents.—Air currents from the system should not discharge into the main rooms. This condition is usually met by discharging the air direct to the dust room.

Location of Pipes.—Long pipes should be generally located outside of main rooms and should not pass through important fire walls or floors. Trouble from condensation inside the conveyor pipe in cold weather, which sometimes arises, may be avoided by providing an auxiliary cold air inlet, and in difficult cases by covering the conveyor pipe, where out of doors, with non-conducting covering.

Pipes should have joints riveted in addition to being soldered and have suitable handholes for cleaning. This is to guard against breakage of the pipe in case of fire from inside or outside the pipe.

Variations from the arrangement shown in Figure 10 are frequently necessary, depending on the number of varieties of stock, the quality, and distance to be carried, as follows:

Omission of Bale Breaker. In the opening room of the smaller mills, the bale breaker or automatic feeder is often omitted and the cotton fed from a pile previously shaken out by hand from the bale. In this case the stock should be fed across a slatted movable table under the inverted cone of the inlet pipe. Uniform hand feed, however, is difficult and without the automatic feeder, frequent clogging of the condenser may result.

Omission of Mechanical Conveyor in Opening Room.—In some of the older systems or where more than one pneumatic conveyor is to be fed, the mechanical conveyor in the opening room is sometimes omitted by forming a pipe connection between the automatic feeders and the branches to the conveyor pipe. In such cases this connection may be in the form of a flattened conical pipe sloping downward and having an opening at the lowest point opposite the upward turn where heavy material may drop out.

Omission of Mechanical Conveyor in Picker Room.—At the picker room end, in case several staples are used, the mechanical conveyor is often omitted and the cotton delivered direct to bins through condensers. Under these conditions, the condensers may be piped in parallel with proper switches and the same fan used for all.

Pressure Systems.

In handling cotton mixed with some wool, as in knitting mills and felt mills, or in colored cotton mills using a large variety of colored stock, pneumatic systems are usually operated under pressure instead of suction. The reasons for this are: (a) stock containing above a very small percentage of wool cannot be successfully handled with condensers, the greasy nature of the wool causing the stock to stick and clog the mechanism, and (b)in handling colored cotton the bins are often so small and numerous that the use of a condenser for each is impracticable. Mechanical conveyors, also, are objected to by manufacturers for handling colored stock, on account of the liability of small tufts of stock caught in the mechanism afterward finding their way into lots of another color.

The pressure system, improperly installed, is dangerous to life and property, as the strong blast of air intensifies any fire in the pipe or near its outlet. The safest arrangement of such a system, where it must be used, is obtained by placing the cotton inlet and the cotton outlet both on the discharge side of the blower, causing the stock to enter by means of a hopper having at its bottom a vane or nozzle projecting into the conveyor pipe at such an angle as to cause an injector-like cone at the point of inlet. This device is practicable, however, only for distances up to about 75 feet. Another method adapted for longer distances is to use a pair of flexible surfaced rolls forming the upper part of an air-tight feed box.

At the delivery end, with either of the above arrangements, the pipe should terminate in a bin with tight walls with non-combustible surfaces, and with vent through a screen piped to such a point that no blast of free air can enter any important room.

Mechanical Conveyors.

Mechanical conveyors are often used between the opening room and picker room bins, or airing rooms. In such cases these rooms are usually near each other. The practice of passing these conveyors through openings in the partitions between adjoining bins has proved objectionable, as fire may enter several bins at the same time.

To avoid this objection, the conveyor can be placed over the tops of the bins, discharging through protected traps in the top. This arrangement requires considerable head room. Another arrangement is to place the conveyor high up at the front or rear wall of the bin and discharge it through small protected openings in the wall. This can best be done where the bins are not deep from front to back and where the conveyor discharges from its side.

In either case the openings through which bins are fed from mechanical conveyors should be protected by tight-fitting, tin covered shutters interlocking with the switch of the conveyor so any shutter will be open only when its bins is being filled

As with the best of machinery and with all the safeguards thus far described, we cannot hope to eliminate all fires as may still occur the extent be made as small as possible. This is especially desirable in mills which store temporarily in bins in the room, considerable quantities of opened cotton of various long staples, and is usually best accomplished by making the bins only moderate in size and making the partitions of adjoining bins tight from floor to ceiling.

Automatic Sprinklers.

Having limited the number and extent of fires, the matter of promptly controlling those which do occur should be cared for. In addition to the automatic sprinkler equipment, always needed at the ceiling of the cotton working roms, sprinklers should be placed in the bins, in the condensers, under travelling aprons, inside and under picker trunks and close over the cotton in the hoppers of the automatic feeders.

Airing Effects in Pneumatic Systems.

Reference has been made to beneficial effects produced on cotton by its passage through the conveyor pipe. The nature of this effect is probably akin to that produced by the so-called ageing, or airing process, as practised extensively in England, and to a less extent in this country. In that process the cotton is allowed to lie for several days in its opened state in large rooms provided for this purpose. In case of a large mill this may require exposing to air of 75 to 150 bales at a time, so whenever a fire occurs from any cause in one of these airing rooms the loss is likely to be unnecessarily great, due to accidental mixing of staples or wetting, or both.

That this beneficial effect does actually exist with a pneumatic conveying system is evidenced by the facts that (a) better working of cotton has been reported in some mills after this conveying system has been in use, even when the class of work done has not warranted the use of airing rooms. (b) Ageing bins have been discarded in certain mills where the pneumatic conveying system is in use. (c) Machines have been devised and brought into quite general use, whose successful performance depends partly on the violent agitation of cotton and air within the machine.

It is not likely that the advantages of the airing room for conditioning of cotton can be supplied by a pneumatic conveying system or by any machine at present known, because the element of time appears to play an important part in the effectiveness of the airing room for treatment. It is doubtless possible, however, with the aid of these mechanical devices, supplemented by air conditioning apparatus designed to produce a definite degree of humidity in the air which carries the cotton, to closely approach the conditioning effect now produced by airing rooms, so making it possible in many cases to greatly reduce the airing room space or to dispense with it entirely.

In addition to the specific remedies which I have described and which have proved their worth for reducing fire losses in connection with the use of pneumatic conveyors, this suggestion of the possibility of its additional usefulness is offered for your further consideration.

In concluding, I would state that the practicability and safety of the arrangements described for conveying stock, have been repeatedly proved and they should be adopted in all mills where the old method of passing stock through fans is still in use.

H. A. Bonnar, of the Redcliffe Knitting Mills, Redcliffe, Alta., is now in the East purchasing machinery. Hosiery and fancy knit goods will be manufactured. The building is now nearing completion, and it is expected that the plant will be running in a month or so.

Effect of Tariff on U.S. Cotton Industry

In his opening address at the recent Convention of the National Association of Cotton Manufacturers held in Boston last week, Edwin Farnham Greene, President of the Association and Treasurer of the Pacific Mills, spoke as follows:—

"We cotton manufacturers are met here to-day for our ninety-sixth meeting. As we survey the events of the past few months we are not over hopeful. A tariff bill was enacted last fall, the last provision of which, so far as textiles are concerned, went into effect January 1, with the reduction of the duty on wool goods. This readjustment was a most serious one with the woolen and worsted mills of the country. As is well known, the losses through curtailment and shrinkage of inventory last year were very large for most of the companies. The result is that even to-day some of the larger woolen mills are still idle and others are radically curtailing, and it is safe to say that most of the mills are operating on the smallest margin of profit, if indeed there is any profit in the present business. What I fear most is that the full effect of the tariff has not been felt. The manufacturers perhaps have not been seriously disturbed in most lines by direct competition from the foreign manufacturers. However, on fine goods, particularly of a fancy nature, competition has been in evidence, and yet the cotton manufacturers as a whole, are not as alarmed as those in the other large branches of the textile industry. This is an ad valorem tariff, and with prices fairly high as they are to-day the margin of protection is greater than it will be later when the industry suffers a possible severe setback and foreign prices fall to a lower level.

"The changes in the tariff, as I have just stated, are likely to effect the textile industry, but apart from this the prosperity of the cotton mills is dependent to a very large degree on the general business of the country, and this seems likely to continue in a very unsatisfactory way unless some of the momentous questions that are now being discussed by Congress and the Interstate Commerce Commission are decided wisely. Congress at this very time is considering corporation bills which directly affect us, and unless sane legislation is enacted injury is bound to result to the general business of the country. It seems to be the consensus of opinion that the increase in freight rates demanded by the railroads is a necessary first step in the restoration of public confidence.

"Moreover, there are several labor bills being considered by Congress. While we in New England cannot help feeling the textile industry should in the long run be put on the same basis as regards labor legislation, nevertheless the Democratic party seems to be departing strangely from its ideals of State rights and individual liberty in the paternalistic programme of the present day with its policy of uniform laws.

"One of the most serious problems which we manufacturers have to face is the labor problem. It is not merely a question of wages or hours of work. A mere shortening of hours will not accomplish what the wage earners themselves really seek. It is a much larger question. As I have frequently stated, we all believe in higher wages for textile workers. The present schedule of wages should be maintained, but if the Government seeks to impose unjust and unfair burdens, labor must bear its fair share of the load.

"It is, perhaps, a sign of the times that one of the largest carpet mills in this country recently reduced the wages of all their operatives, including foremen, ten per cent. I sincerely hope that this will not prove necessary throughout the industry, but it behooves us to consider carefully whether we are in a position to compete with the English, French and German mills if any further burdens of restrictive legislation, such as shorter hours, are imposed."

Systematic Supervision in Dyeing and Bleaching

Read before the National Association of Cotton Manufacturers at the recent Convention held in Boston, Mass.

By ANDREW FISHER, Jr.

George William Curtis once said: "Progress is everywhere, the golden fleece to be won only by hard contention, by taming fire-breathing bulls of stupidity, by slaying dragons of malignity, and by victoriously withstanding hosts of slanderers and liars sprung from the teeth of venomous serpents." Most of us know that there are plenty of bulls of stupidity in the world, and that progress is confronted with obstacles hard to overcome. The men who control the financial end of the textile business are often ignorant of the details and the practical men have to tame bulls and slay dragons in order to accomplish results.

The object of this paper is to discuss briefly systematic supervision in the dyehouse, which will make it possible to keep up to date in regard to materials used. It is not always the lowering of costs and increase of production which is aimed at, but also the improvement of the product with regard to general appearance of the goods and fastness of the colors used. A man may weave and spin well, but poor colors and bad finishing keep his goods in the storehouse. Charles M. Schwab recently said, "Great corporations have done great harm in deadening individual initiative," and further, "Determine what is a fair output for a fair wage in any department and then, when that output is exceeded in quality or efficiency, share with the actual producers in this department the profits of their production."

No department in the mill needs intelligent supervision more than the dyehouse, yet few mill men ever keep accurate records of the costs of dyeing the various shades produced. Usually, dyers have an approximate idea of the costs of different shades, but they are not carefully kept and recorded.

Systematic supervision must result in progress, individual initiative being preserved by encouragement from the executive head. We cannot have progress without initiative therefore let us have intelligent supervision in order that individual initiative may meet with its just reward. If this paper, by mentioning a few incidents of dyehouse and bleachery routine causes you to think some good will result.

Progress in the dyestuff industry has been rapid, the Germans now having the supremacy in the dyestuff and chemical business. The quality and strength of most dyestuffs have been wonderfully improved during the past twenty years, and as a result, many fast colors are now in use, much to the disgust of paper makers and users of rags and mill waste.

The use of dyestuffs and chemicals has followed along lines laid down by the manufacturers, and the user and the maker co-operate somewhat, although it may be safely said that the user is more conservative. In a recent conversation with a gentleman of the old school this remark was made, "No, we do not require fast colors in our mill." Dosen't it seem as if the user should demand fast colors, rather than obect to them?

Industrial research along these lines should be carried on to a much greater extent by the cotton manufacturers, who should constantly strive to improve the quality of their product. A man recently took charge of the dyeing department of a large concern. The results obtained in the department previous to his arrival had been poor. This man introduced a system of systematic trial and thorough test of every dyestuff submitted. His method of keeping records is somewhat as follows:—He uses an ordinary filing cabinet, provided with indexed folders, similar to those used in filing correspondence. On each folder is placed the name of each dyestuff submitted for trial, the date, price quoted, maker's name and address, as well as the formula used and a sample of the dyed result. The tests of value to him are:

(1)—Fastness to light.
(2)—Fastness to washing.
(3)—Fastness to bleaching.

These tests are made on the dyed sample and neatly mounted on the folder. As a result, he always selects suitable colors for his work, taking no chances of putting out goods unable to stand all sensible requirements.

Under the system previously used it was impossible to know definitely the dyestuffs used to produce each shade, the cost, or the trials made to produce the same shade with other colors.

Consequently the salesmen calling at the mill were unable to know if the goods they carried would be of value to the concern, and never felt certain that the samples submitted were given a fair trial. Whenever a new shade was wanted or any dyehouse problem arose, very little reliable data was available. The new man has every shade matched up with all the latest as well as cheapest and fastest colors, and keeps his laboratory staff everlasting at it, and has little trouble in getting any desired shade at short notice. For example, take a fairly heavy green shade. This is rather expensive, and it will be well worth while to be careful to use the dyestuffs, which may be obtained at the lowest price, without sacrificing anything in the way of quality.

The dyestuff concerns are glad to match any shade submitted. From them we get every possible method known to them. We take all the colors submitted by them, find the least expensive method of obtaining the desired result, by any combination we can make from these, or other colors, keep an accurate record of all trials made, the cost, level dyeing properties and fastness tests. When we get through we have something which will serve the purpose better than the old method and usually at a much lower cost. Every mill dyeing regular shades should have some competent person take them one at a time to see what improvements can be made. If a big saving or an improvement in general appearance or fastness is possible, the change should be made just as soon as an opportunity presents itself, but it is not advisable to mix things up by constant changing, as slightly different results cause trouble. If an arm of a shirt is the least bit different from the body (even after it has been worn for some time) it may injure the reputation of the mill. Many of the mills making blue check apron ginghams have of late years dyed the warp in long chains in indigo vats and have dyed the filling with sulphur colors in the raw stock, spinning directly on to the filling bobbin, thus saving the cost of quilling. The indigo fades much faster than most sulphur blues and the result is that after the apron has been laundred a few times the warp and filling no longer match. This makes a bad looking piece of goods and both warp and filling should be of similar fastness properties.

Very often laboratory tests of colors are not carried out on a sufficiently large scale to be of much importance to the dyehouse. It is advisable to always conduct tests on a large enough sample so that the results will be close to those to be obtained under practical conditions, and in all cases costs must be determined from the actual work, not from samples. The cost of drugs used in the dyehouse over a period of six months must exactly balance the sum of the costs which is charged against each shade produced, and an account of all re-dyes must be carefully kept. In this way the efficiency of the department will constantly improve.

As a general proposition, the labor and dyestuffs used per pound of goods dyed may be reduced by making the batch as large as possible. A man can handle the work better and the shade will run more uniform. This is especially true in long chain dyeing of warp yarn where all the chains making up the sets are dyed in one bath.

For piece goods dyeing, the keeping of accurate records is extremely important, as the shade is usually matched by making one or more additions of fresh color. In some dyehouses, the dyer is paid a bonus for matching his shade in two trials. The fewer additions necessary and the less time required, the greater the chance of uniformity, and a bonus of this kind if sensibly carried out, is found to be profitable to both the manufacturer and the workman. By constant examination of shipments of dyestuffs received and close inspection of the results obtained in the mill, the laboratory may become a great aid to keeping results uniform and helping the dyer earn their bonuses.

If the exact cost of dyestuffs, chemicals and labor for dyeing each shade is recorded, the executive of the concern may find it possible to avoid expensive dyestuffs and expensive shades. If orders can be obtained on styles using shades of low, rather than high cost, profits are materially increased. If dyestuffs and labor are constantly being reduced, the men in the dyehouse may well be given a share of the increased profits which they have helped to earn.

Systematic research work in connection with bleaching and dyeing must become more general. Years ago when chemicals were very expensive, much greater care was taken to obtain economical results.

There is a book written by Bertholett in 1804, entitled The Elements of Dyeing and Bleaching, which may be consulted at the Chemical Library of the Massachusetts Institute of Technology. There is nothing confusing about the manner in which Bertholett conducted his bleachery, and it is unfortunate that there are not more men like him to-day. He was a practical man as well as a great student and scientist. He controlled his bleaching process chemically, that is, he measured the excess chlorine used in bleaching and kept his results very uniform, for he found that the goods were not well bleached until the bath ceased losing in chlorine content.

The theory of bleaching with chlorine compounds is that the chlorine set free forms hydrochloric acid ($H\,Cl$) and sets free oxygen (O) from the water present. Of course a slight amount of moisture is the same thing as a lot of water and it would be interesting to see what rapid results might be obtained if we had gas bleaching for raw stock, similar to the dry carbonizing process used in woolen mills. This would be a good problem for the Industrial Laboratory of Applied Chemistry at the Massachusetts Institute of Technology, which you should all visit occasionally. The new Technology buildings in Cambridge will make provision for nearly one hundred men in this department each year and the Institute is very anxious to have all members of this association realize that right here at home we have an equipment, second to none in the world for solving industrial problems.

Berthollet made his own chlorine and the workmen were nearly suffocated at times because the gas escaped from the bleaching bath and filled the room. Javelle overcame this by using solution of caustic soda to hold gas (now known as Javelle water), and found he could get much more gas into the bath in this way. Tennant afterwards found that lime water would take up more chlorine than Javelle water. The bleaching powder of the present day is made by passing chlorine gas over lime and good bleaching powder contains about 35 per cent of available chlorine.

The writer once made several experiments to determine the most efficient method for bleaching raw cotton and found that when water and chlorine gas are used without any alkali being present, less chlorine is required. This corroborates Berthollet's contention of one hundred years ago. The operation was carried on in a pressure machine, that is, the cotton was packed into the machine and the cover screwed down tightly, the bleach liquor then forced in from beneath and out through the holes in the cover. It was then circulated for about fifteen minutes to make sure of uniform results. The working pressure for the operation was about fifteen pounds per square inch. The bleaching powder solution was found to be cheapest, and the results were about the same as far as uniformity was concerned. Bleaching powder is at present much the most economical method of obtaining chlorine for bleaching cotton.

The results of my trials led us to make certain changes which made the bleach house turn out more uniform results at less cost, and conviced me that the whole dyehouse problem is to be handled best by exercising intelligent and systematic supervision over the workmen. If we keep everlastingly at it we will find the most economical method for producing each desired result, and if the executive power happens to be placed in the hands of men capable of comprehending the chemistry and mechanics involved in these operations, the efficiency and economy of the dyehouse should be excellent.

NEW INCORPORATIONS.

Canadian Niagara Linens, Limited, Niagara Falls, Ont. Capital 300,000. A. Ferguson McIntyre, manager.

The Canadian Underwear Company, Limited, Montreal, Que. Capital $50,000.

The Princess Hat Company, Limited, Toronto, Ont. Capital $40,000. Max Sigal, Asher Winkler, Moses Sigal.

The Premier Pants Manufacturing Company, Limited, Montreal, Que. Capital $50,000. Saul Rubin, Charles Rubin and Samuel Cohen, directors.

Obituary

EBEN SUMNER DRAPER.

The death of Eben Sumner Draper, of the Draper Company, of Hopedale, Mass., in Greenville, S.C., on April 9 last, came as a great shock to his many friends in the textile industry in this country. The late Mr. Draper was stricken with paralysis several days previous to his death and never rallied.

The Late Eben Sumner Draper

The late Mr. Draper was one of the best known men connected with the textile industry in the United States, and through the firm of Draper Company, of which he was a leading member and with which he had been connected all his life, he had done much for the industry in the United States and throughout the world. He had also won his spurs in the political arena of his native State and was twice Governor of Massachusetts.

Mr. Draper entered the firm of George Draper & Sons in 1880 as a junior member and at once became closely identified with the selling department of the business. He was elected a director in each of the older companies and on the incorporation of the Draper Company in 1896 was elected a director and agent of the company, which position he held until his death. As agent he had entire charge of the sales of the company.

Throughout his life he always had wide business interests other than those directly connected with the Draper Company of Hopedale. He was associated with the Hopedale Machine Company, the Dutcher-Temple Company, the Hopedale Screw Machine Company, the Globe Yarn Mills, the Continental Mills, Lewiston, and the Glasgow Thread Company.

He served as vice-president of the Manville Company, was director of the Milford National Bank, the Queen City Cotton Company of Vermont, and the Sawyer Spindle Company of Maine.

He retained an active interest in the Massachusetts Institute of Technology and was for a number of years a member of its corporation. A Unitarian in religion, he was elected some years ago vice-president of the American Unitarian Association. He was a member of the Society of Colonial Wars, the Metropolitan Club of New York, the Hope Club of Providence, and the

Somerset, Algonquin, Union, Middlesex, and Massachusetts Clubs of Boston.

Much of the success of the Draper Company is due to his clear foresight and untiring energy. Under his direction the Draper plant at Hopedale became one of the model industrial organizations of the country. He was responsible for the development of a cottage colony for the men whom he employed, which is regarded as one of the best solutions of the industrial housing problem in the State. The whole section has been attractively laid out by landscape architects, and the town of Hopedale possesses many evidences of the generosity and interest of Mr. Draper and the Draper family in the way of public buildings, schools, churches, etc.

THE LATE WILLIAM S. McMORRAN

In the death of William S. McMorran, which occurred in St. Hyacinthe on April 14, the textile industry in this country lost one of its oldest and most respected members. Mr. McMorran had been ailing for some time, but his death was not expected, so that it came as a great shock to his family and many friends in St. Hyacinthe, where he had lived for a number of years, and elsewhere.

The late Mr. McMorran was born in Hawick, Roxburghshire, Scotland, August 21, 1853. He came to Canada with his parents when only a child and with them settled in Galt, Ont. After about a year in Galt the family moved on to a farm in Minto Township, Ont., where they lived for about 5 years. They next moved to Harrison, Ont., and there he received his education. In 1867 the family moved to Hespeler, Ont., and, after going to school for a short time longer, he went to work in the woolen mill, then known as the Farr's mill (which is now the Forbes mill). Mr. McMorran worked there for a number of years, learning the dyeing trade under the foremanship of Mr. Musgrave.

In 1874 the Farr factory was moved to Holyoke, Mass., where it is still running, now known as the Farr Worsted Mill, and Mr. McMorran went along. His family at this time moved to Valleyfield, Que. Billy, as he was then called, and was known all his life to his friends, remained in the States for upwards of 9 years, after which he moved to Hopewell, N. S., and then back to Montreal in 1885. He worked in the Valleyfield woolen mill for about 2 years, going to St. Hyacinthe in 1888, where he held the position as boss dyer up till his death.

William McMorran was always one of the most popular men in the mill and was always held in the very highest esteem by his employers and fellow-workers. As a dyer he had earned an enviable reputation and his work had established itself throughout the country where the Penman goods were sold.

He is survived by his wife and three sons, all of whom were at his bedside at his death. His son Howard succeeds him as boss dyer with the Penman Company in St. Hyacinthe.

The Glen Woollen Mills, Glenwilliams, Ont., are installing a new set of 72 in. English cards, bringing the equipment up to three sets of these cards. Considerable additions have also been made to the knitting department, including several Jenckes automatic machines, stripers and automatic ribbed hose machines.

RECENT TARIFF CHANGES

No important changes affecting the textile schedules of the Customs Tariff were announced in the budget speech submitted by the Finance Minister last month. Those of any interest are as follows:—

Garnetted wool waste in the white when imported by manufacturers of woolen goods for use exclusively in their own factories, free.

Jute or hemp yarn, plain, dyed, or colored, when imported by manufacturers for use exclusively in their own factories for weaving purposes, or for insulating wire, or for the manufacture of hammocks and twines, free.

Linen yarn, when imported by manufacturers of towels, damask, or seamless linen fire hose duck, for use exclusively in the manufacture of such articles in their own factories, free.

Jute and jute butts, jute cloth or jute canvas, as taken from the loom, not colored, cropped, mangled, pressed, calendered, nor finished in any way, free..

Jute cloth, or jute canvas, uncolored, not further finished than cropped, bleached, mangled, or calendered, 7½ per cent. pref. and 10 per cent. general.

Twine or yarn of paper, when imported by manufacturers of furiture for use only in their own factories in the manufacture of furniture, free.

Embroideries, n.o.p., lace, n.o.p., braids, n.o.p., tapes of cotton or linen not over one and one-quarter inches in width, not including measuring tape lines, fringes, n.o.p., cords, elastic, round or flat, garter elastic, tassels, handkerchiefs of all kinds, lace collars and all manufactures of lace, nets and nettings of cotton, linen, silk, or other material, n.o.p., shams and curtains, when made up, trimmed or untrimmed, corsets of all kinds, linen or cotton clothing, n.o.p., free.

Silk in the gum or spun silk, when imported by manufacturers of silk thread, silk underwear, or of woven labels, for use exclusively in the manufacture of such articles in their own factories, free.

Yarns composed in chief value of wool, single, numbers thirty and finer, on mule cops, tubes or cones, or in hanks, dry spun on the French or Belgium systems, in white only, and doubled or twisted, when used in the manufacture of socks and stockings, 99 per cent. drawback.

INVENTOR OF TURBO HUMIDIFIER.

Mr. Albert W. Thompson, the inventor of the Turbo Humidifier has, after mature consideration of several positions open to a man of his attainments, concluded to become actively identified with The G. M. Parks Company, of Fitchburg, Massachusetts.

Mr. Thompson will act in the Engineering Department which is becoming more and more a factor in the Parks Company's work, and his shop and particularly his textile experience will make his engineering knowledge particularly valuable to the client.

Mr. Thompson was graduated from the Massachusetts Institute of Technology in the Class of 1896. He joined the staff of the Amoskeag Company, rising by merit to the office of Mechanical Superintendent, having in charge the machine shop and machine problem about the mill.

Later he became Superintendent of the Saco-Lowell Machine Shops at Lowell and comes from them to the staff of The G. M. Parks Company.

Mill and General Textile News

Earnest N. Brooke, designer for the Paton Manufacturing Co., Sherbrooke, Que., has resigned.

Howard McMorran succeeds his father, who died on April 12, as boss dyer with the Penman's Limited, at St. Hyacinthe.

John Irving of Huddersfield, Eng., has secured the position as head designer with the Trent Valley Woollen Mills at Campbellford, Ont.

Gerald Markham, lately with the Dominion Textile Co., Montreal, in the purchasing department, is now with the Federated Press, Montreal.

Mr. Bell, formerly assistant superintendent in the Thorold mill of Penman's Ltd., has succeeded the late T. L. Hillabrant as superintendent.

The Harley-Kay Knitting Machine Co., Ltd., Georgetown, Ont., has been granted permission to change the name of the company to Harley-Kay, Limited.

Harry Twigg, formerly with the Standard Woollen Co., Toronto, has accepted the position of head dyer with Messrs. T. H. Taylor & Co., of Chatham, Ont.

It has been estimated that sales of textile machinery and supplies totalling $3,000,000 were made by exhibitors at the Textile Exhibition held in Boston recently.

Mr. Albert F. Duclos, of the firm of dry goods importers, Messrs. McIntyre & Co., Montreal, died very suddenly on April 23rd. Mr. Duclos had been in the employ of the McIntyre Company for upwards of 45 years and was a director of the firm at the time of his death.

L. Routh, for many years boss dyer with the Slingsby Mfg. Co., of Brantford, Ont., has resigned on account of ill-health. Mr. Stewart formerly with Messrs. T. H. Taylor & Co., of Chatham, is now with the Slingsby Company as head dyer.

The Niagara Silk Mills of North Tonawando, N.Y., are establishing a branch plant at Brantford, Ont., and have commenced building operations on a three-storey mill 165 feet by 52 feet, at the corner of Sarah and Drummond Streets. This company manufactures silk gloves, underwear, hosiery and scarfs at North Tonawanda.

The Halifax plant of the Dominion Textile Co., was closed down the week of April 26, but resumed operations again on May 4, working until 4 p.m. each day. Most of the mills of the Dominion Textile Company are now working short time. Sales are reported 25 to 30 per cent below last year, some of the largest accounts having curtailed as much as 75 and 80 per cent in their orders.

The Canadian Knitting Co., Limited, Montreal, Que., has been granted a charter. The capital is $50,000. The powers granted include the right to carry on a general dry goods and manufacturing business and to acquire and purchase the general dry goods business now carried on by Sol. A. Jacobs under the name and style of 'The Canadian Underwear Co."

The Canadian Niagara Linens, Limited, has been organized at Niagara Falls, Ont., with a capital of $300,000 to establish the linen factory in that town. Damasks, napkins, covers, towellings, etc., will be manufactured. Plans for a mill of the very latest design have been prepared and work will be commenced on the construction at once. The machinery will be driven by individual motors. The building will be erected, two-thirds saw tooth roof and the remainder, comprising the bleaching and finishing section, with monitor lights to allow of the leading away the steam and fumes. A. Ferguson McIntyre, who was for five years cost accountant with the Montreal Cottons, Limited, is the general manager of the new company. His experience in the manufacture of the goods named is very wide and goes a long way toward insuring the success of the undertaking.

ARTIFICIAL SILK MANUFACTURING RESULTS.

The viscose process for the manufacture of artificial silk is maing rapid progress among Continental manufacturers, and a glance at the net profits earned by two important concerns that have discarded other processes in favour of the viscose process is sufficient to show that the change-over has not been made at the expense of the profits. The Fabrique de Soie Artificiele de Tubize, the leading Belgian company, which has hitherto manufactured by the guncotton process, is increasing its capital by two million francs in order to acquire a controlling interest in a new company which will work the viscose system in Belgium. The report now issued shows a net profit of 1,088,902 francs, and dividends of 25 per cent. on the preference shares and 20 per cent. on the ordinary shares are being paid. The report issued by the Vereinigte Glanzstoff-Fabriken, Eberfeld, probably the largest producers of artificial silk in the world, shows a net profit of 5,743,598 marks, against 3,726,825 marks in the previous year, and a dividend of 34 per cent. is proposed. Up to about two years ago this company worked only the cupro-ammonium process, but it has since adopted the viscose one, with good results.

TRAVELLING TROLLEYS.

We have just received from the Herbert Morris Crane & Hoist Company, Limited, a copy of their newly issued bulletin B. 5, which is entirely devoted to the various types of Travelling Trolleys made by the Company.

The Morris Trolleys are of many patterns to run either on a flat-bar track, or on the lower flange of an ordinary steel I Beam. Some of them are prepared for short straight runways, while others, containing suitable swivels, are flexible in a horizontal direction, and thus permit of the use of curves or "bends" in the track.

The bulletin contains a great deal of practical information of immediate interest to all users of this kind of equipment. The illustrations, diagrams and tables of dimensions and prices are arranged in a handy and useful form.

THE MARKETS

THE WOOL MARKET.

Shearing has commenced in most districts where sheep are maintained under mixed farming conditions, and in pure-bred flocks, has been completed for a fortnight. This is especially true of southwestern Ontario, where in some cases clipping began the first of April. The rancher in the western provinces is commencing to make preparations for an early shearing season and indications are, if the weather holds favorable, that many may begin by May 20th or thereabouts.

This should prove a banner year. The winter, very generally throughout the Dominion, was not severe, and had an added advantage of being exceptionally short, which entailed little feeding. Reports from the western provinces point favorably to the production of a strong, firm fibre. This feature has frequently been called "the besetting sin of Western wools." It is caused by a check in the normal growth of the fibre created by ill-nourishment or disease. Where the animals have received sufficient feed of a nutritious nature the tensile strength is not so likely to be impaired. A Western dealer stated recently to your correspondent that he anticipated little complaint in this regard this year.

Western wool production will exceed that of last year. The exact amount, however, is difficult to estimate. More than 200,000 sheep were trailed across the border, but of these many were disposed of directly to the shambles. That a third were retained for breeding purposes should represent a fair average, which would mean altmost half a million pounds' increase in fleece wool. The sheep imported were largely Merino producing wool of a fine character. Such animals are confined mostly to the ranching districts, the small farmers in the northern sections purchasing from the ranchers their crossbreds which give wool of a medium grade. Therefore, with the recent introduction of so much Merino blood it may be expected that a portion of the wool clip will incline toward a fairly high shrinkage.

In the older provinces a slight decrease has occurred within the past year in sheep production which will affect to some extent the wool yield. This is due to the high prices for mutton that have prevailed. Farmers have shortsightedly endeavored to reap all their profits at once, and have unfortunately in far too many instances sold to the butcher females perfectly capable of bearing offspring. Owing to the short length of time it was necessary to confine the animals during the winter, shrinkage on the average should be somewhat lighter.

Little Canadian wool has been actually purchased or contracted for yet. A few special Ontario and Quebec clips have been bought by dealers, but the prices paid cannot act as a criterion for the general clip, since the wools come mostly from pure-bred flocks and represent small lots of extra long staple, strong fibre and superior preparation. Down and Dorset medium grades of this character have sold from 20 to 24 cents in the grease.

Southern Alberta Wool Growers' Association recently applied for incorporation with a capitalization of $20,000. The Association comprehends most of the large ranchers south of Lethbridge to the Milk River Ridge, who will shear this year about 125,000 sheep. Shearing will be performed co-operatively at central corrals. It was recently reported in a Lethbridge paper that the entire clip has already been contracted for by a Boston firm at 16 cents flat in the grease.

THE COTTON MARKET.

The strength of the market has been unabated during the month of April. This was mainly due to the spot situation, which is as firm as ever—good grade quantity here and there. Even strict low middling good color is hard to find, and prices for all desirable grades are high everywhere.

In spite of the talk of bad business, the takings of the mills continued very large. On the 2nd of May, they were 360,000 bales more than last season and only this week did the weekly takings begin to show a decrease as compared with last year.

May cotton went up to 12.83 on the 8th of April, reacted back to 42 on the 15th and went up again to 12.77 on the 23rd. At this writing—May the 7th—May is quoted 12.56.

These fluctuations are inevitable in such a nervous market. Nevertheless there is a strong undertone, and for the present, we do not see how May could break heavily, owing to the strength of the spot market.

Some 50,000 bales were tendered on May at the end of April. It is understood that this cotton was taken up by the representatives of some southern mills who may use the best of it and retender the balance. It is also rumored that a large Philadelphia concern, after tendering a large number of bales on their May short contracts, bought May in order to regain their tenders.

Whatever it may be, this manipulation shows the strength of the actual stuff, and that it is very hard to get enough real cotton to cover sales of fictitious contracts. The certifiacted stock of New York was 80,139 bales, on April 1st and on May 4th, it is only 86,682, in spite of the heavy bulge in the price of futures during April.

We still believe that the only thing that may cause prices to go down will be a change in the present cool and wet weather prevailing in the Western belt. It is an axiom that a wet May is very bad for he crop and so far we have had too much rain in Texas. It seems to be changing lately, and two weeks of fine warm temperature may change the conditions in that state, on which we depend for an early crop.

Of course, good prospects for the growing crop would affect the fall months' values more than the summer options. In fact we do not think that May would be very much depressed by a decline in October and December. Best July would probably be more sensitive to very brilliant weather news.

Last year, October and December went down to about 10.82 in the early days of May, when the prospects were very good. It may do the same this season if conditions change for the best during the next month or so. But the expectation of a large demand for new cotton, as soon as the crop begins to move, may act as a damper on bearish speculation.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

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Published by The Industrial and Educational Press, Limited

Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

New York Office, 206 Broadway.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI | **MONTREAL, JUNE, 1914** | **No. 6**

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The Jobbers in Canadian Business.

The proposition, put forward by the Canadian Chamber of Commerce, London, Eng., to establish a British Manufacturers' Exhibition train in this country, which would constitute a travelling exhibition of the products of British manufacturers, with a view to bringing these products prominently before the notice of merchants throughout the Dominion, is attracting much attention in the Old Country. Commenting on the scheme in a recent issue the "Textile Recorder" says in part:—

"As to whether or not the trade is there in sufficient volume to justify competition for it, it may be mentioned that for the year ended March 31st, 1913, the imports of Canada 'entered for consumption' were £137,860,000.

"With a population of 7,200,000 at the June, 1911, census, with immigrants flowing in at a rate of nearly 500,000 a year, and with a natural increase of, say, 20 per cent., there is good reason to believe that the population of the Dominion should almost double itself during the present decennial period of 1911-21; so also should the imports.

"It should be borne in mind that there is a preferential tariff of, roughly, 33 1-3 per cent. reduction on British goods, whilst in some instances freight is actually lower from the United Kingdom than from the United States manufacturing centre.

"Another point to be borne in mind is that in Canada the merchant as a successful intermediary between the manufacturer and the distributor can hardly be said to exist. Direct trading between the wholesaler or retailer and the manufacturer is a marked feature and dominates the situation. It has been stated that failure to appreciate this attitude has resulted in business passing the United Kingdom and going to the United States."

Undoubtedly the Canadian market is a most attractive one to the British manufacturers, but so far as textiles are concerned we do not think they have any cause to complain over the proportion of our import business they have secured since the granting of the Preference. As far as proof of their recognizing the usefulness of the jobber goes one needs but go into any wholesale house in the country to find ample evidence. British goods have not only been given the preference in the tariff, but importers and jobbers have been unceasing in their efforts to discredit domestic goods and create a prejudice in favor of the imported goods. British manufacturers have no better friends than the Canadian jobber, simply because there is a much wider margin of profit for the jobber on imported goods than on domestic. Of course, there are exceptions, but exceptions prove the rule.

We believe it would be to the advantage of Canadian manufacturers to eliminate the jobbing end of the business so far as their goods are concerned in every possible way. In the first place, mills selling through the jobber have to allow at least 15 per cent. on their price for the house charges and profits of the jobber, while the actual selling expenses amount to only some 8 or 10 per cent. This applies to staples as well as fancy goods and in some cases the jobber's profits amount to considerably more. There are also other inconveniences. In most cases the mills have to carry the full responsibilities of selling the goods, that is, the jobbers do not place their orders from samples or else place their orders without specifications and rely on being able to make cancellations or repeats as the occasion demands. It is undoubtedly an unprofitable system for our manufacturers and many of the mills are awaking to this fact. There is, unquestionably, a place for the jobber in this country, a large place, but conditions such as prevail at present are not in the best interests of the textile industry here. The jobber has the upper hand mostly because there is a lack of organization and co-operation on the part of our textile manufacturers.

The Woolen Goods Section of the C. M. A.

The Canadian Manufacturers' Association is in annual convention in Montreal this week. Many subjects are being discussed, both in connection with events of the past year and the propaganda for the coming year. There is a certain feeling of contentment over the tariff legislation this session and also over the results obtained in other features of the commercial activity of the Dominion. There is one section, however, that is far from satisfied. That is the "Woolen Goods Section." But we have not heard of any serious attempts being made to hold a meeting of this "Section" in order to discuss the events of the past year as directly affecting the woolen industry or the course to be followed during the coming year.

The woolen industry is recognized as one of national importance to the country and yet the present state of the industry is deplorable. Even more pronounced this year than for some time past. The question naturally arises as to whether organization and co-operation would not be effective in bringing about a change of conditions.

work done by certain members of the industry who had sufficient influence to obstruct the good work for reasons absolutely foreign to the best interests of the facturers of the Dominion will soon awake to the poswoolen industry. Do such practices not require illumination? Surely organization and co-operation would squeeze out such individuals and counteract such political influence they may have.

We believe the time has arrived when better organization is necessary, and if the Woolen Section of the C. M. A. does not provide the proper co-operation on the part of the manufacturers of the Dominion, a separate association should be formed, or at least a separate organization. It should not interfere in any way with the C. M. A., but there are a great many things to be taken up that are not being dealt with by the Woolen Section and that require immediate and concerted action. We trust that the textile manu-

During the past year efforts have been made to secure relief and there is every reason to believe that some success was obtained. These efforts would have met with even greater success but for the countersibilities of an association.

Trade During the Month

Conditions among the mills are about unchanged since last month and the majority of the mills are still working short-time. At this time none of the mills are closed. In some cases they are well supplied with orders, although contracts are mostly close. During the past couple of weeks there has been a fair repeat order business in underwear and cotton goods, but in some cases the mills have received notice to delay the shipment of fall goods another month, which has caused some inconvenience. This is more general among the knitting mills.

The blanket and woolen cloth mills are busier than they were last month and several on pure wool white blankets have all they can do this season. The cloth mills have not been so fortunate, but have kept their travellers on the road and are now fairly well supplied, although cancellations during the past few weeks have been more general. The clothing factories are busy now, but orders on hand are not large. The Western trade in clothing has shown no improvement but the East has ordered well, especially in the Maritime Provinces, where there has been little falling off.

During the month the cotton mills have been very slack. One week five of the weaving mills were closed and several have been closed each week. The latter part of the month saw a good repeat business, however, and at this time the mills are all running, although short time is general. The annual statements of the two largest companies showed a considerable falling off in sales, and likewise profits, but in view of the general trade depression, the statements are most satisfactory. The presidents in their addresses to the stockholders were optimistic, but refrained from making any prophecy as to when business would begin to show improvement.

The hosiery mills are busy, likewise the heavy wool underwear mills manufacturing the cheaper grades. Sweaters and knitted novelties have not been in demand, as also the higher grades of fine underwear, the mills on these lines being very slack. There is, however, an optimistic feeling among the manufacturers and the trade in general is eagerly looking forward to an improvement. If the present prices of yarns and raw material, cotton and wool, continue there will have to be a general advance in prices of the finished fabrics, which would have already taken place if conditions had been better. A great deal of dependence is placed in this year's crop, which, if up to expectations, will go far toward a general improvement in trade conditions.

COMMERCIALIZING A TECHNICAL TRAINING

Address by Harry C. Raynes, Consulting Engineer of Boston, Mass., before the Graduating Class of 1914, of the Bradford-Durfee Textile School, Fall River, Mass.

Whatever influences foster and encourage a determination in a young man to seek a technical training, there are almost invariably three diametrically opposed objects involved in the process of acquiring such an education.

The student, choosing the line of industry to which he intends to devote himself, usually most desires the shortest road to success and the acquisition of position and wealth to better advantage than his fellows. Or, possibly, through influences of inheritance, he may desire to maintain a family position and prestige in an industry and follow in the footsteps of his father.

Results of Technical Training.

Whatever may be the process of technical training, the crude result is the same. A condition is produced either properly or improperly, expeditiously developed or long deferred, of a high, low or medium order. This last, perhaps more than the others, is dependent upon individual characteristics.

Accepting this unmaterial condition as the reward for months of studious application to classroom and laboratory, or years of unremitting labor among machines and working men and women, the commercialism, uses and investment of this asset is the subject I wish to place before you. Such a condition of mind and body is but the "stock in trade" of a young man starting in business with himself. To this stock, of course, we will add continuously. I wish to point out that this nucleus to future commercial greatness will never be other than working capital.

Importance of Standardizing.

To standarize selling methods and predetermine market possibilities is but a different application of the same principles which govern standard operations for production. The shrewd investor in mill securities carefully analyzes both dead property valuation and live operating possibilities of his property. Very few men put their money into mill property only with a knowledge that the operating organization is sound in principle and personnel. To accept security through confidence in the abiilty of a single man to conceive and execute all profitable measures is to take the very short end of a gamble with life and death.

Buying, manufacturing and selling conditions, always changing and in a state of evolution, are at present violenetly agitated. Increased cost of labor and material have both been saddled with more or less responsibility for unsatisfactory aspects of business. Treasurers decry the acts of selling houses and directors; superintendents bend under the burden of hardships inflicted by other superiors, and so down the line of delegated authority to the smallest and most humble of an association of graded men and responsibilities which is not collectively an organization.

Responsibilities of the Individual.

Years ago in the textile industry mills were comparatively few in number, limited in equipment, simple in variety of product and served by a high order of intelligent labor. Advances in mechanical research and invention have about kept pace with the demands for increased unit human service. However, with this advance have come increased demands upon the resourcefulness of labor, and the numerical increase in machines of a growing mill has been enormous.

Time in which to accomplish results has also been steadily decreasing, until today the operating mill man, or superintendent, as he is commonly called, cannot, through sheer physical inability, occupy his former self-contained position of usefulness. Several years ago one man could know his mill of a few thousand spindles intimately and the successsful control of his equipment and labor was a simple matter. Today the same form of organization and the same single man is supposed successfully to handle, and does struggle to administrate, a manufacturing plant of 500 per cent. or more increase in size or number of units and with rapidly detoriorating instruments of labor.

Industrial pressure upon mill operating executives has not as yet, to any extent, produced permanent remedial measures. The conventions of our forefathers still endure in the organization of the textile industry, and as business demands have incessantly increased the instinct of individual, self-preservation has come strongly to the front. Men still talk in whispers and look wise over "trade secrets" known to them alone, and superintendents believe they "hold their jobs" through individual experience and qualifications to which nothing can be added by association with unconventional measures.

Necessity of Analysis.

The young technical man about to engage in the commercializing of his training through the textile industry should then further school himself until the habit of analysis is well formed. Unless he would suffer the hardships of the pioneer the young man should select a field of opportunity for work where science has at least begun to replace chance or guess-work and organization or the harmonizing of effort has been recognized as a constructive measure of permanent success. These conditions are not always easily recognized. An inclination soberly and thoroughly to analyze all conditions surrounding a problem is one of these developments and is to be highly cultivated. To apply this analytical examination not only to a branch of industry and field for work but to one's self is of tremendous value to a man, either young or old.

Traditions a Handicap.

Possibly the most serious difficulty to confront the young man will be his battle in the exercise of his reasoning powers against traditions and local conventions. He may secretly entertain brilliant aspirations for the doing of things yet undone and for accomplishment along lines of radical departure from his immediate examples. The practise or habit of his mill community will very likely oppose his progressive thought, and the professional esteem of his fellows is, to the young man, a very precious possession.

Incompetent men apparently succeed in many instances and their lack of constructive effort may not overtake the business committed to the charge for a very long time. The potential of able predecessors may carry the business along in spite of bad management and pride in prestige, often cover real financial losses. The price of commercial elevation of an individual is sometimes a long one for the industry involved.

Organization versus Waste.

Good organization is an instrument for the elimination of waste of all kinds and unnecessary wear and tear of business. Standard organization is an analytically recognized plan or grouping of methods for scientifically delegating to each necessary part of the plan clearly defined duties and organic functions to be discharged. Organizations or parts thereof become standard when all involved business conditions positively determine the necessity for functional delegation of responsibility. Financial restrictions may, to an involved concern, retard or apparently forever prohibit the realization of standard organization, but the principles are elementary and all mill operations can with no great effort be made much better than they are by adhering to the principles of standardization.

No operating mill executive or superintendent can alone and without an enormous amount of help through organization and council maintain a high operating efficiency. The fact that the mill executive is technically educated or not, has been experienced under good, bad or ordinary superiors, has served an industry for many years, do not in any sense raise his capacity for the development of a high operating efficiency under standard organization and conditions. The superintendent can best serve his mill who so thoroughly knows his craft as to recognize his limitations and who fearlessly admits his inability to cope with all the difficulties of a rapid operating development. Such an admission honestly made is an indication of strength rather than weakness, for a mind fair enough to conduct a self - examination will supply the lacking elements of his plan from whatever source they may be secured.

Possibilities of Standarized Operation.

No superintendent knows his whole mill as intimately as a specially delegated man who, by devoting his entire energy to each specific producing problem, becomes a specialized source of information. On the other hand, such a specializing assistant might possibly fail if put to the test of executive management and operation. The same principles of requisite elements apply to all executives other than the superintendent.

It is unfortunate for the young technically trained man that very much more than a majority of mill executives know but little of the possibilities of standardized organization and operation. It is true that much less than 100 per cent of the present number of operating mills could easily supply the entire market if standards of operating efficiency and organization were fairly well developed. Reliable detailed knowledge of all conditions surrounding mill operation is absolutely necessary to a high order of success. Comparisons cannot be intelligently made without proper consideration for all conditions. Standardization of organization and operation will clearly indicate the necessity for supplying this requisite to success.

You must learn to both respect the ideas of other men and accept them in co-operation with your own. Contempt for the knowledge of others is a deplorable stumbling block to progress, but not as serious an outrage against progress as stubborn conceit and a self-sufficient contentment with average conditions and satisfaction in being an average man.

Elements of Standardized Organization.

Technical knowledge however applied is but part of the service demanded by standardized organization. If specialization is devoted to the actual operations of converting raw cotton into a salable fabric or to the marketing of the finished product other elements must be supplied if 100 per cent institutional efficiency is to be realized. The operating bill executive or director of sales organization cannot alone even approximate a reasonable standard. Scientific accounting, cost and controlling methods are indispensable to maximum results, and that this element of organization is almost invariably terribly neglected opens a splendid field of work for the technically trained man. A keen knowledge of cotton processes is not alone sufficient to success in cotton manufacturing. Most superintendents and higher executives consider it so, however, and herein lies the cause for the low operating efficiency of the tex- industry as a whole. Conventions of the trade, time hallowed inefficiency of organization and an abounding conceit fostered in the breast of a vast majority of operating men have held it down.

I have been brought closely in contact with many very able men in executive positions in cotton mills, and in this contact innumerable questions of doubt as to causes for low operating efficiency have been answered by the general condition of sublime ignorance of what other men could possibly do and what a small part they are playing in their self sufficient turtle-like seclusion. These conditions, while exercising a tremendous handicap upon the textile industry, will bounteously spread the table of opportunity for young, keen, broad-minded and courageous men.

My advice to the young technical man is to avoid aspirations to executive mill offices. Do not make your ambition the acquiring of a superintendent's or even a treasurer's position only. Rather determine to supply an element of organization which you will in time know to be lacking. Rise above obstacles and the interference of narrow minds. Do the unusual things to upset and defeat limiting or destructive customs of however long standing.

Cultivate courage to attack all problems from inside as well as out. Business politics are necessary to avoid the losses of commercial clashing and trade marketing warfare. Such polities are perfectly justified as a means of harmoniously smoothing the way to an end.

Individual Standardization.

Ambition to be a commercial success is most worthy of praise. Such material success will come of itself if the young mill man standardizes himself and watches his own operating efficiency and his influence for good or evil on the institution of which he is only a part.

Demand your true worth, demonstrate it, fight for it. Pay no attention to the scoff and jokes of small minds; go ahead along the lines you believe to be right, profiting by advice and council from any and all sources. The innumerable problems of textile organization and operation offer magnificent opportunity for the exercise of your talents in many directions. The demand all along the line for reorganization of operating methods is too insistant to be much longer ignored by the whole industry.

Your reward will come from efficiency, both individual and your influence upon the collective efficiency or organization. The term efficiency, much abused, ill used and dragged in the mire, is well known and familiarly used by all men as the ratio of their producing condition to an accepted base.

The last four lines of Kipling's now very celebrated poem, to me, mean more and convey more than any exhaustive treatise upon the subject from an engineering source.

I offer them in conclusion:

"If you can fill the unforgiving minute,
With sixty seconds' worth of distance run,
Yours in the Earth, and everything that's in it,
And what is more, you'll be a Man, my son.

ANALYSIS OF WOVEN FABRICS.

The need for such a book as this has long been felt, for although there are many books on the market dealing with the methods whereby a fabric may be analysed in the finished state, none have treated the subject in such an authoritative and exhaustive manner as the one under review, written and compiled by two such authorities as Aldred F. Barker and Eber Midgely, of Leeds University and the Bradford Technical College, respectively. This treatise first deals with the qualities of the raw materials and yarns, describing all the fibres and substitutes now used in textile manufacturing and the yarns manufactured from them, as well as the various methods of calculation relating to the yarns. It then deals with the various successive steps in the designing of fabrics and the analysis of the fabric in the finished state, describing the effect of the finishing processes on the cloth and the many methods and operations made use of by designers the world over. The chapters on the "Qualitative and Quantitative Analysis of Fibres in Woven Fabrics" and "The Costing of Woven Fabrics" are especially interesting. The book will be a valuable addition to the designer's library, and is one that merits careful study by both the young and old designer who wishes to keep abreast of the times.

The Flyer-Lead and Bobbin-Lead Fly Frames.

In the flyer-lead frame, when you decrease the speed of the bottom cone you increase the speed of the bobbin. At no time does the bobbins revolve as fast as that of the bobbin lead except at doffing time. The faster the bobbin cone revolves the more revolutions are taken from the bobbins. Any hesitation of the bottom cone has a tendency to slacken the end, which is contrary to our former belief. When the bottom cone is raised at doffing, the speed of the bobbin is increased to the same proportion to that of the spindle. Owing to the position of the presser paddle, the grip is not as firm at the termination of paddle, consequently, the tension comes more between the bottom of the hollow leg of the flyer and the bite of the front rolls. For these reasons, the pressure between the paddle and the surface of the bobbin does not affect the compactness of the bobbin as in case the bobbin-lead

The sun-gear rotates in the same direction as that of the driving shaft, which is a great aid to the cone belt, and one of the strongest points in favor of the flyer-lead.

In the bobbin-lead frame, when you decrease the speed of the bottom cone you decrease the speed of the bobbin. The bobbin speed exceeds that of the flyer-lead at all times except at doffing time.

The faster the bobbin cone revolves the faster the bobbins revolve.

Any hesitation of the bottom cone has a tendency to slacken the ends the same as the flyer-lead.

When the bottom cone is raised at doffing time, the bobbin speed is reduced to the same proportion to that of the spindle. Owing to the position of hte paddle the grip on the strand is greater, and this, aided by the pressure, makes a more compact bobbin, but makes the conditions on fly frames unequal, although the grip and pressure aids in holding more twist in the strand.

The tension is mostly between the paddle and the surface of the bobbin, which means a slack tension between the hollow leg of the flyer and the bite of the rolls, a condition that should always exist on fly-frames.

The sun-gear rotates in the opposite direction to that of the driving shaft, which is a strong point against the bobbin-lead.

The friction is as great with the new so-called differential motion, as the differential sleeve is called on to check the periphery and drive the belt wheel or gear.

Any hesitation of the flyer in the flyer-lead through a worn flyer pin, etc. will cause slack, as the flyer leads the bobbin.

Any hesitancy of the flyer in the bobbin-lead through a worn pin, etc., will cause a certain amount of strain on the strand as the bobbin leads the flyer.

Out of total of 190,000 bales that were available during the third series of London wool auctions, 185,000 bales were sold. Of these 121,000 bales were sold for home consumption, 80,000 bales to the Continent, and 21,000 bales to America, leaving 5,000 to be carried forward to next series

The fourth series will commence on July 7 and the list will be closed on June 29. Assuming that the net new arrivals will reach 160,000 bales, the total quantity available, including old stocks, will be about 165,000 bales.

HANDLING THE TEXAN COTTON CROP

Cotton growing is the main feature in the agricultural life of Texas and the occupation gives employment to the majority of the population. Weather conditions and the soil are specially favorable, as the plant must have hot weather and the soil is well adapted, being of a sandy nature, so that the State produces a good proportion of the Country's crop.

The city of Houston is one of the principal centres in the cotton districts. It is situated about 50 miles from the two principal seaports of the State, viz.: Texas City and Galveston, so that is in an admirable position as far as shipping is concerned. The warehouses can therefore easily trace all shipments until they are ready for ocean shipment and in this way do away with endless trouble. Messrs. Hubbell, Slack & Co., are one of the largest handlers of cotton in the State and have their immense warehouse in Houston.

Loading Scene, Warehouse and Yard.

The warehouse is 1300 feet long and 156 feet wide and will hold about 25,000 bales. The reproductions herewith furnish a good idea of the facilities for storing, classing and shipping possessed by this firm. All the cotton handled by this firm comes from the interior and is first stored at Houston where it is classed, weighed and made ready for shipment. Damaged bales are mended and great care taken to ensure the right quality and the proper baling for shipment. The following description of the cultivation and handling of the cotton crop has been kindly furnished by Hubbell, Slack & Co., and will give our readers an idea of how the world's greatest crop is produced and made ready for the mills.

"The ground is generally broken up by the end of November by a shallow plow to about 4 inches in depth, and is harrowed until time of planting, which is about the end of February. Of course some farmers are late in planting and do not finish until about the beginning of May. This is all subject to conditions of weather. It may happen when they are starting to plant, heavy rains come, and the work has to be put on one side until clear weather comes again. This is one of the hard contingencies cotton growers have to put up with in this country. Weather conditions are not always favorable.

Cotton planted the end of February is ready for picking about the end of July, and picking goes on from that date until about the end of November. In planting, the ground is ridged up to about 6 to 12 inches, and the seed is planted in the top of the ridge to a depth of about 2 inches. After the young seedlings commence to come up they are thinned out to about 6 inches apart to as much as 15 inches, depending upon the soil. Black land sections generally thin out to about 15 inches, owing to the fact that the rich soil in such districts makes a bigger plant, which require more space in the ground.

The chief point in growing cotton is for the plant to have what they call a big tap root, that is, a root which goes down deep in the ground. Such a root will always go down deep enough to collect any moisture. These roots are always formed after goood winter seasoning of rains which have gone deep into the soil. Should the winter and spring rains be light, the result is that the root instead of being a tap root is what they call the horizontal root, that is, it spreads out instead of going down, and such roots make weak plants. While the plant is growing it is essential the farmers keep their fields clear of weeds, and to see that soil is well ridged against the stalk. If this is done a good healthy plant results.

Cotton will not grow unless it has hot weather, about 90 degrees in the shade. The plant will stand temperature practically up to 110 degrees in the shade, provided that it does not experience hot winds. In this case young bolls are likely to get burnt and fall off, and should the plant not have a good tap root it will soon wither and die. There is an old saying in this country that a cotton plant never dies. It is really, in the horticultural sense, a "Perennial" but it is always planted each season, otherwise if left to grow each year it would grow to all wood and not much cotton.

We now get to the point when cotton is ready for picking. The plant bears a bloom, which falls off and changes into what they call a square, which is a covering to the little boll inside. As this boll grows the square falls off, and the cotton is found inside the boll. The boll finally grows to the size of a fair size peach. These bolls ripen by the heat of the sun and crack open into four or five sections, and finally open out full showing beautiful cotton in all its whiteness.

Of course one will readily understand that no plant can be expected to grow perfect. This applies also to a cotton plant. It is subject to many climatic conditions and insect pests. Sometimes worms will get hold of the plant and do tremendous damage. They have various remedies to try and kill this pest, one is that certain poisonous powders are sprinkled over the plants. This is a big undertaking and rather expensive, but it must be done, or some other proceeding resorted to, or else the pest would never be overcome. At times the boll weevil will come into certain districts. This pest is one of the most dangerous to the growing plant. It is a most peculiar kind of insect which attacks the boll only; hence its name. It attacks the boll while it is in its infant stage by piercing through the outer shell, penetrates to the centre laying its egg and the larva when hatched eat the centre of the boll and kill it. If a boll is so attacked that is the end of it, and there is no known way to combat the boll weevil with poison. The only way to fight it is by planting the cotton so the sun can penetrate between plants at all times. Hot sunshine kills weevil so that the farmers must allow openings so as the sun can reach the plants and the soil..

A few seasons ago the boll weevils practically decimated the cotton crop in several sections, and it was only after a lot of hard work that it was got under. A wet season is always favorable to the breeding of such insects, but on the other hand a very hot dry season is detrimental to them and soon burns them up.

Cotton is picked and put into canvas bags which each picker has hanging from the neck. This is called seed cotton. This seed cotton is taken to the nearest gin house in which are the machines for separating cotton from the seed. This is done by a process of rapidly revolving circular saws. The cotton first of all is taken from the farmers wagons by air suction. It then travels through forced draft chambers which takes out most of the rough matter, such as dust, etc., and finally falls on the saws which separate the cotton from the seed. The seed falls into special receptacles while the cotton goes on to the gin box, this is a square box the size of the bale to be made. When the box is full it is pressed. The box

Weighing Yard.

is first lined with canvas and after the pressure is put on, the canvas is wrapped around the bale and six iron bands are put around the bale to keep it together. The diamensions of such a bale are 27in. x 54 in. x 47 in.

The bale is now ready for market, and after being sold is sent by railroad to the nearest compress. The compress is a special piece of machinery where the bale is subjected to a much heavier pressure than the gin, and is pressed down to about half its thickness. While under the press a new set of bands, eight in numben in this case are put on the bale. The dimensions of the bale now are about 27in. x 54in. x 22in. Cotton is compressed so that cheaper railroad rates and ocean freights can be had.

The bale is now ready for shipment to the spinner, either in the States, Canada or abroad. The last man receiving the cotton is the shipper. On him lays one of the most responsible parts of the cotton business. The cotton has to be sampled and classified. An expert classifies the cotton into various grades and staples. What we mean by grades is how the cotton looks. The highest grade is called "fair" cotton, and it is perfect cotton, and is cotton without a blemish, being of good color and containing practically no foreign matter, such as leaves, sand and dirt. The lowest grade is "ordinary" cotton, which is cotton of very poor color and contains plenty of leaf and dirt and sticks (sticks are stems attached to the boll). The matter of grade is all caused by the climatic conditions. If the boll matures under perfect weather, that

Classing Yard.

is dry sun-shiny weather, cotton of high grade is the result, but hsould rain and frost occur the open bolls are damaged, with the result that the white cotton is discolored, and we get what we call tinged and stained cotton. Sometimes when the bolls are just about matured and hard rainy and frosty weather comes the stem on the boll becomes rotten and it is impossible to pluck the cotton away from the boll as the boll will come off the plants in the actual picking. Such bolls are plucked off in their entirety and all thrown into a special gin for bolly cotton. There is a great difference in this kind of cotton. Some bolly cotton is full of sticks and trash, while others are discolored cottons and do not contain so much trash. The reason of this is that in this case they havbe been passed through a special gin to which new mechanical cleaning appliances have been attached which drives out most of the trash.

As regards the staple of the cotton, this is quite an

Warehouse 1,700 ft. long, 150 ft. wide.

expert piece of business. Staple is the fibre of the cotton, and the experts test it by pulling the fibre from the sample and test it with their fingers as to strength and length, and the clearness of the fibre.

BLENDING AND PREPARATORY PROCESSES IN WOOLEN SPINNING.---XII

MODERN CARBONISING MACHINES.

By JOHN W. RADCLIFFE.

The subject of carbonising would be incomplete without some reference to the machines which comprise an up-to-date plant. The old time methods and arrangements of tanks with their dripping trestles will not suffice for the present day carbonisers of wool and rags.

In such old time systems the rags or wool to be carbonised were steeped in tanks containing the carbonising agent, and by means of rakes, the material was lifted out and spread over racks or trestles in a dripping condition. In this way the process was attended by much unnecessary waste of acid, which in the modern plant is considerably reduced if not entirely eliminated.

In some cases, where large quantities of burry wools are dealt with, mechanical steeping tanks are employed, which are similar in construction and actuation to ordinary scouring machines, of which more will be said at a later stage. Where such machines are employed, the process is a continuous one, as the wool to be carbonised passes slowly through the acid contained in the lead lined bowl of the machine and is exhuded in a thoroughly soaked condition. It is more general however, to have a series of lead lined tanks, the tops of which are level with the floor. Above this series of tanks is a travelling crane, or runway which is so arranged as to accomodate the same number of crates as there are tanks.

When a batch of the material to be carbonised is placed in one of the crates, it is hoisted up and run into a position from which it can be more conveniently lowered into one of the acid tanks. After the

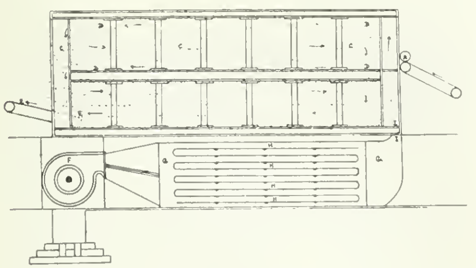

Fig. 25.

material has become thoroughly soaked with the acid, the crate is raised out of the tank, but is allowed to remain suspended above it, until the superfluous acid runs off the material. When this occurs the crate and its contents are run to an hydro-extractor to remove a further quantity of the carbonising agent from the fibre. It may be mentioned that the crates are fitted with automatic bottoms, so that when they are machine is a most ideal one, as it not only serves to convey the material to the top lattice, but the hot air engages with the wool, when the latter is in the most

in position over the hydro-extractors the bottoms can be opened to allow the contents to fall into the perforated receptacles of the machines referred to, without having to handle the acidified wool.

When the material has been placed in the hydro-extractor it is caused to rotate at a very high speed, which develops such sufficient centrifugal force as to extract the desired quantity of acid from the wool, which after treatment contains about 20 to 25 per cent of acid and moisture.

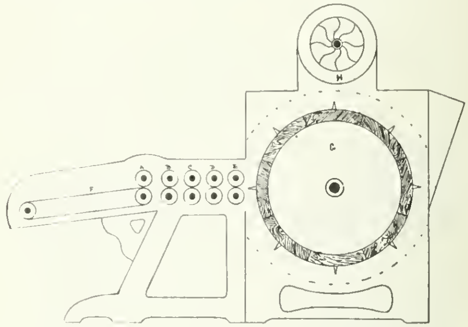

Fig. 26.

After "whizzing" in this machine the material is passed through a continuous drying machine at an ordinary drying temperature to remove the ordinary moisture prior to actual baking or carbonising.

The drying or baking machines are very similiar, both in construction and actuation, and only differ in the extent to which they are heated for their respective objects. Of course there are several types of these machines made, but the one shown at fig. 25 is a most popular type and very efficient in its treatment.

From this diagram it will be noticed that a series of endless lattices are so arranged as to convey the material through the machine. The material passes into the machine at the point marked A and is blown by a strong blast of warm air to the top lattice B, upon which it travels in the direction indicated by the arrows to be eventually deposited upon the second lattice C which in turn slowly conveys it to the third lattice D and so on until it is exhuded from the machine at the point marked E.

The hot air is generated by means of a super heater G, and is driven into the machine by a fan F, as will be noticed, the super heater contains a series of hot air pipes H, so that it will be readily understood that the fan F, by its revolutions causes the hot air to pass into the machine at the point marked I, and the centrifugal force, created by the action of the fan, causes the wool to be blown to the top lattice as previously stated. This means of introducing the hot air to the moist condition. After drying, the material passes through another similar machine for baking or actual carbonising, but at an increased temperature.

It must not be understood from these remarks that it is entirely essential to have continuous machines similar to the one illustrated, as this is by no means the case. Ordinary drying ovens of a non-continuous type may be employed although they are not as conveniently handled as those of the continuous type.

When the vegetable matter has been reduced to hydro-cellulose by baking, it is essential that this vegetable residue, which is now in a friable state, shall be crushed or reduced to powder, which can be entirely removed by shaking. For this purpose, a machine as shown at fig. 26 is employed, which is a burr crusher and shaker combined.

If rags have been carbonised, the hydro-cellulose resulting from cotton threads, etc., does not need crushing, so that an ordinary shaker is all that is required to remove the dust. The machine shown at fig. 27 is equipped with several pairs of heavy pressure rollers as shown at A, B, C, D, and E, and the wool passing along the feed sheet F must stand the challenge of the 5 pairs of rollers. By so doing, the burrs, which at this stage are friable hydro-celluse are reduced to powder which is removed when the wool comes into contact with the pins of the swift G. In order that the rollers of this machine are better enabled to crush the vegetable matter, the respective pairs are arranged to run at different speeds. Thus the first pair of rollers A will revolve at a slightly lower speed than the rollers B, whilst rollers C have an increased velocity over B, and rollers D possess a greater speed than rollers C, as also do the rollers E over rollers D. In this way, the machine possesses what may be termed a drawing action, which reduces the bulk of the material at each pair of rollers, and as the wool becomes reduced in bulk in passing through each successive pair of rollers, the gradually diminishing particles of vegetable matter are more ably dealt with. A fan operates at H which removes much of the dust from the machine, and by means of a conveyor pipe transfers it to some convenient place away from the machine.

The inside of drying and shaking machines are better when covered with lead or galvanised iron, as the acidified wool will attack the machines with disastrous results. Not only is there a danger of machines becoming affected, but the wool itself is liable to become stained with iron rust if this is not carefully guarded against.

After the removal of the dust, the wool may then be passed through neutralising tanks. In this part of the operation a similar series of tanks are arranged containing the neutralising agents, as was described with regard to the acid steeping tanks. In these the wools are steeped, and after drying are ready for use.

MACHINERY FOR DYEING, BLEACHING AND SCOURING.

We have just received the new catalogue of the Klander-Weldon Dyeing Machine Co., of Amsterdam, N.Y., describing and illustrating the various machines manufactured by this firm. The machines described include skein machines, raw stock machines, garment machines, tubs and special machines for sulphur colors and carpet yarns. The catalogue is well put up and each machine is described carefully. Some twenty Canadian mills are now using Klander-Weldon machines with satisfaction.

Dyeing Wool in the Grease

The dyeing of wool in the non-degreased state is undertaken almost solely with the object of avoiding loss in weight of the material as against the weight in the raw state. The practice of sending piece-goods to the dyer with the definite stipulation that they must be returned "weight for weight" is growing considerably. This requirement was at one time met in a fashion by weighing the cloth after the dyeing with metallic salts, but this procedure has fallen into discredit, and the custom of dyeing in the greasy state has taken its place. The goods handled in this way are mainly serges, and particularly those woven with a cotton warp. This method of treatment simplifies the manipulation, and at the same time reduces the cost of production. Although the final results in the matter of appearance of the goods may not come satisfactorily through close criticism, the matter of lessened cost is in many circumstances a sufficient recommendation in justification of the procedure. A further advantage of leaving the greasy impurities of the wool in the fabric is that the finished material has a fuller bodied and more pleasing feel. The economy effected is, however, the main point.

The goods, after having been looked over and "set," are dyed in the ordinary way and then washed, whereby of course only the loosely adhering particles of coloring matter are removed, while the oil still remains in the goods. The material is then dried on the stenter, and passed on to the pressing operation. It is at this stage where the character of the goods may be influenced more than during the actual dyeing. Certain qualities of light black and blue serges, which, when treated in the more general way, weigh only one pound to the yard when finished, maye be double the weight when dyed and finished in the grease. Naturally enough the new practice produces a material that rubs badly and soils clean washing liquors. Moreover, the material is extraordinarily receptive of dust and dirt, and this becomes quickly obvious after a short period of wear.

There can be little doubt that the new practice, if allowed to extend much, will bring the hitherto good reputation of these classes of wooled materials into serious question, and on that account it is to the interest of the manufacturer and the dyer alike to discourage this class of work.—Textile Colorist.

MACHINERY FOR TEXTILE SCHOOL

John Heatherington & Sons, Ltd., through their agent, Stephen C. Lowe, have given the New Bedford Textile School, New Bedford, Mass., the camless winding machine exhibited at the Textile Exhibition in Boston last month. Through Mr. Lowe the firm has given this school a hasmith comber, a Heatherington mule and a Heatherington card, thereby showing themselves quite anxious to further the cause of textile education in the United States.

At the annual meeting of the Canadian Cottons, Ltd., held in Montreal on May 22, the old board of directors and executive were re-elected, as follows: David Morrice, president; C. R. Hosmer, vice-president; and Sir H. Montagu Allen, Theophilus King of Boston, D. Morrice, Jr., Hon. F. L. Beique, Geo. Caverhill, A. A. Morrice and A. O. Dawson, directors.

Problems of the Hosiery Manufacturer

By Herbert Robson, B. Sc.

A special, though small, class of looseness to stocking consists in the appearance on loaded silk of red stains. Gnehm, Meister and Sisley have proved that this is due to the action of common salt. Even small quantities of this haloid are sufficient to produce the stains under definite conditions of temperature and moisture, or in the presence of certain catalytic agents, such as traces of copper, or with the co-operation of certain local atmospheric impurities. Sisley attributes the presence of the common salt to contact with sweaty fingers, and to the condensation of cigarette smoke, and the presence of traces of copper to the abundant use of copper coins in France and Italy. We may observe that salt particles are found in the air in all seaside places, and that even in England a certain amount of copper is used part of it in the form of bronze currency. It has been, nevertheless, remarked that these red stains vary in the time they take to appear in different countries. In Italy and the South of France they appear, if they appear at all, in from one to two months, while in Switzerland farther from the salt sea be it noted they require three to four months, and in North Germany (still farther off) nine to twelve months. It has further been remarked that if silk workers keep their hands dry and clean the stains rarely occur. The stained places are invariably tendered, and sulphocyanide and the other remedies for tendering by loading also are a good preventive of these stains.

Greening of Aniline Black Under This Head.

This phenomenon has undoubtedly a right to be classified with looseness to stocking. It may be due to the fact that imperfect rinsing has left in the fabric drugs used in preparing the dyebaths. It may also be due to imperfect dyeing. Besides ,aniline black proper (nigraniline), other products are formed, which turn green under the influence of atmospheric gases especially moisture and reducing agents. Many of the latter are frequently present in the air of a warehouse, such as sulphur dioxide from fires and gas lights, organic dust, nitrous acid from incandescent gas and electric lights, and even ozone. All these agents are greatly assisted by any large amount of moisture in the air. The remedies are keeping the places clean, dry, and well ventilated. It is by no means waste of space and labor to have vacant shelves to which goods can be removed while their own shelves are being cleaned. Artificial light should be avoided as far as possible by having large windows so as to get as much natural light in the daytime, and dust should be excluded by well-fitting doors and window sashes. Dust should be removed, and not just disturbed so that it will settle again a few feet off. Slightly damped dusters or a vacuum-cleaner should be used. In the former case the goods must not be put back until the shelves are quite dry. These remarks apply all round and are not considered as confined to stocking goods dyed aniline black.

Yellowing Due to Imperfect Rinsing.

White goods sometimes quickly turn yellow in stock, although pure cellulose when exposed to light keeps its color for an extremely long time. The cause of the yellowing is in almost every case imperfect rinsing, so that the goods contain residues of bleaching powder, powder soaps, especially lime-soaps from hard water, rosin from adulterated soaps, dye from colored soaps, and other things besides. Even iron in the water which has been used is occasionally responsible for the mischief. Furthermore, starching or finishing may cause yellowing. Rancid fats, sour dextrine still containing traces of the acid used in its manufacture, and overheated irons, often have something to say in the matter. There is no cure, and the only thing to be done is to do the washing and other processes in a workmanlike manner, and with soft water, and good soap and other accessories. The yellowing sometimes does not appear until the goods have been for some time in stock. It developes most quickly when much daylight has had access to the goods. It may just be noted that ultramarine, often used for blueing, is very quickly destroyed by acids. When this occurs any yellow it has hidden at once reappears. Further, the destruction of ultramarine by acids forms sulphuretted hydrogen, which will blacken yellow marks made by iron. Overheating in calendering or ironing, not unfrequently causes yellowing by converting starch into dextrine. Yellowing is sometimes associated with tendering due to the formation of oxcellulose.

Metal Stains Caused by Sulphuretted Hydrogen.

These are rare and referable when they do arise during stocking, to the presence of sulpheretted hydrogen in the air of the warehouse. Extremely small traces of the gas, indetectible by the most delicate nose, will cause brown stains by long continued action on traces of compounds of the heavy metals should they be present in the stocked goods. The cause of the presence of sulpheretted hydrogen in the air of the warehouse may be an escape of coal gas, or when the gas has been left on unlighted or blown out by a draught, or it may be that sewer gas has got into the stockroom from a drain or a toilet which is out of order. The metallic salts which must be present in the goods to enable the sulpheretted hydrogen to produce the stains may be salts of iron from a vat or from the water supply, or compounds of copper or lead from washing or dyeing plant.

A curious case possessing several points of interest was recently investigated in Germany at the Imperial testing station. Certain goods, some of silk and some of wool, developed numerous small nearly black stains, scattered in a very irregular fashion over the fabric. While the goods were waiting in the station for analysis, many of the stains disappeared mysteriously. Those left were found to consist of sulphide of lead. It was therefore probable that those which had vanished and were the smallest of all, had probably been converted into white lead sulphate by oxidation by the oxygen of the air. To test this hypothesis, the goods were treated by a reducing agent, whereupon the lost stains immediately reappeared. Further investigation showed that the gas fittings in the warehouse were in very bad condition, and that the warehouse was so badly constructed that in the winter, the season when the stains were noticed, the gas had to be burnt all day. The goods in question had been bleached in lead-lined wooden vats, the linings of which were partly corroded and anything but clean. Clearly all this trouble could have easily been avoided, and the history of the occurrence is a sufficient indication without further elaboration, of the necessary preventive measures.

Mould Stains on Unbleached Cotton Goods.

These appear mainly on stocked goods containing an excess of size, especially in damp badly ventilated stock-rooms. The chief fungi concerned are Fusarium, Penicillium glaucum, and Mucor racemosus. The stains are of all sorts and colors and shapes, following the places where the spores of various kinds can flourish best. Nevertheless, they rarely occur near the edges. The fungi multiply rapidly and infest whole piles of goods.

Experience has shown that unbleached dressed cotton goods are those most liable to mould stains. The bleaching process, especially if traces of the bleaching agents are left in the fabric, checks moulding to a great extent. The original sizing is removed by the scouring before bleaching, and all bleaching agents are antiseptics, or rather bactericides. Raw cotton whether in the form of yarn or fabric, which has begun to get mouldy, can usually be saved by bleaching. It has also to be noted that the hygroscopic substances used in sizes and dressings for getting a soft handle, such as magnesium chloride and glycerine, favor the development of the fungus-spores which are always settling on the goods out of the atmosphere.

When mouldiness is well developed there is no cure. The fibre is irretrievably rotten and should be burnt to prevent it spreading the infection: A rough and very useful test is that once the mouldiness can be smelled, all is over.—Knit Goods.

DOMINION TEXTILE COMPANY'S STATEMENT.

Profits Smaller Owing to General Trade Slackness.

In spite of adverse industrial conditions the Dominion Textile Co. earned nearly as large profits during the year ending March 31st, 1914, as the preceding year. It is true that net manufacturing profits were smaller, amounting to $1,196,990, compared with $1,230,705 the preceding year; but this net was arrived at after writing off the sum of $294,362 for repairs and improvements to the mills, compared with $241,482 written off during the previous twelve months. Or, in other words, if only the same sum had been paid out for improvements and betterments during 1913-14 net manufacturing profits would have shown an increase of over $20,000, and not a decrease.

Details of Prifit and Loss.

Net profits, as stated before, after paying current interest on loans, mill charges, and writing off $294,362 for repairs and improvements on mills, amounted to $1,196,990. To these profits were added the sum of $73,385, being a dividend of 2½ per cent. on the 29,354 shares of the Dominion Cotton Co., Ltd., held by the Dominion Textile Co.; or in all, total earnings available for disbursement amounted to $1,270,375, compared with a total of $1,361,129 the year before. Interest on bonds took $219,138; dividend on preferred stock, $134,653; dividend on common stock, $300,000; rental of Dominion Cotton Mills and Mount Royal Spinning Co., $551,172; for bad debts was written off $15,989, compared with $12,290, leaving a surplus for the year of $49,420. This added to the accumulated surplus makes the total balance now at credit of profit and loss $829,379.

Surplus earnings available for dividend were equal to 25.11 per cent. on the preferred, against 29.63 per cent., and on the common 6.98 per cent. against 8.49 per cent. the previous year. Comparisons of the profit and loss figures for two years are presented in the following table:—

Profits	$1,196,990	$1,230,705
Dividend	73,385	120,424
Net rev.	$1,270,375	$1,351,129
Rentals	551,172	566,434
Balance	$ 719,203	$ 784,695
Writ. off	15,989	12,290
Balance	$ 703,213	$ 772,405
Bont. int.	219,138	216,285
Balance	$ 484,075	$ 556,119
Pfd. div.	134,653	131,395
Balance	$ 349,421	$ 424,723
Com. div.	300,000	275,000
P. L. bal.	$ 49,421	$ 149,723
Prev. bal.	779,958	630,235
Total P. and L.	$ 829,379	$ 779,958

Mr. C. B. Gordon in his report as president states that the new cotton mill at Magog erected the previous year has been fully equipped and is now supplying the print works with grey cloth. The extension to the St. Anne's mills has also been completed and fitted with new machinery. "All the mills," adds Mr. Gordon, "have been kept up to a high standard of excellence and are capable of increasing their output considerably as soon as trade warrants it." Mr. Gordon ventures on no prophecy as to when a turn in business will come.

The board of directors was re-elected as follows:—Messrs. C. B. Gordon, president; H. S. Holt, vice-president; Hon. Robert Mackay, D. Morrice, J. P. Black, C. R. Hosmet, G. A. Grier, John Baillie and Captain D. C. Newton. Mr. C. A. Hanna was re-appointed secretary-treasurer.

Sales of the Dominion Textile Co. in the year ended March 31st last fell considerably below the high record level established in the previous year's business and, indeed, were the smallest in four years. Net manufacturing profits, however, made relatively a very good showing, being exceeded in the company's record only by the figures for the previous year. Sales, net manufacturing profits and surplus carried forward in each of the last nine years were as follows:—

	Sales.	Net.	Surplus.
1906	$8,131,600	$ 918,810	$236,194
1907	8,507,013	895,518	286,927
1908	8,045,497	900,805	44,493
1909	6,153,626	678,017	8,285
1910	8,743,706	893,312	35,732
1911	9,470,270	989,710	37,105
1912	9,038,464	1,137,554	100,225
1913	9,824,101	1,230,705	149,723
1914	8,899,718	1,196,990	48,421

The yarn trade in England at the present time is none too good, as shown by a cable from London, saying that about twenty coarse yarn mills at Royton have decided to close on account of poor trade. There will be further temporary mill closings during Whitweek (next week), and most of the Burnley mills, mainly making print cloth, will shut down.

PRACTICAL TUNING AND CONSTRUCTION OF POWER LOOMS.--III

DRIVING OF POWER LOOMS

By BEAUMONT METTRICK.

The commonest method of driving power looms is by means of friction between belts and pulleys, driving by means of chains being only in the experimental stage as yet. They may be driven directly from the main shaft, or indirectly, by having counter shafts on loom, or by small motors, one for each loom or one for a group of looms.

A directly driven loom is one where the strap comes from the line shaft, directly to the loose and fast pulleys, which are fitted to the crank shaft of the loom. Figs. 12 and 13. An indirect drive is one where a counter shaft on train wheels carries the motion to the crank shaft of loom. Fig. 14.

The driving pulleys on the main shafts should be arranged so that the belts run straight on to the loom pulleys and are not held in position by the strap guides.

It is the usual practice when line shaft drives are used to arrange the looms in two rows for one line shaft, then the belts will run thus, one row with open belts and the other with crossed belts. As a rule, the crossed belts will give a better drive, owing to a larger surface of both pulleys being gripped by the belts. When the loom pulleys are placed at right angles to the line shaft, the half crossed drive is used, but this style is not a very satisfactory drive. Have slack side of belts running on top side of loom pulleys, if posssible.

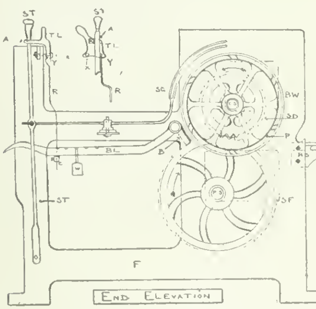

Fig. 18.

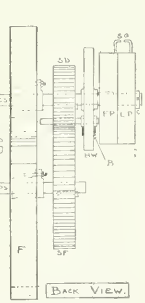

Fig. 17.

The Direct Drive

Figs. 17 and 18 illustrate one type of a direct drive, showing the end and back elevation. Here loose (LP) and fast (F P) pulleys are used, and are connected directly on to the crank shaft (C S) of loom, the loose pulley being held in position on shaft by means of collar C, and the fast pulley keyed fast by a taper key. Behind the fast pulley is placed the brake wheel B W. As this type of loom usually runs at a good speed, anywhere between 100 and 200 picks per minute, according to width of loom and goods woven, an appliance of this nature is needed to help stop the loom from overrunning, after the strap has been transferred to the loose pulley. B is a leather lined brake, which is made to act against the brake wheel, when the loom is stopped. B L is the brake lever connected by rod R to the tumbler lever T L at Y, T L being pivoted to the frame work at X, and the position of T L is regulated by the starting handle S T, as follows:—If the strap guide SG is moved from L P to F P the starting handle will push the tumbler lever back by means of an arm A (as shown by front view of tumbler lever). This will cause the rod R to lift, by means of the regulating collar C, the brake lever, and take the brake off the brake wheel. When the strap guide transfers the strap to loose pulley, the reverse actions of the brake motions, assisted by the weight W will place brake against brake wheel, and help to stop the loom. Care should be taken to see that the collar is set in such a position as to allow the brake lever, assisted by weight W. to drop low enough to give brake a good grip against back wheel, and the leather on brake must be kept free from oil and in good repair. Next to the brake wheel, the spur driver S D P is keyed fast to the crank shaft; this gears direct with the spur follower S F, which is keyed fast to the pricking shaft P S of the loom, this last wheel being usually twice the size of the spur driver (S D), so that the picking shaft is only turned once to the crank shaft twice. This allows fixed picking tappets being used to pick alternately from each side, and also gives a nice steady pick, when the loom is running at a good speed.

This type of drive is chiefly used on overpick single shuttle jacquard looms, and on light and medium built tappet looms, where the heald tappets are fixed outside the loom frame, at the opposite end to the driving motion.

For plain cotton and linen looms, where the heated tappets are fixed on the bottom shaft between the two end frames of loom, the two driving pulleys and the brake motion may be placed at one end of shafts, and the spur wheels at the opposite end, the advantage of this being: 1. A heavier brake can be used for linen looms; 2. The brake motion is brought more into sight and is more easily reached for repairing purposes; 3. The spur wheels may be covered better to safeguard the weavers.

Position of Strap.—Care should be taken to have the driving strap so guided by the strap guide that when the strap is working the loom, it is partly on fast and partly on loose pulleys, say $\frac{3}{4}$ on fast and $\frac{1}{4}$ on loose pulley. This factor allows the loom to be stopped quicker and easier, when stopped by action of weft or warp stop motions, without much strain being placed upon the various levers of the motion in action. When belts are fixed in this manner, it is advisable to reverse the working side occasionally, and run it on loose pulley side, especially if fast pulley is slightly larger than the loose pulley, which is sometimes the case, allowing for a higher grip of pulley by the belt.

The main advantages of direct driving are:

1.—The first cost is low. 2.—Less power is required to work it. 3.—Economical in cost of repairs.

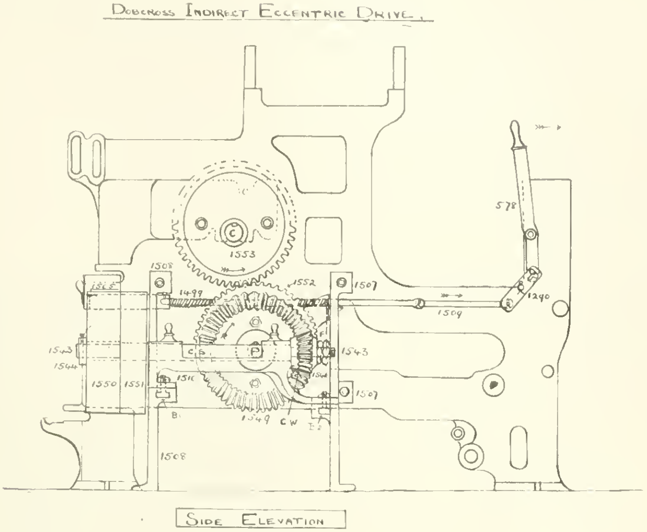

Fig. 19.

The disadvantages are: 1. The line shaft being connected directly to the crank or top shaft of loom, any irregularity in the running of the line shaft is transported directly to the crank of loom, thus causing the motions to work erratically with such accompanying faults as constant knocking off of loom, owing to bad action of the picking motion, stripping of the weft off the bobbins in shuttles, or shuttles thrown off the going part, with probable broken warp ends, or looping of the weft, owing to sudden checking of shuttle as it enters shuttle box, and various other defects according to amount of variation in speed of loom. 2. The speed of loom cannot be changed without changing line shaft pulley. The loom pulleys, of course, could be changed, but this is worse still.

The Indirect Drive

The majority of dobby looms are driven indirectly by means of a train of gear wheels and pulleys, and sometimes an extra counter shaft is used as on the Dobcross loom.

Fig. 19 gives the end elevation of the ordinary loose and fast pulley, indirect eccentric drive, fitted on the 80-pick per minute Dobcross looms. This motion is driven by a belt running from the line shaft pulley on to the loose and fast pulleys, 1550 and 1551, the loose pulley 1550 revolving on a sleeve 1554, the sleeve being connected to the counter shaft 1543 by a set screw. This pulley is made extra heavy, so as to assist in overcoming the resistance offered by the gear wheels, etc., to the motion of the belt, when it is transferred from loose to fast pulley. The fast pulley 1551 is keyed fast to the counter shaft, which rests in the moveable bracket 1510, which is fastened by two bolts B_1 and B_2 fitted in slots on the framework 1507 and 1508, to allow for change of size of change wheel. At one end of the counter shaft is fixed the change speed wheel 1546, a bevel driving wheel, usually ranging from 18 up to 22 teeth, one tooth making a difference of about 5 picks per minute in speed of loom, therefore a 19 wheel will run loom at 5 picks more per minute than an 18 wheel would.

The advantages of using this change wheel are: (a) Speed of loom can be altered, without changing the belt pulleys and the length of belt; (b) It is easy to

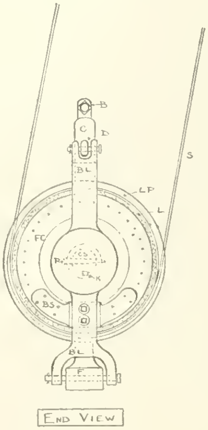

Fig. 20.

get at, and a much quicker method of altering speed. (c) It helps to steady the drive of loom, and to reduce variations in speed.

Ast the counter shaft, pulley and changing wheel rest against the loom frame, and arc partly supported by the floor, very little vibration is set up in the loom. The change wheel is held on counter shaft by a key and two lock nuts F. Care should be taken to see that the change wheel does not gear too deeply with its companion bevel 1549, or the gearing will bind, and set up extra friction to wheels, necks, &c. If not deep enough in gear, the teeth will wear away. The bevel 1549 with which the change wheel gears, is fastened by two set screws on to the spur gear wheel 1552, which is keyed fast to the bottom or picking shaft P. This gears with the following spur wheel 1553 keyed on to the crank shaft C of loom. It will be noticed that the two spur wheels are eccentric wheels, this idea being to vary the speed at which the going part travels, so as to allow a pause at the back centre, to give more time for the shuttles to cross from box to box, and to give a quick beat up of the weft at the front centre. When these wheels have to be removed for any purpose, care should be taken to see that they are put back in gear in their previous positions. The wheels

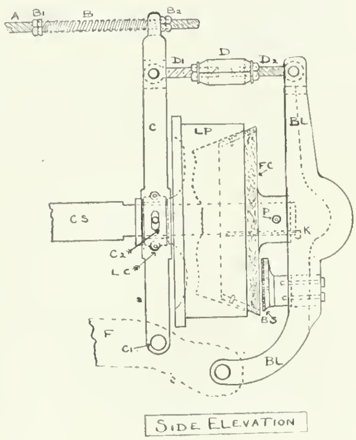

Fig. 21.

are usually marked by the makers, but, if not, the exact position of gearing should be found, and the wheels marked. On the newer type of fast looms this idea is dispensed with, the picking having been improved to give a smarter and quicker blow to the shuttles. The handle to work the belt is shown at 578. This is pivoted at the centre, and connected by a small centre pivoted lever 1290 to the rod 1509. This passes through the frame 1507, behind which is fixed a strong spiral spring 1499, which is fitted loosely round the rod between frame and strap guide 1505. The result is that when the belt is transferred to fast pulley, by pulling the handle towards the weaver, the spring will be compressed, and the expansion of this spring will assist in moving the belt from fast to loose pulley, if the slightest touch be given to the handle by the weaver, or to the rod that connects both handles by the weft fork levers, or warp protector motion.

The Indirect Friction Clutch Drive

This method of driving is now used on the improved Dobcross fast dobby looms, and have been found to work very successfully, when kept in good order, the great advantage being that the loom can be stopped at once without any over-running of the going part, when the weft fork motion acts upon the loom handles, or the weaver throws back the handle. Thus a great saving of time, yarn, &c., is brought about, to the advantage of both weaver and employer. It is also a style that is suitable for drives, where only short belts can be used, as the belt is not required to move much (say only about 1/8 to 1/2 in.), therefore no drag is imparted to the belt by the strap guide, which also means a considerable saving in wear and tear of belt.

Very little power is lost on this motion, compared with some indirect drives, as all the wheels are machine cut, therefore the drive is true, and not many breakages of teeth are registered, if the other motions of the loom are kept in correct working order by the tuner.

Fig. 20, which shows the end view of the clutch, and Fig. 21, the side elvation of same. Fig. 22 illustrates how the cluth and counter shaft are connected to the picking shaft of loom. Fig. 20 shows the strap S running directly from the line shaft to loose pulley L P. As this is always revolving, when the line shaft is running and strap is on pulleys, care should be taken that the bearings are kept well lubricated, and that the strap guide, which is a fixture, fitted on to loom frame, does not rub against the belt edge, as this in time works loose the belt fasteners, and wears away the belt. The loose pulley is controlled by the level C, which is connected to loose pulley by a loose collar C, and is pivoted to framework at the point C. The lever in turn is connected to starting handle by the regulating rod A, and other plain rods and levers as shown in Fig. 22. Over the rod A is fitted an escape spring B, regulated by the two pairs of lock nuts B_1 and B_2. Sufficient tension should be put on the spring to force the loose pulley by means of lever C into clutch with the fast pulley F C, but a certain amount of compression must be allowed for, to allow for an escape motion, so that the pulley may slip in case of any part of the driving gearing should be locked. The fast cone-shaped pulley F C is lined with leather on the outer rim, this being fastened on to the shell by wooden pegs, and the shell is keyed on to counter shaft by pin P and key K. Care must be taken to see that the key does not pass beyond the inner edge of cone, or the loose pulley will be apt to work against it, and either work it loose, or fail to grip the cone side; the pin should also fit tightly. The leather lining should be kept free from oil or dirt, and the loose pulley should grip as large a surface of leather as is possible. If only a small part of leather is worked upon, a ridge is apt to be formed at that point, which often prevents, by suction, the loose pulley from being pulled away from the fast cone.

The Brake Motion

This motion is controlled from the starting handle, rod, and lever C. Two threaded rods D_1 and D_2 are connected by the regulator D, D_1 being connected to lever C by a pin, and D to brake levers B L by another pin; the length of these rods and likewise the distance of brake lever from lever C is determined by regulator D. The brake lever is pivoted to frame work at the bottom, and to this lever is bolted the brake shoe B S. A leather face is fastened to the shoe, which works against the fact of fast cone F C, in which small wooden pegs are fitted, to assist the brake in its action.

Setting of Brake and Loose Pulley.

When the loom handle is full back, and loom stopped, the brake should be pressing tightly against face of fast cone, and the loose pulley clear of the edge of same. With the handle half-way pulled forward (as in Fig. 22) the brake and loose pulley should both be clear of fast cone, the reason for this being to allow weaver to turn the going part by hand.

With the handle pulled full on, the brake should be clear of fast cone, and the loose pulley in gear with fast cone, so as to start the loom at once, without any slipping of cone. These settings can be obtained by adjusting the regulating nuts B_1 B_2 and D. The neck of loose pulley and the collar C_1 require constant lubrication, as they are always in motion when the line shaft revolves.

Fig. 22 illustrates this style of drive, fitted with a three phase alternating current motor, and belt driven. The writer is of opinion that an improvement of this would be to have a silent chain drive, fitted with pinion

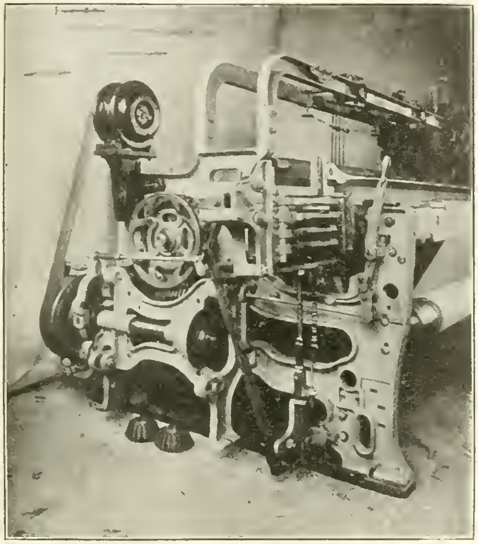

Fig. 22.—"Dobcross" High Speed Loom (Motor Drive.)

on motor, and a groove on loose pulley. This would give as near a positive drive as it is necessary to have. The pinion would drive the chain positively, and the groove would allow for a certain amount of slipping necessary for safe driving. The style of driving shown in Fig. 22 is not yet in general use.

Another form of individual electric loom driving is by having the motors fitted on the floor and fixed up with spring belt relieving fittings on each motor. This allows for escapement, and when the looms are stopped, the current is immediately cut off from the motor, thus allowing the motor to stop also. It is advisable to lay the wires in grooves cut into a cement floor, and covered, so that there is not much chance of fire taking place, and any loom may be easily moved and connected up.

Setting of Counter Shafts.—See that the counter shaft is perfectly level, and set at right angles to the picking shaft, and parallel with line shaft.

Repairing of Spurr Teeth.—If one of the teeth in spur wheels 1552 and 1553 (Fig. 19) is broken, which often occurs through hard picking, they can be repaired and made workable very simply.

First remove wheel, cut and file away the remains of the broken tooth. Drill two holes into bed of wheel, cut a thread into these holes, and one also on the piece of metal to fit into the holes. Screw these down tightly, then file to shape of other teeth. Care should be taken that the false teeth do not come above the level of the others, and the shape should be as near to the shape of the original tooth as possible. Drill the holes near to the centre of wheel, because if too near the edge, they will probably burst the rim of wheel.

Improved Methods in the Handling and Dyeing of Raw Cotton Yarn and Piece Goods.

By **LOUIS JOSEPH MATOS, Ph. D.**

The handling of cotton in the several stages of its manufacture is so closely related to the operation of dyeing in the corresponding stage that to give consideration to one without discussing the other is practically impossible, and as proper handling has much to do with successful dyeing results, the two propositions will be treated jointly.

Modern cotton dyeing dates from the period when mechanical apparatus and machines began to gradually replace hand work, and not, as is usually supposed when the artificial dyes began to replace the dyes of natural origin.

It is a long step from that remote period when cotton was only dyed in the raw state in open tubs, to the modern high pressure apparatus for warps upon the beam, but the gradual stages through which the intervening improvements were made show the constant application of thought of many men leading towards that final triumph that enables the cotton manufacturer of today accomplish in a short time that which his or his predecessor barely dreamed of.

The purpose of this paper is not to enlarge upon the merits of any system of dyeing, but rather to point out the advantages that accrue to cotton mills doing their own dyeing by adopting processes that will reduce the time and labor elements in handling cotton in the preparatory stages.

Raw cotton dyeing has advanced gradually along two broad lines—mechanical and chemical. —The former comprehending only the manufacturing processes; the latter the dyeing proper.

Formerly and in the olden times cotton was most commonly dyed in the piece, and in very olden times in short lengths only, except in case of narrow widths, when the lengths were correspondingly increased.

The actual process was to immerse the entire piece of goods to be dyed within the boiling dye liquor, and work it around until it had taken up the amount of color to give it the depth of shade desired by the dyer.

In olden times shade matching was not the art that it is today.

Next we have the desire to produce effects of various kinds that led to the coloring of yarns before weaving, and this gave rise to the art of skein dyeing, and as the skill of the dyer increased with time, so in a corresponding way the ambitions of the textile de-

Read before the National Association of Cotton Manufacturers.

signer increased, with the result that more pretentious patterns were developed.

As the art of spinning advanced, so in a measure the ability of producing colored threads from previously dyed raw cotton increased, and this gave rise to the widely extended practice of raw stock dyeing.

Warp dyeing is comparatively a recent development of the cotton dyeing industry. In former times warps were made from dyed skeins exclusively, but in course of time means were devised for handling warps in dye kettles so that almost any length could be taken care of properly.

Piece goods dyeing has not made the same relative advancement that other branches of cotton dyeing have but the time will come when cotton piece goods will be revolutionized, and that levelness of shade, coupled with penetration will be a matter of routine.

Raw stock dyeing is now a matter of dyeing in two ways, either by moving the loose cotton through a stationary volume of the dye liquor, as is done in the common open dye tub by poling, or as is common in some of the well known types of revolving dye machines; or by keeping the mass of cotton fibre in a fixed and immovable position, and causing the dye liquor to circulate regularly through the cotton by means of a force pump, as is common to those machines that are designated "pack system" machines.

Each of these two methods of dyeing possess their disadvantages. The former, in that it tends to an impairment of the condition of the cotton fibre to such an extent as to lower its spinning value, and in some instances to a wastefulness of the heat, especially in dyeing in the old types of stationary open kettles.

This method of dyeing, whatever the results might be as to shade or condition of the cotton, is also positively wasteful of the dye. Of course, it must be remembered that the open tub method of dyeing is a relic of the days when shades were fewer than they are today, and when logwood—always a cheap dyeware—was the principal coloring matter used in the cotton dyehouse.

While poleing in the open kettles, and tumbling in rotary machines generally produced fairly even shades, this apparent advantage is offset by the amount of man-killing labor over the open tub.

The so-called pack system machines have revolutionized raw cotton dyeing, and at present it seems that this general method will hold its own for a long time to come, although it is possible that various improvements will constantly be made towards simplifying the machines and their appendages.

The principle of dyeing fixed masses of cotton or other loose fibre by circulating dye liquor is very old, but it is only during the last fifteen or twenty years that any attention has been given to the development of the idea, and this actually from manufacturers and dyers rather than from machine builders. This unusual condition of affairs being traced indirectly to commercial conditions of competition—the desire to eliminate whenever possible, hand labor by the substitution of machines.

One of the disadvantages of the pack system is traceable directly to the human element, and is the almost impossibility of packing the cotton so evenly and uniformly that unevenness is eliminated. At times, leads will form through which the dye liquor circulates with greater freedom and there causing much heavier shades than where the dye liquor encounters greater resistance. This condition appears to be attracting the attention of inventors who may in time overcome this trouble.

The pack system of dyeing, by whatever name known, however, has come to stay, and must be accepted by all progressive dyers as the last word when maximum output at the lowest possible cost is desired, not only lowest cost for handling, but for the greatest saving in dyeing, due directly to the relatively small volume of dye liquor necessary for a given weight of cotton to be dyed—the spent dye liquor being, in the great majority of instances, of no use to serve as a "Standing Kettle" about which dyers are so much concerned when dyeing in open kettles.

Cotton skein yarn dyeing has not progressed much beyond the ordinary open kettle method of dyeing, the skeins being manipulated by hand, but it is safe to assert that rotary skein dyeing machines will ultimately prevail, the packing system not likely to prove universally applicable for such work on account of mechanical reasons that appear to be extremely difficult to overcome, notably the tendency to form leads resulting in uneven shades.

Warps, however, always a most interesting branch of cotton dyeing, is in the revolutionary or transition period, and with the great attention that has been given to it during the past few years, both in this country and abroad, leads me to believe that the perfect dyeing machine for cotton in this forum is not far distant. The idea of dyeing a heavily wound mass of cotton thread on a hollow and perforated spool is old, but it has taken both time and courage to persist in developing the idea so that it might become technically practical. To-day there are several such machines on the market, especially constructed for this class of work, and the results obtained indicate that they are no longer experiments.

By dyeing cotton warps in such machines a very great saving is effected, not only in direct labor and handling of the warps in this condition, and which contributes to a very much better fabric. As the warps are correctly wound on the dyeing spool at a uniform tension, and put through the slasher and wound on to the loom beam at the same tension, it cannot be otherwise but that the warps are practically perfect.

On the other hand, however, the cost of such modern warp dyeing machines is so great that many mills defer buying them, preferring to continue using the old Scotch tubs or long chain systems, and hoping that the unforeseen may not occur to impair the quality of the dyeing or condition of the warps.

The dyeing of cones and cops, a favorite method of dyeing cotton in many European mills, is not likely to become at all popular in American mills on account of the higher labor cost in handling the cotton in this condition, and besides we entertain the idea that by handling the skein dyed cotton, as is customary in American mills at present, we are able to obtain a more uniform run of cops than each lot of cops from a specially constructed dyeing machine is liable to turn out. It is generally accidental when two succeeding lots of cops from the same cop dyeing machine, dyed with the same dyestuffs, are of exactly the same depth of shade. When standing kettle dyeing is undertaken, the final conditions are even worse. For cotton mills of small output, such dyeing machines are without doubt very good, but time considered, the output of dyeing is restricted, and out of proportion to the cost of the installations.

Cotton piece goods dyeing resolves itself to three broad methods: Jig dyeing, continuous machine dyeing, padding machine dyeing; and, of course, each of these methods is directly applicable for solid colors only.

Jig dyeing is deservedly popular on account of the ease of control and regularity of quality of output, besides being easily adaptable to nearly all classes of cotton goods and groups of dyestuffs. Dyeing with certain classes of colors, jigs must be constructed to cope with the new conditions imposed by the chemical principles involved in the newer dyes, and any attempt to make improvised makeshifts will only lead to disappointments. In this connection, it might be well for us to bear in mind that the large color works have elaborate experimental dyehouses fully equipped with commercial size apparatus in order to try out their new discoveries, and to devise proper methods for their use, in connection with the combined skill of both engineers and chemists. These color works also have their own machine shops, to be called upon for special machines or apparatus to meet pending requirements demanded by the properties of new dyes.

When new ideas are thus developed, it does not imply that other workers, or local conditions existing elsewhere may not modify the method originally devised in the color works, but it is quite fair to presume that their recommendation may prove of value as a means of preliminary trials of a new dye in a given mill.

Jig dyeing is modified by the introduction of "skys" or continuous oxidizing frames to permit the dyed fabric to obtain the full benefit of the oxidizing action of the air. Jigs are also provided with carefully balanced heavy squeezed rollers, to introduce which, in many instances, required considerable diplomacy on the part of the dyestuff demonstrator to overcome objections on the part of the dyer. The gradual introduction of sqeeze rollers on all jigs is now only a matter of a short time. Submerged rollers and spreaders to keep the cloth completely beneath the surface of the dye liquor, is a matter of common note in cotton piece dyehouses using regularly immedial and many vat colors.

The continuous machine is not as common in this country as it should be. It is one apparatus that permits of a large output. Ordinarily constructed to admit of from two to three or five compartments, each of which is provided with a pair of squeezing rollers, the upper one of each pair being generally coated with rubber. Immediately preceding each nip is generally mounted a spreader to keep the cloth smooth and free from wrinkles.

Owing to the tendency of the strength of the dye liquor to vary, due to condensation, it is thought best to provide for heating the liquor by means of indirect steam, together with a steady inflow of stock dye liquor from overhead tanks, thus permitting, after the machine is started, a uniform shade to be produced upon a large quantity of cloth.

The amount of stock dye liquor allowed to flow into the first compartment corresponds to the amount of liquor taken up by the cloth and mechanically retained after passing the last nip. When once the speed of the machine, and rate of inflow is fixed, the process is almost continuously automatic. As a rule, the first compartment is for wetting out or preparing the cloth for dyeing, and for the general run of staple shades such as black, brown, dark blue, etc., dyed with diamine or direct colors, this first compartment is charged with soda ash only.

The continuous dyeing machine is also used for the well known diazotising and developing process. The construction is somewhat modified, however, to meet the different conditions and usually has only three compartments. After the pieces have been previously dyed and washed on another machine, they are transported to the diazotising and developing apparatus, the first compartment of which is the diazotising box containing the nitrite of soda and hydro-chloric acid, both of which solutions are fed from stock tanks mounted overhead.

The second compartment is a rinsing box containing acidulated water, and the third is the developing box, containing the developer found best suited for the shade to be dyed and which is replenished from an overhead tank. Each compartment is separated from the other by a heavy nip. Where continuous diazotising is practiced, the location of the machine can be conveniently placed in a boxed-off corner of the dyehouse and provided with a suitably constructed ventilator leading from a hood suspended over the diazotising tank so that the fumes may be led to the open air.

Closely related to the diazotising and developing process above described is the so-called paranitraniline red process, which, while not requiring any particular type of dyeing machine, yet it has been found best to make use of a machine specially constructed for this purpose. The goods are first prepared or "mordanted" by passing through a beta naphtol prepare, after which they should be made absolutely dry, then passed through the padding machine, constructed as shown in the accompanying sketch, where the first compartment consists of a trough containing two small submerged rollers which keep the cloth below the surface of the diazotised paranitraniline solution. After leaving the second roller, the cloth is passed between a moderately heavy nip, subsequently given an air passage, finally given a thorough washing with two jets of water, then a nip and then through two washing compartments and final nip and terminated with a plaiting down; the usual boiling soap and rinsing follows.

Dyeing in the Padding Machine is becoming better understood in this country, and while a number of piece goods mills employ it, yet there is room for its further extension. It permits of the production of a very great output and where the fabric to be dyed is not heavy, very excellent results both in penetration and levelness are obtained. Two forms of padding machines are common, one for the direct padding in one short passage, the other for a slightly slower but with a greater amount of fabric in the dye liquor. The first machine, shown in Figure 4, consists of three superposer rollers taking the dry cloth from the small submerged roller into the color box, given two nips and plaited down. This machine serves for almost every variety of light and medium shades. By means of an overhead stock tank, for the dye liquor and in which is a closed steam coil, the stock liquor can be made up in sufficient quantity for a morning or a day's run. This method permits of a very large output of uniform shades. In usual mill practice, knowing beforehand the amount of cloth to be dyed, the padder prepares only sufficient dye liquor for a day's run or to dye the amount of cloth a given shade. On standard goods, running for weeks at a time, no difficulty is encountered in making successive fresh batches of color each day.

The second form of apparatus previously alluded to provides for a box containing a double row of submerged rollers similar to a single compartment of a continuous dyeing machine, through which the cloth passes, thereby being given about eight up-and-down passages through a large volume of dye liquor (instead of one passage in a single submerged roller, as in the former case). This modification of the machine permits of very good penetration and a more thorough fixation of the dye by dyeing, than squeezing with the single roll padder. This method has been called the "Jigger Dyeing Method," although there seems to be no connection between the standard jigger and such a machine. The goods are prepared for dyeing, and passed through the machine, plaited down or rinsed before plaiting. In case of either of the above two machines, one passage only is employed, which means that the shade and dye formula can be carefully worked out beforehand.

The above methods of dyeing apply equally to the direct or diamine colors as well as to the sulphur or immedial colors. In dyeing the latter, it becomes necessary to make use of the oxidizing action of the atmosphere and dyers have found it advantageous to construct over the machine, oxidizing frames consisting of a series of rollers in order that an air passage can be conveniently given. So-called vat dyeing is done in a small way by making use of dye kettles similar in almost all particulars to the old fashioned cloth dyeing machines and capable of handling at one time eight or ten pieces of an aggregate weight of 400 pounds more or less. The wooden partition serves to separate the pieces from contact with the steam pipe and which always facilitates the addition of fresh portions of dye liquor. The pieces are usually dyed in rope form and consequently this precluded the possibility of medium shades in handling. As a matter of fact, black and dark shades on cheap cloth only are dyed in this way.

Since the introduction and wonderful development of the so-called vat colors, marked improvements have been noticed throughout the entire field of handling and manipulation of cotton goods. These changes have been brought about by the peculiar characteristics of the various classes of colors that belong to the vat dyeing group and which differ so much from other classes of dyes heretofore used, that they stand in a class by themselves.

The dye solutions of such colors are known to chemists as "reduced" solutions, that is, the dyestuff itself has been subjected to the action of chemical reducing agents such as hydrosulphite of soda, and which, when in solution alters chemically the condition of the dye-bath, imparting at the same time to the dye liquor, a color entirely different from that of the ultimate color of the fabric when dyed. Upon immersing cotton in such a reduced chemical solution for a short time, then squeezing, washing, and afterwards exposing to the air the proper color is restored by the action of the oxygen of the air, which thus counteracts the "reducing" action of the hydrosulphite in the dye liquor.

The principal property possessed by the so-called vat dyes is that they are much faster to the usual influence of wear, exposure and repeated laundering than other heretofore well known dyestuffs.

The writer's experience in the use of the vat colors has been limited to the handling of cotton dyed with the so called group of hydron dyes, and which will be referred to for the purpose of illustrating this particular type of colors, but in doing so he does not desire to create the impression that other vat dyes do not possess properties of equally general interest.

Hydron blue is the type of a group of dyes that possess the peculiar property of prolonged resistance to the action of hypochlorite of soda, and consequently appear to be of particular interest in the manufacture of cotton goods. The shades of blue produced by this dyestuff when dyed heavy and full upon cotton, unlike time honored indigo, remain upon the cotton where the dyer puts them, and do not bleed off or stain adjacent whites as is one of the characteristics of indigo.

The group of dyes represented by the hydron may be dyed in all existing forms of machines, but it has been found an advantage to recommend slight modifications where such alterations do not interfere with the usual working of the dyehouse. Under ordinary conditions, rotating raw stock dyeing machines or dyeing machines constructed in accordance with the pack system ideas, necessitates no other requirement. On the other hand, skein dyeing appears to offer a chronic disadvantage of requiring the use of bent iron sticks in order to keep the skeins well beneath the surface of the dye bath. On the other hand, warps can be dyed on the long chain system or in any suitable warp dyeing machine, on account of the relatively small surface of the dye bath exposed to the atmosphere, or an indigo warp dyeing machine may be modified for the same purpose.

Beam dyeing machines, however, have served a very useful purpose in making it possible for hydron and other vat colors to be dyed satisfactorily, and there is no doubt but that this system will be greatly extended.

The particular point to be noted in the dyeing of warps on beams, with vat colors, is that but a relatively small volume of dye liquor is necessary and which is continually circulated in alternating directions through the beam, and with little or no exposure to the outside air. While the dye solution remains in a reduced condition, no oxidation takes place, owing to absence of contact with the air, and perfect dyeing consequently progresses. After the circulation of the dye liquor and sufficient time has elapsed and the excess of liquor drawn off, then oxidation may take place advantageously, as indeed it must, in order to fix the color and develop the ultimate shade.

It seems to the writer that as dyeing machine builders study the dyeing details of the processes necessary to apply the modern dyestuffs to cotton, the apparent difficulties now encountered in dyeing will be rapidly overcome.

Having briefly outlined the principle methods of dyeing cotton, it only remains to direct attention to the fact that even the simplest process is essentially a chemical operation, and to secure the results having the highest commercial value, it becomes necessary that every advantage be taken to place at the command of the dyer those facilities that modern science points out as essential to good work.

In the matter of dyes, it is rapidly becoming a subject of prime consideration on the part of the manufacturer to employ those that have been best suited to meet the requirements and conditions imposed by later day commercial demands.

In former days, and not so many years ago, almost any colored fabric, if prettily woven or printed, would find a ready sale, but at the present day—owing to broadly conducted campaigns of education the ultimate buyer is the creator of the demands which must be met by the mill man, and in the last analysis, it devolves upon the dyer to keep abreast of modern color achievements and dye his goods to fully meet the conditions imposed.

The Journal of Commerce, New York, in issue of May 28, places the condition of the cotton crop on May 23 at 78.2 per cent., compared with 80.5 per cent. a year ago, and the ten year average of 78.9 per cent. An average gain of 1 per cent in acreage is indicated.

Eastern States Letter

(From Our Special Correspondent).

Providence, June 6, 1914.—There has been a reawakening in the textile industry in the Eastern States during the past two weeks that augurs well for the coming season. At the beginning of the month there was much talk about curtailment, and during the past four weeks there has been some little curtailment among the various cotton mills, but the past week has revived the interest of the manufacturers and they have received more orders than for some time past.

The woollen and worsted mills are still running full time and better than full time, and some of them are having a hard time to get competent weavers and spinners who will work at night. Labor troubles have practically disappeared from the horizon and at this time there is not a single strike of moment among the woollen or worsted mills. There is still the strike of the mule spinners of the Pawtuxet Valley, R.I., mills of B. B. and R. Knight, but this, now running well over 20 weeks, will probably never be declared off.

The mills of New Bedford, Mass., have made gains in the recent stimulated buying, there being calls for fine staples for the firs ttime in many months. Prices strengthened and the market as a whole felt better. The good trade which had prevailed in print cloths for two weeks grew better and most of the mills secured contracts that will carry them fairly well through the coming season.

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While the mills of the North are running close to their capacity, the mills of the South, especially the spinning mills, are running short time, and intend to keep on that schedule until the beginning of the new cotton year. The Hard Yarn Spinners' Association of the South held a meeting early in the month at which it was voted to run not more than 50 per cent. until the first of July, and on that date to curtail still further with a total shut down during the month of August.

This association is the largest in the South, and controls more than 1,000,000 spindles in all. The individual members followed the lead of the association by notifying their agents and commission men in the North that they would not take orders subject to positive delivery on any date, and that after the first of July they would not accept any orders that were not large enough to warrant the opening of the plants and the starting of the machinery.

* * * *

The condition of trade in the woollen and worsted mills is something which pleases the great majority of the manufacturers. Not at any time have the mills been running as well as they are at this time, and several companies are planning for additions. Of coarse there is a great element of doubt in the minds of many of the manufacturers as to whether or not the good business of this season will be repeated in the coming season, because of the fact that prices are being raised on the new goods for the fall. But the clothing manufacturers of the country are almost wholly out of stock and there is nothing that they can do except buy the goods that are at hand.

It is a fact that the importers are going to give the domestic mills a hard run for the business of this coming season and if they can cut the prices any lower than they are at this time, they will certainly do so. Many of the importers had a very unsatisfactory season last winter and the goods that they sold were but a small percentage of what they had contracted to take. Several of the manufacturers have found a good business on one or two particular styles and the American Woollen Company has been forced to withdraw its serge style 1392, which is made by the Fulton Mills of that company. This is one of the leading serges of the market, and is always in great demand, but this year the withdrawal came much earlier than it did a year ago.

* * * *

The annual meeting of the Textile Exhibitors' Association of Boston, which gave the recent textile show in Mechanics' Building in Boston, was held at Danvers, Mass., on Monday, June 1. There was a dividend of 6 per cent. and a substantial rebate was voted on the space which the members of the association occupied at the show. The officers of the association are as follows:—President, F. H. Bishop; vice-president, E. F. Hathaway; secretary-treasurer, Chester I. Campbell; directors, F. H. Bishop, of the Universal Winding Company; E. F. Hathaway, of the American Warp Drawing Machine Company; Lewis E. Tracy, of Lewis E. Tracy and Company; E. H. Rooney, of the Whitin Machine Works; Charles F. Hutchins, of the Crompton and Knowles Loom Works; and Chester I. Campbell.

* * * *

For the second time in its history the Philadelphia Textile School is sending the graduates of the year to New England and New York State for an inspection trip through some of the large and more representative plants. The party leaves New York on June 7th and travels by boat to Fall River, Mass. The first day will be spent in looking through several mills in New Bedford, and the party will arrive at Providence on Tuesday.

In Providence the graduates will be the guests of the New England Alumni Association of the Philadelphia Textile School, and will inspect several of the plants which are in charge of members of this association. On Tuesday evening the sevond annual banquet of the association will be held at the Crown Hotel, and the graduates will be the especial guests of honor.

Among the plants which will be visited here will be the Providence plant of the Crompton and Knowles Loom Works; the Howard and Bullough American Machine Company; Fales and Jenks; the Hope Webbing Company, and several others. Wednesday morning the party will leave Providence and will go to the plant of the Whitin Machine Works, at Whitinsville, Mass. They will also visit the Worcester plant of the Crompton and Knowles Loom Works and various textile mills in the vicinity of Worcester.

Thursday and Friday will find the graduates in the vicinity of Springfield, Mass., and Rockville, Conn., and on Saturday the trip will end in New York with a dinner. The party consists of E. W. France, director of the Philadelphia Textile School; Ray S. Cox, teacher of Jacquard design in the school, the latter in charge of the party; and the following students: A. E. Eisemann, C. A. Wimpfheimer, J. C. Eames, Jr., J. W. Gillespie, W. L. Meisel, I. D. Strasser, B. C. Goodman, J. A. Henson, C. K. Dillingham, L. N. MacKenzie, and J. W. Jeffers. The trip of last year was said to be one of the best things that was ever done for the students of the school.

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The tenth annual convention of the National Association of Hosiery and Underwear Manufacturers was held in Phildelphia during the week beginning May

11th. There was a large attendance of the members and in connection with the convention was held an exhibit of machinery and products used by or allied to the knitting trade that was one of the best of its kind ever attempted.

The officers elected were as follows: — President, Charles E. Leippe, of the Reading Knitting Mills, of Reading, Pa.; first vice-president, Edward Blood, Sr., of John Blood and Brother, Philadelphia, Pa.; second vice-president, T. H. Johnston, of the Knoxville Knitting Mills Company, Knoxville, Tenn.; secretary, C. B. Carter, of Philadelphia, Pa.; treasurer, Robert C. Blood of John Blood and Brother, Philadelphia; directors, W. Parke Moore, of the Brown Knitting Company, Philadelphia; S. D. Bausher, of the Gotham Underwear Mills and Bleach Works, Hamburg, Pa.; B. L. Galbraith of the World Star Knitting Mills, Bay City, Mich.

The convention lasted several days and was very well attended. The members listened to many papers on matters of interest to the knitting trade in general. The delegates were welcomed to Philadelphia by Mayor Rudolph Blankenbur, who reminded the members that 50 years previous to the convention he had become interested in textiles himself and that after 10 years on the road he had established a plant of his own and had remained its active head until his retirement.

The following were some of the papers read, and the names of those who read them:—"Optimism Because of Development," by Edward James Cattell, of Philadelphia, Pa.; "Economic Necessity of the Jobber," by Calvin M. Smyth, of Philadelphia; "Sound Credits and Economy Distribution," by J. H. Tregoe, of New York City; "Too Much Tinkering," by Hon. J. Hampton Moore, of Washington, D.C.; "Adoption and Protection of Trade Marks," by H. R. Culbertson, of New York City; "Operating Costs and Economies," by C. E. Murray, of New York City.

* * * *

Recently the Navy Department asked for bids for making bunting to be used in making flags for the United States war vessels. Among the bidders were two English firms, C. B. Brock and Company, of Bradford, and the Nostrand-Reynolds Company, of Halifax, Eng. When it was found that these two firms had entered bids with the Navy Department and that they being the lowest were about to be accepted by Secretary Josephus M. Daniels, there was a storm of protest from the Atlantic to the Pacific. The bids were based on the tariff of 35 per cent. that is charged on this class of goods, and at that they were considerably lower than the two bids submitted by the mAerican concerns. This would make the cost to the Government hardly more than half what the domestic firms wished to make the bunting for.

During the second week in May an announcement was sent out by Assistant Secretary Roosevelt, who was actin-secretary at the time, that it had been decided to confine the bids to American firms only. The elimmation of the two English concerns left the following bids for the goods: United States Bunting Company, of Lowell, Mass., $43,095; The New England Bunting Company, of Lowell, Mass., $44,625.

* * * *

The New England section of the Society of Chemical Research at its May meeting devoted the time to listening to papers on the recovery of wool grease. The papers read included the following: "Operations of Wool Grease Recovery Plants in England," by Joseph Edmondson, of the Barre Wool Combing Company, of Barre, Mass.; "Prevention of Stream Pollution," by H. W. Clark, of the Massachusetts State Board of Health; "Engineering of Wool Grease Recovery Plants," by Robert S. Weston, a sanitary engineer; "Operations of Wool Grease Recovery Plants in America," by Charles E. Swett; "Market for, and Market of, Recovered Grease," by H. Gardner McKerrow.

* * * *

The various lines of carpets and rugs were opened in New York on May 18th, and the prices quoted ranged from those made last year to several moderate advances. . The most important of the changes was that on rugs of the 9x12 basis, where the advance was from 25 cents to 50 cents.

From 12,000 to 15,000 pounds of tree cotton from Jamaica has been sold in the New York market at 17 cents a pound. This cotton came from the farm of the Cauto Tree Cotton Company, of Meriden, Conn., and the sale was made by W. W. Wheeler, the president of the company. He states that the company is doing fine business and expects to be able to supply many thousands of pounds of the staple within a few years.

The National Association of Woollen and Worsted Overseers held their annual outing at Rocky Point, just outside of Providence, R.I., on May 16th. There was a large attendance ,and after officers were nominated a genuine Rhode Island clam bake was the order of the day. The supply of clams was hardly large enough to supply the craving of the members for the bivalve, and when the dinner was over, many of the overseers were ready to say that they had eaten enough clams to last them until next year.

* * * *

The wool markets of Boston and Philadelphia have been very active during the past month, and the prices of wools in both places have soared to heights believed to be impossible six months ago. The highest prices of the season have been paid in Montana for the new clip, where 20 cents has been freely offered for wool throughout the State.

The killing off of thousands of sheep in anticipation of lower wool prices has caused a shortage in the wool market that will be hard to make up. The usual wool sales have been held in various places in the West, but at nearly every sale there was very little wool to be offered, and what was offered was not the best of the clip by any means.

The manufacturers are anxious to secure the new clip as soon as possible, and they have asked several times to be supplied with the stock as soon as it is received. One dealer in Boston reports the transfer of 500 bags of wool from Utah in the original bags, for which he secured from 19 cents to 22 cents in the grease. Scoured values of the new wools are running from 53 to 57 cents a pound, the latter for good Nevada wools.

Throughout the country, as is the condition throughout the world, there appears to be no limit to the price which manufacturers will pay for wool. American manufacturers and wool interests bought a large proportion of the wool offered at the London sales, and in the West for the first time probably in the history of the woollen business, t he manufacturers have representatives out who are making a stiff fight for the new clip against the agents of the wool buyers.

Buying operations now extend throughout the whole of the West, and are most active in Idaho, Oregon, New Mexico and the Middle West. Growers in Wyoming are holding the remaining portions of the clips for a flat rate of 20 cents, and they will get it before a great while. It is estimated that fully 75 per cent. of the clip in this latter State has already changed hands.

In Ohio and other fleece wool States the mill buyers have set the pace for the dealers, and one Rhode Island mill has already picked up about 1,000,000 pounds of fleece wool in Ohio, paying 23 1-2 and 24 cents a pond for it.

The excitement of the first part of the month in the West among the dealers and buyers of wool continued throughout the month, and as this letter is written there is no let-up in sight. In some portions of the West speculation in wool is rampant and the buyers for mills and dealers are competing strongly for the new clip. It is intimated that the prices that will be paid before the end of the present season will be the highest in many years.

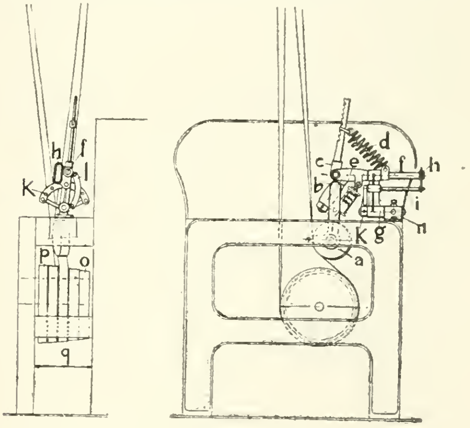
Foreign wools are more quiet than they have been for some time, but there is still a large movement in the wools from other countries than America. Several of the dealers have representatives in all of the large wool growing centres throughout the world who have instructions to secure the greatest amount of wool that is possible for them to get, and to bid high for it if necessary.

Speed Variation Device for Ring Spinning Frames

Textile engineers will appreciate the difficulty which is frequently found in giving proper provision for the increase of diameter of the bobbins as these are being wound. If the speed at which the thread is being wound exceeds a certain limit the strain upon it becomes excessive and it breaks, the result being the loss of time in the operation of the machine until the thread is repaired, besides the disadvantage of having numerous breaks in the thread as a finished article. In order to overcome this two things are necessary: The first is that the regular or irregular variations of speed in the driving power shall be eliminated except when a definite variation is required by the operator, and secondly, that these variations of speed shall be so adjusted that the highest speed is obtainable when the bobbins are at their smallest diameters, the speed being reduced when the larger of the diameters of the bobbin is reached. In practice it has been found that in order to keep the thread at all times running at the highest economic speed and still within the limits of strain imposed to the strength of he thread it is necessary to have a controllable speed variation on the driving head of the spinning frame of something in the nature of 15 per cent. In order to accomplish this a good many installations have been put into operation in which electric motors of a special type are fitted to the frames, each frame having its own motor, the speed of which can be varied, either automatically or by hand, within the desired limits.

It is not, however, every mill which can contemplate the expense either of doing away with its present driving power or even where electrical drive is used, of installing a separate motor of special type to each machine, and in order to meet cases of this description a most interesting form of speed variation device, which is illustrated in Fig. 1, has been introduced by the Berlin Anhaltische Maschinenbau Aktiengesellschaft, of Dessau, Germany, and which embodies some features which make it worth description. It may incidentally be mentioned that, although its obvious application is in connection with ring spinning frames, a speed variation device of this description is also applicable with a great deal of use to a considerable range of drives for other industrial purposes.

The mechanism consists essentially of a belt tightening pulley (a) running on a steel pin fixed into a movable lever (b), and fitted with an automatic lubricator. The belt is tightened automatically by means of the swinging lever (c) and the spring (d). These again are held by means of a forked shape lever (e), and a pin (f), which by means of the rocking lever (g) and the hand lever (h) can be swung from side to side. The stop pin can be set at any desired position in small holes drilled in the segment (k) at the time of erection, and is held in place by the pressure of a spring. The link (l) serves to guide the tightening pulley (a) so that it is always in the correct position on the rising side of the belt. The duty of the oil brake (m) is to minimize the vibration which takes place when changing the power or speed of the machine. The whole



Speed Variation Device.

mechanism is supported by a small frame (n) which is fixed to the stretcher in the frame of the machine. The driving belt can always be narrower than would be necessary for ordinary driving, because owing to the use of the tightening pulley the belt is always taut, and, moreover, it laps round the driving pulley. It is, of course, necessary that the belts should have no projecting joints. For ordinary sizes of machines a belt 2⅜ to 2½ inches wide is sufficient, while for heavy drives the width of belt can go up to 3½ to 4 inches. The step cone pulley has four steps for belts 2⅜ to 2½ inches wide and a range of speeds varying up to 15 per cent. It is made 11 inches wide and is supplemented by a loose pulley (p) 2 11-16 inches wide. Hence the space (q) about 14¾ inches wide has to be provided in the end of the frame of the machine. If this space is not at first available, it is generally an easy matter to shift out the end of the frame, while if necessary a smaller number of steps can be used.

The speed can also be changed by hand within certain limits while running by means of the hand lever (h). When changing, the belt is guided by means of a belt fork fixed to the lever (b). Apart from this.

the belt runs quite free on the tightening pulley and does not rub against the belt fork, as the tightening pulley always adjusts its position to the direction of the belt. If necessary the link (l) can be shifted slightly and the mechanism can be adapted to almost any existing belt drive. When the belt runs over guide pulleys it is often necessary, on account of the wider pulleys, to shift them a little, and with open belts care must be taken that the side running upward is not at too great an angle to the mechanism. — The Textile Manufacturers' Journal.

Carding Points

By WILLIAM SHAW

In almost every carding room it is a common thing to hear the coilers on the drawing frames making a rattling noise. This is generally due to a dry coiler or a small piece of matter lodged in the groove for the reception of the coiler. However, it is strange when one stops and thinks of it, how few drawing tenders know what to do in such a case. They should be instructed each time a coiler is found dry or dirty to first lift out the coiler to ascertain whether there is dirt in the groove or not. If none is found, the tender should be instructed to oil the coiler.

When a coiler is dry or dirty, it offers much resistance to the train of gears driving it, and in a short time considerable wear takes place, and although the work is not affected, it does much injury.

There are many times when a can will fall to the floor from the coiler on the card or drawing frame. In most cases the can is blamed and marked and placed to one side. But the real cause is generally due to a small piece of dirt being lodged in the groove in which the turn table revolves. I find that when dirt is lodged under the turn table of either card or drawing, that it will not cause the can to fall to the floor every set, but will every yilttle while during the day. So that in this case, again, the turn table should be lifted each time the can falls out and thoroughly cleaned.

In lifting the coilers out of the drawing frame great care should be exercised, for the reason that the frame on which the coiler revolves is very weak and easily broken.

I notice of ten in many mills when a coiler is broken, the frame is stopped until repairs are completed. This occurs mostly in case of electrical stop motion drawings, because, owing to no stock passing through the calender rolls on the delivery where the coiler is broken, it is found impossible to run the frame. Removing the top preventer rolls from the lower preventer roll is an easy matter, but to many separating the calender rolls while in motion seems a puzzle. Not only in case of a coiler being out of repair, but other things connected with the delivery of a drawing is liable to cause delay, and stopping the whole frame means a loss of production.

In such cases, first remove the top preventer rolls from the bottom preventer roll on the delivery where repairs art to be made. Next, come in front of the drawing and pick a long piece of sliver, say about one yard long, wet one end, then remove the clearer on the calender rolls for that delivery; lay the wet end of the sliver on the front calender roll and then start the frame slowly. When the whole length of the sliver is wound around the roll, the frame can be put on full speed and run for hours, when a new piece should replace the first one.

Cáre should be taken that too much sliver is not wound, as it may separate the calender rolls to such an extent as to cause the opposite ends to come in too close contact and cause the frame to be continually knocking off.

It pays also to instruct every new drawing tender to be sure and have what is known as tail ends hanging over the top of the can after doffing. The writer never fails to do this, and I am sure I have saved myself much work and the company much money by so doing, because every practical carder will admit that this practice of allowing ends to hang over the top of the cans has caused many bad break-downs on drawing frames. On all drawing frames, the coiler shafts are fairly well protected, but somehow, the end of the sliver is too often wound around the coiler shaft, which in a short time will make a mess. It is very little trouble to instruct a new hand to be sure on starting the frame that every end is in the can.

Another common fault found in most carding rooms is the drawing coiling between the tin roll which supports the ends on the slubber and the back rolls. I have seen in some mills where a bunch would come through every few minutes. I know a mill that is bothered much at this very writing with the above trouble and as they happen to be subscribers to this journal, the following will remedy the trouble, and may also help out others having the same trouble.

The first thing to do is to stop the roll, then lengthen the arms that support the tin roll about three inches. By having a greater space between the tin roll and the back drawing rolls, the coils in the drawing will be extracted before entering the back rolls. Having the roll stopped will also aid in making the coils in the drawing disappear.

By lengthening the arms as stated, the tin roll is brought more central over the cans, and I find this a great aid also in preventing the drawing from breaking in the cans.

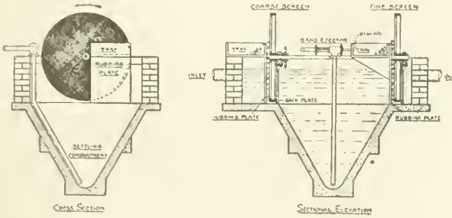
THE SCIENCE OF KNITTING.

"A book on the universal laws of knitting." "An illustrated reference book on the elementary principles of knit fabrics and machine knitting, including fundamental conventions, definitions, rules, formulae, and tables, for the student, operator, manufacturer and analyst." The author, Earnest Tompkins, M.E., knitting expert for the Wildman Manufacturing Co., Norristown, Pa., has given in this book one of the most valuable treatises of the subject ever written. There is a conspicuous absence of technical terms and yet the author has not lost valuable points. It is a description of knitting machinery and covers every phase of knitting that comes up in everyday work.

Principally, it is the result of over twenty years' experience and observation in many departments of knitting, concisely expressed in simple rules with instructions how to use the rules. Tables are given for rib machinery and loop-wheel machinery, so that those who have no use for the rules in connection with those machines may obtain the results directly from the tables. These tables show for different conditions the obtainable production, width, weight, wales, courses, strength, etc. The book also contains much special information tabulated and arranged ready for use. The Renouf Publishing Company, 25 McGill College Ave., Montreal, are the publishers' agents for Canada and Newfoundland. The book will be sent post-paid to any address on receipt of the price, $3.

A Wool Recovery Machine

An interesting form of wool recovery machine and sand separator is that illustrated in cross section and sectional elevation. In raw wool scouring, unless special precautions are taken, the effluent will convey from the works a considerable waste of valuable wool or other fiber. In order to prevent loss in this way the scouring liquors are directed through fine mesh screens before being allowed to leave the works. This method is at least successful in promoting a feeling of



Wool Recovery Machine.

assurance that the best precautions have been taken toward the prevention of unnecessary waste. Nevertheless, such means do not by any means prevent a considerable loss of wool or other fiber for a very simple reason.

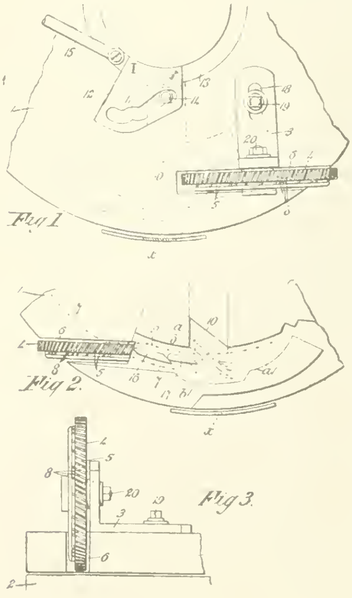
The diameter of the individual fiber is many times less than the finest mesh screens which are practicably available, and the result is that separate fibers thread themselves through the perforations in large numbers. A practical demonstration of this fact was afforded some little time ago at a very large wool washing works which had an average flow of 20,000 gallons of effluent per hour. The whole of this effluent passed through fixed screen the mesh of which was very fine, whereas it would have been thought that as much as possible of the fiber suspended in the effluent had been retained.

A machine of the rotary type, illustrated in the figure was, however, installed in such a way that the effluent after passing the fixed screens mentioned had to traverse the rotary arrangement shown, and the result was that the rotary machine recovered on an average no less than 150 pounds of dried wool per day. This saving, the important nature of which is apparent, is due to the fact that in the rotary recovery machines the fibers, which would otherwise thread themselves through the perforations, are deflected by the traverse of the rotary disk, with the result that the fibers come into contact with the disk in a lengthwise manner instead of head on. As a consequence any fiber exceeding one-quarter of an inch in length, it is claimed, is recovered by the machine. The claim appears to be justified by the record above given because the mesh of the screen in the rotary machine was actually larger than that adopted in the fixed screens.

In raw wool and other scouring the fiber recovered by fixed screens is merely a matted mixture of wool, sand, burrs, seed and other foreign matter which considerably detracts from the value of the fiber. The wool recovery screen shown in the illustration, however, automatically separates the fiber from any of the foreign bodies referred to, and as a result the recovered wool is, it is stated, quite equal in quality to the bulk from which it was detached in the scouring process. It can therefore be returned to the scoured wool or blend. The machine is very simple in design, consisting of a substantial perforated disk, a cast iron plate, a horizontal shaft and receiving tray, and hence is entirely free from complicated working parts. There are no brushes, scrapers, conveyors or other mechanical parts, and the screen will work for days without attention. If an external source of power is not available the necessary power can be derived from the flow of the effluent. The recovered fiber is automatically washed in the effluent and before being delivered is squeezed free from water and dirt. The fiber is therefore so clean that it can be used again for manufacturing purposes and is worth twice the value of fiber from the fixed screen. Moreover, the screen is self cleaning; no brushes are used, but the screen washes itself clean in the efflnent and does not become choked. By means of a simple ejector the sand in the settling compartment is very easily removed. — The Textile Manufacturers' Journal.

Improvement in Producing Patterned Fabrics

An improved method for producing patterned fabries having tuck, openwork, or similar designs, and for selecting and actuating the rib needles by the introduction of a rotary pattern or selecting wheel combined with the ribbing dial of a rib machine working in such a manner as to act directly upon the rib needles to select same for patterning purposes, has recently been introduced.



Improvement in Producing Patterned Fabrics.

Fig. 1 shows a plan of a part of a ribber dial cap with the pattern wheel combined; Fig. 2 being an underside plan of the dial cap showing cams, and Fig. 3 a side elevation of the patterning wheel on the cam cap.

The patterning wheel (4) is shown arranged on the cap (1) in such a manner that its side is disposed obliquely to the circular track of the needle butt (7), certain gaps of the wheel are filled by means of removable bits (8), and so become what is technically termed blind gaps.

During the rotation of the dial (2) and pattern wheel (4), the rib needle butts following the track (7) meet the wheel, with the result that where a butt enters a gap, it passes through the edge of the wheel from one side to the other, and the needle is not moved by same but by any needle coming to a blind gap is pushed back until the wheel rises clear of the butt, and so causes these needles to follow a different track shown at (9). The setting of the wheel, therefore, determines the needles affected, and by the set-out enabls different patterns to be made.

In conjunction with the wheel (4) may be four or more cams for directing the selected needles from the track into which they have been deflected by the wheel operating for the various purposes of tucking or knitting, taking a change of thread, or for taking of additional threads.

Any convenient number of wheels may be combined with the same dial to act upon the needles at different places and feeders.

This improvment is not limited to a rib machine as it may obviously be applied to circular flat needle beds. —Hosiery Trade Journal.

The Proper Handling of Wool

A Description of the Australian Methods of Marketing.

This year's domestic wool clip is now about all on the market and reports from various sections of the country are, in many cases, far from flattering so far as the condition and quality of the wool is concerned. In some sections the Government and Agricultural Colleges have done good work in supervising the shearing and grading and in such cases a ready market has been found for every pound of wool on hand. But the reports of the experts sent out from the above sources concur in saying that there is much prejudice to overcome and that a vigorous campaign of education is necessary to bring the Canadian wools generally up to the state of excellence obtaining in other great wool growing countries, as Australia, New Zealand and Argentina.

The following description of the Australian methods of marketing wool, by W. T. Ritch, formerly of the Live Stock Branch of the Department of Agriculture, gives an idea of the work that must be done in Canada before the sheep raising industry will become the highly profitable feature in the agricultural life of the Dominion it should rightly be:—

"Nearly all of the shearing in Australia is done by shearing contractors, who clip for so much per head. This contract system has developed scores of organizations of expert shearing crews and has reduced the shearing to an exact science.

The Australian flockmaster works for a clean, high grade clip of wool from the moment he begins to prepare for the shearing.

"The sheep of but one flockmaster are handled in the establishment at any one time. The flock is driven from the mustering pens to the sweating pens, and then to the feeding pens, where they are segregated—the ewes, rams, hoggets and wethers going into separate pens.

"From these pens they go to the catching pens. These are pens arranged down the sides of the centre of the building and before each pen stands the man who does the shearing. The sheep are put into individual catching pens to obviate the custom practised by so many shearers in crews not properly organized of rushing about among the sheep to try and secure the easiest sheep to shear.

"The moment a sheep is shorn he is rushed through a chute that leads down under the shearing shed floor, and thence into counting pens, where he is branded and counted and sent on his way to the rest of the flock.

"Meanwhile, some very interesting things have been happening back in the main room. The shearer first clips the belly wool. The instant it falls to the floor—and that floor is as clean as a library table top—it is quickly but carefully gathered up and thrown into a basket provided for belly wool. The same process is performed with the hocks. These are inferior classes of wool and are kept separate.

"Then comes the main fleece, and it comes off in one piece. As it drops to the floor a boy who is expert in handling fleeces picks it up in such a way that it is not broken or greatly disturbed, and spreads it on one of the rolling tables.

"From the shearer the wool is taken direct to men known as skirters and rollers. Here the fleeces are spread out and skirted—or, in other words, trimmed of those portions which are not desirable of retention with the entire fleece. Each portion trimmed off goes into a certain basket, and is kept separate.

"After the fleeces have been rolled and skirted they go to the wool classer's table. This man is one of the important employees of a shearing organization. Under his eye is classed all the wool that goes through the shearing station. Not only must he class all the main fleeces, but he supervises the classification of the inferior portions of the fleeces.

"Grading is the placing of whole fleeces into different grades, according to their indications of breed and quality, while classing is the placing of skirted fleeces into different classes according to their length, quality, soundness, condition and tint.

"From the classer's table the fleeces go into different bins. The classer's table is always clean, as he works with tremendous rapidity and must make no mistakes.

"Then men who assist him by classing the poorer parts of the fleeces all deposit their work in baskets from which they are later taken to be pressed by the baler. Then the bales are branded and sent through to the shipping platform outside the shearing station. The moment the last of one flockmaster's sheep is shorn word is sent to the superintendent of the shearing station, and the work begins at once of clearing away every vestige of the clip just finished. When all of the shearing operations have been completed on a flock of sheep, the shearing station is as clean as a ballroom floor from one end to the other.

"The method of handling the fleeces so that they are not broken is close to perfection. In the pressing and baling, the fleeces are so laid that they retain their form and as each bale comes out to the shipping department it is marked as to quality and grade, and with the owner's name.

"From the shipping platform the owner carts away his wool to a railroad depot and makes whatever other disposition of it that best suits his purpose or convenience for the time being. The only hands through which his wool will pass, however, before reaching the manufacturer, is that of the wool broker. There is no expensive, profit-making middleman in the Australian system.

"The secret of the success of the system lies almost wholly, of course, in the proper preparation of the wool for the market at its source. You see, the work of separating the wool into its different classes has already been done, and the manufacturer by inspecting samples of each class knows exactly what he is buying. The main portions of the fleeces, or, in other words, the best of each fleece, brings the price such wool can always command when it is segregated. The first and second pieces, the necks, the belly wool, the hocks and other wool of a lower grade bring lower prices, of course, but the higher price of the best of the fleeces predominates.

"Or let me illustrate in this way—the bulk of the fleece of a sheep is high-grade wool that should bring anywhere from 24 to 28 cents a pound. The poorer portions of the fleece bring from 16 to 18 cents. When wool is properly shorn and prepared for market, the high grade portions of each fleece are segregated, and the grower therefore receives from 24 to 28 cents a pound for his wool. This is the case in Australia, remember.

"Western Canada sheepmen, on the contrary, receive the lower price of from 16 to 18 cents a pound for their wool, because the fleeces are poorly clipped to begin with; they are neither skirted, classed or picked; they are thrown promiscuously into bags and tramped by men in heavy boots, thereby breaking the fleeces and permanently injuring them so far as their market value is concerned, and finally, because the buyers have no means of knowing how much high-grade wool is mixed with the lower grades and dirty wool. These buyers average the good with the bad, and hammer the price for the whole clip down to about the level the poorer portions of the clip should bring alone, were they properly prepared.

"The difference is so evident, and the superiority of the Australian system seems so obvious, that I hesitate to draw further comparisons."

KNITTED SPORTING COATS.

Probobly the newest knitted novelty shown by the leading stores at the present time are ladies' tennis and golfing jackets, knit very much the same stitch formation as the knitted neckties and scarfs which heve been so much in demand in recent years. In fact the cloth for these garments is being made on the same machines that a year ago were knitting mercerised and artificial silk mufflers. The cuffs collar and borders are knit in plain heavy stockinette stitch, which produces a very dainty and effective trimming. Knitted caps of the same design and material and finished with a band of stockinette stitch are sold with the coats, the retail prices of which are now $10.00 to $12.50. A short belt across the back of coat is the only additional trimming shown. These coats and caps are offered in solid colors throughout and in all the prevailing fashionable shades. One enterprising Toronto manufacturer has placed among a few of the exclusive stores sporting coats of pure silk to retail at $50.00 each.

Our Old Country Letter

(From Our Special Correspondent).

London, May 28, 1914—Professor Aldred F. Barker has been appointed to the chair of Textile Industries at Leeds University, and it is quite evident he will have the good wishes of a great number of friends in Canada. In Egland business men know him as an authority on trade subjects and many hundreds of his former students (many now in lucrative positions) owe much to the knowledge he imparted to them. He has succeeded in the chair of Textile Industries Professor Robert Beaumont, whose father, Professor John Beaumont, was the first to hold the position. Professor Barker was the second head of the Textile Department of the Bradford Technical College, the first, whom he succeeded twenty-one years ago, being Mr. T. R. Ashenhurst. Before taking up the appointment in Bradford which he has just vacated, Professor Barker was attached to the Technical School at Saltaire. Professor Barker has not confined his interests to the Bradford College. He has been a leading spirit in movements outside the college. He was instrumental in starting the Shipley Textile Society and when he removed to Bradford he took an active part in founding the Bradford Textile Society. In this Society Professor Barker has taken a great interest and the members have had the advantage of hearing many valuable lectures delivered by him. Other bodies in which he has played a prominent part are the Association of Managers of Textile Works and the Textile Institute in Manchester. All the institutes and societies Professor Barker has been associated with are doing excellent work for the good of the English textile trade, and considering that frequent references have been made in the Canadian Textile Journal to the fact that greater interest should be manifested in technical work in Canada, I may mention that these English bodies have in past years produced some of the finest practical workers, which in the end must prove of great benefit to trade.

* * *

The third series of Colonial wool sales in London have just closed. Throughout there was a good attendance of buyers and competition was strong. Prices of merinos and fine crossbreds ranged from par to 5 per cent. dearer, while those of medium and coarse cross-breds, though firm, showed no quotable change from March closing prices. Punta Arenas and Peruvian wools were again in keen demand and sold well at full current rates. All other sorts realized satisfactory rates from the seller's point of view.

* * *

Scotch manufacturers report that the Border woollen trade is in a statisfactory state. A substantial amount of confirmation orders for the winter have come in from all sources and interest is now being centered in the new spring season's showings. Manufacturers tell me that they are fairly satisfied with the pattern orders offering. In addition to flannels and fine Saxonies there is indication that good Cheviots will still be wanted. Dyers and spinners are not too busy, but with the strong wool market there is no uncertainty as to the future, and more business is expected in June and July. Hosiery manufacturers are well employed with a good deal of work in hand.

* * *

Professor Chapman at the spring meeting of the Textile Institute, held in Manchester the other day, gave an address on wages problems, and emphasized their importance to the producer, who might easily, he said, throw away in a labor dispute of a few weeks the earnings of twelve months. In the solution of such questions it was necessary, in the first place, that the system of settling wages should be one which would lead to the "right" wage. By a right wage he meant nothing fundamentally ethical, but a wage which corresponded to what was meant in speaking of "the right price"; it should be the expression of the equilibrium of the forces of demand and supply. The machinery needed was not something to be substituted for supply and demand, but was a frictionless medium through which those forces could be expressed. He commended the Australian system of arbitration.

* * *

The Farnworth Spinning and Manufacturing Company, whose mill is at Walkden, are building another adjacent to their present one. The company is a very successful one. The present mill contains 45,000 spindles for fine yarns, and the new mill, which is expected to be finished in a year, will contain 15,000 spindles.

* * *

Trade between England and Canada in woollens, piece goods, etc., is reported to be satisfactory all round. This no doubt is due to the increased shipping facilities obtaining between the two countries and Canadian manufacturers in their own interests should not lose sight of the tariff question in matters of this kind. There is a movement now in England to secure lower rates, an improved bill of lading so as to make the shipping companies responsible for loss or delay during a strike in a port, and from what I can learn there is a general concentration of attention on the part of British and Continental manufacturers to secure more of the trade of the Dominion. A strong association, or some similar body, is, therefore, necessary in Canada to counteract these modern movements, and one way will be is to have furnished first-hand information from the English side which, of course, must be of a private character for the purpose of protecting Canadian textile and other industries.

* * *

The cotton trade in England is fair, but quotations have been rising and falling rather in quick succession owing to the American consumption, which creates an uneasy feeling on this side of the Atlantic. Demand, however, is certain; supply is uncertain; and as the world cannot accumulate large reserves of cotton it is particularly liable to being startled in advances.

FAST COLORS ON UNION GOODS.

We are in receipt of an interesting pamphlet illustrating and describing the use of Diamine Fast Colors and Union Fast Colors in dyeing union goods. It shows a series of 90 dyed patterns, of which 30 are self shades and 60 are combinations on a wide variety of fabrics together with elaborate dyeing directions.

To dyes of all classes of cotton and wool mixtures this pamphlet will prove of much value as it shows two depths of shade for each color type, thus enabling the dyer to accurately judge the color value of each dye.

A copy of this pamphlet (No. 5538) should be in the library of every union goods dyer and no doubt a request made to any of the offices of Cassella Color Company will secure one.

Mill and General Textile News

The Canadian Cottons, Ltd., are installing a beam dyeing plant in the Marysville, N.B., mill, at a cost of $12,000.

Charles Ferrill, boss finisher with Bates and Innes, Limited, Carleton Place, Ont., felt department, has resigned to accept a position with the Militia Department at Ottawa as inspector of clothing. Mr. Ferrill was handsomely remembered by his fellow-workers on his departure.

Harring Twigg has resigned his position as boss finisher with Messrs. T. H. Taylor and Sons at Chatham, Ont. He has accepted another position in Toronto.

Ernest Mills, of Bridgeton, Maine, has accepted the position of boss finisher with Bates and Innes, Ltd., Carleton Place, Ont.

The warehouse of the Montreal Cotton and Wool Waste Co., Montreal, was badly damaged by fire on May 31st.

Paton Twines, Limited, have established a plant on Esplanade Ave., Toronto, under the management of E. H. Wilkinson, late of the New Brunswick Pulp and Paper Co., Millerton, N.B. The twine is manufactured from paper and flax.

Charles Porter, superintendent of No. 1 mill, Paris, Ont., has resigned to accept a similar position in a Southern mill.

Dan Kelly, of Amsterdam, N.Y., has accepted the position of boss carder with the Almonte Knitting Company, Almonte, Ont., replacing Joseph Ainley, who resigned recently.

A despatch from Washington on June 2nd stated that dissolution of the so-called thread trust, organized under the name of the American Thread Company, was ordered on that date by the Federal Court at Trenton, N.J.

The Board of Control of Montreal is considering the advisability of manufacturing all the clothes required for its uniformed employees. The matter was brought up by a letter from the Garment Workers' Union, asking the city to make inquiry and see that the uniforms for firemen and policemen were made in sanitary shops, and by tailors paid fair wages.

W. T. Ritch, formerly employed with the Dominion Government in the Live Stock Branch of the Department of Agriculture, has returned from Australia and is now conducting an education propaganda among the wool growers of the State of Utah.

Edward E. Magner has accepted the position of overseer of dyeing with the Cobourg Dyeing Co., Ltd., Cobourg, Ont.

The bye-law providing for a conditional loan of $10,000 in aid of a company promoted by George W. Charles of Montreal was carried by a large majority in Cobourg, Ont., on May 22nd. The company takes over the plant and machinery of the Cobourg Matting and Carpet Company, and is to manufacture felt and other textile fabrics, boots, shoes, and other footwear made of felt, etc.

The Co-operative Silk Manufacturing Company, Ltd., of Montreal, has been granted a Dominion charter to carry on a silk manufacturing business. The capital is $50,000.

The new mills of the Canadian Flax Mills, Limited, at St. Catharines, are now nearing completion, and it is expected they will be ready for operation within a month's time.

Thadie Dalcourt has severed his connection with the Dominion Textile Company as boss carder in the Merchants Branch, Montreal, and has established a plant at St Felix de Valois, Joliette Co., Quebec, for the manufacture of hoses, tuques, belts and mittens. Mr. Dalcourt has been with the Merchants mill for 22 years as second hand and boss carder.

The authorities at the McDonald Agricultural College, St. Anne's, Que., have been active in giving assistance to wool growers in the neighboring district. The entire clip of Pontiac Co. was sheared under their direction and properly graded and packed, and is being disposed of to Ontario mills. Manufacturers who have already purchased part of the clip are most pleased with its quality and condition.

English Woolens and Worsteds

(From Our London Correspondent.)

London, May 30, 1914.—Trade in the English woollen and worsted industries shows considerable improvement, and manufacturers in the Huddersfield centre say that while there are some who could do with more work looms as a rule are fully employed. Repeat orders for the present season are still flowing in, and orders for winter goods are rather more numerous. The patterns for next spring, which are being shown by the manufacturers, are being well received. It is likely that cheviots and Saxonies will be in favor, with rather more variety in colors, but styles are still very neat, especially in checks, these also being very small. At the same time, only slow progress is being made in the fine worsted department. This is entirely due to high prices. Manufacturers, however, are proving very resourceful and cheaper lines, rather smart in appearance and finish, are being placed upon the market. Much better conditions are being experienced by fancy tweed makers for whose productions there is a brisk demand, particularly on the part of the wholesale clothiers, who are very busy and inclined to be for some time. All classes of manufacturers complain that prices are a source of difficulty, and that the high rates of wool, coupled with a constant increase in the cost of production, leave them an inadequate margin of profit. Canada is at present a good customer at Huddersfield for tweed fabrics, while there are also signs of a steady growth in worsteds.

At Dewsbury and Batley the woollen cloth trade continues brisk, and the same may be said of Morley. To meet the demands for prompt delivery, full capacity is being worked at the mills. Canadian orders are about on an average, but the United States demand for medium tweeds in stylish designs, as well as of plain cloths of the same grade, have been very heavy. In ladies' costume cloths more is doing, also in mantlings, and there is a fair demand for serges in navy blue and other colors. Some manufacturers in these districts have army and navy contracts on hand, and I am told, also, that in Birstall, Ravensthorpe, and Ossett the cloth trade is in a healthy condition, and manufacturers in the entire district are doing well, but it is doubtful considering the prices of raw material. White blanket makers are not fully employed, and only small orders have arrived so far from Canada. In colored blankets more is doing, and the same is true of motor and other rugs. Saddlery blankets remain dull. In the Spen Valley there is more activity in the production of rugs for Canada and South Africa. The carpet trade of the Spen Valley also shows animation, but it cannot be described as brisk so far as the home demand or the export demand is concerned. Liversedge flannel manufacturers are doing very well, but the high price of wool hits these men very much.

Hawick manufacturers report a fair amount of business doing, although the confirmation of orders for the winter season are rather late in being placed. First sample patterns for the spring of 1915 are being well taken, and the better class of Cheviots and Saxonies continue in favor. Spinners appear to be well employed, and in few instances overtime is being worked. The hosiery branch of the trade is enjoying a good spell of business and prospects appear to be satisfactory.

The new styles made at Leeds from the season's wool are to command higher prices. That is decided upon, and the general trade for Canada and other sources is keeping up for actual requirements and repeat orders are coming in satisfactorily, but future orders are given out with the greatest caution. They are mostly for low and medium qualities, higher priced goods being slow of sale. Most of the mills are fully employed, and a few are very busy. Woollen merchants report good business, the best sellers being tweeds, serges, and costume cloths in neat designs in a variety of grey shades, and medium worsteds, which Canadians seem to like. Indeed, the Canadian trade with Leeds has improved very much in recent months, while the demand from the United tSates is not so great. At Rochdale manufacturers have shown some indifference to accept the orders of merchants at the lately advanced prices on wool.

In Leicester trade is limited in quantity, and prices are very firm. Spinners of yarns are compelled to maintain advanced prices, even though for the time being there is little, if any, response by way of new business. The hosiery branch of the trade is fairly active.

TARIFF CHANGES

Correction

In our last issue issue, on page 156, under the heading "Recent Tariff Changes," we reported the following:

"Embroideries, n.o.p., lace, n.o.p., braids, n.o.p., tapes of cotton or linen not over one and one-quarter inches in width, not including measuring tape lines, fringes, n.o.p., cords, elastic, round or flat, garter elastic, tassels, handkerchiefs of all kinds, lace collars and all manufactures of lace, nets and nettings of cotton, linen, silk, or other material, n.o.p., shams and curtains, when made up, trimmed or untrimmed, corsets of all kinds, linen or cotton clothing, n.o.p., free."

This is item 575 of the Canadian Customs Tariff and under the new arrangement these goods are dutiable as follows: British Preferential, 25 p.c.; Intermediate, 32½ p.c.; General, 35 p.c. Under the previous Act the following duties were in force: British Preferential, 25 p.c.; Intermediate, 27½ p.c.; General, 35 p.c.; and under treaty with Belgium and Netherlands, 32½ p.c.

THE MARKETS

THE WOOL MARKET.

During the past few weeks the new clip has been coming forward in good volume. The Ontario clip is in fair condition and improvement is apparent in the manner in which the wools are put up and marketed. Top prices are being paid, averaging from 2 to 3 cents a pound over last year's prices, and are holding firm at these figures. A number of mills in Eastern Ontario have bought up the wools marketed by the McDonald Agricultural College, St. Anne's, Quebec., collected from the farmers in the neighboring counties and found these wools of good quality and excellent condition. No great trade, however, has passed with the mills as conditions do not warrant the purchase of large stocks of the raw material at the present time. Reports of the past week show no improvement in woollen manufacturing circles. Dealers state that they have no difficulty in disposing of their stocks to American buyers and anticipate that prices will hold very firm for some time. The following prices prevail: Unwashed coarse, 17½ to 18½c; do., fine, 18½ to 19½c; washed wool rejects, 19 to 19½c; washed coarse, 25½ to 26½c; do. fine, 26½ to 27½c; N.W. fleece 15½ to 16½c.

Business in foreign wools has practically been at a standstill. Recent Bradford reports state that there is still an upward tendency for merinos, largely because of the difficulty in connection with new supplies. Some topmakers will not quote at all, whilst others are protecting themselves by asking higher prices. Crossbreds are firm all round at late rates. Yarn business is quiet, and some spinners are working to stock. Home wool prices are unchanged, but are largely nominal.

THE COTTON MARKET

Messrs. Hubbard Bros. & Co., in their weekly letter of June 5, say:—

Although the cotton trade expected a low report of the condition of the cotton crop on May 25th, we do not believe they thought the Government could give as low a condition as 74.3—a condition which makes the report one of the three lowest reports in the past twenty years. Nor are they yet quite prepared to admit that the rains in Texas have reduced the crop in that State to a basis of 65, which would mean a disaster. They have not forgotten the error made in the low estimate of the crop of this season made in December last and the admitted large error made in the acreage. As a matter of fact, the impression is world-wide that condition reports and estimates of the cotton crop are influenced to favor higher prices. We doubt the correctness of this idea, conceiving it to be the reflection of the errors in yield and acreage which we have just mentioned, yet still it exists. It may be "Mental mourning" over the losses caused by those reports; nevertheless it will take some time for the trade to become convinced of their verity. However, to us, admitting a margin of error quite possible in the best of estimates, it will call for remarkably good weather conditions to make more than an average crop.

We look forward to a period of fine weather which will raise the average condition during this month, and which, if it occurs, is likely to put the market in its present condition under such a strain as to bring about a sharp reaction from the extreme advance and possibly a partial change in the present bullish sentiment. But, as we pointed out a fortnight ago, the crop has been put on the defensive, to produce more American cotton than will be needed at present prices.

At the moment the market has not the support of the spinner in providing for his future requirements. On the contrary, spinners at home and abroad are waiting for further developments because they wish to see how the market will act under the test of good weather, and also they find trade in such a condition that there is only a small proportion of the usual forward orders for delivery ahead.

Merchants have not yet had an opportunity to study the details of the proposed legislation in Congress to regulate the cotton trade neither have planters, who are quite as much interested in the disposition of the different grades that nature gives them to sell to the spinner. In this present mania for regulating business, some are bound to be injured, and we fear the pendulum has been swung so far that the loss to the farmer and planter will greatly exceed the proposed benefit to the spinner through Government Regulation of grades.

THE BRITISH MARKETS.

(Special to Canadian Textile Journal.)

London, May 27, 1914.—The high cost of the new material today in England is making manufacturers very careful in any dealings with merchants and buyers, and it is now rumored that the increased cost of production of the finished article will necessitate another rise in prices. At the recent Colonial sales here there was a strong market for all grades, and the delays in New Zealand gave crossbred wools an exceptional predominance, and the demand from all countries seems to convince everybody that there will in the future be no probability of any fall to a narrow limit of either cross breds or Merinos. Bradford consumers filled their requirements in Merino and fine cross-bred tops for a while ahead and top-makers advanced their prices to a level at which little or no business could be done lately. The cart is before the horse in most cases occurring recently, the contracts being made from motives of policy rather than for the sake of any visible profit. Now while more work is being done it cannot be said that more money is being earned. Stocks are not the encumbrance they were in the yarn and cloth trade, and spinners are feeling a more direct pull of demand. From the various consuming centres throughout England and Scotland reports reach your correspondent of the extra cost of wool, while at the East India Wool Sales at Liverpool—the third series for this year—prices were well maintained, except for defective lots, which went at 5 per cent. cheaper than the rates at the second series.

Prices are about as follows:—

Tops.

	cents.
40's Colonial tops, prepared	33½
40's Colonial tops, carded	30
46's Colonial tops, prepared	30
40's English tops, average	33
40's Devon tops	33
36's Devon tops	33

Yarn.

	s.	d.
1-36's Demi lustre (40's-44's) English per gross	8	0
2-32's Worsted (40's) cross-bred, per lb	1	9
2-16's Worsted (40's) cross-bred, per lb	1	7
3-12's Hosiery white (40's) per lb	1	8½
3-12's Hosiery white (46's) per lb	2	0½

BRADFORD WOOL MARKET.

(Special to Canadian Textile Journal.)

Bradford, May 27, 1914.—Bradford market has not been relieved in any way by recent events, and business generally continues to be exceedingly difficult to negotiate. Fine wools are exercising a very strong influence over the whole position, and in consequence of high prices makers are today exceedingly firm. The amount of actpal business doing in this description of tops is not large and the position of spinners is such that they are not operating unless compelled to do so by actual needs. Fine spinners have recently not been meeting with such a good inquiry for their yarns and manufacturers have somewhat kicked so strongly against the prices which they have been compelled to quote that profitable business has become more difficult than efforts can devise. Reports have been heard of good 64's top being sold as high as 54 cents, but this, of course, is an extreme figure even at the present time and a cent less business can be done. Fine cross-bred tops are all very firm and inquiry in that section seems to be improving somewhat. Crossbreds are on the whole steady, and the recent ready improvement of this class of raw material in London has strengthened top makers in Bradford, though there is still room for considerable improvement in respect of inquiry for tops. Spinners are very often in a worse position than is the case among Botany men. Fortie's prepared tops are being quoted at 32 to 33 cents, and it may be said that the best inquiry is still being experienced for the low descriptions, including 32's and 36's.

English wools are quiet and unchanged. As regards mohair the only sorts in which there is any business are mixed classes of capes. Sales of Alpacha are being effected at full rates, with every indication of a rise taking place.

Canadian Cottons, Limited, Statement

Sales Fall Off 20 Per Cent.—6.13 Per Cent. Earned On Common.

Despite a sharp falling off in the volume of sales for the year ended March 31st, the annual statement of Canadian Cottons, Limited, shows profits which will be considered highly satisfactory in view of the general depression in business.

Sales amounted to $3,500,4776, a decrease of $906,688, or 20 per cent., but profits, including rentals, were $602,942, a decrease of only $45,568, or about 7 per cent. as compared with the previous year. Net manufacturing profits were some $70,000 lower than in 1912-13, but rentals received for the Mount Royal Mill and other leased properties brought in about $25,000 more than in the previous year.

The balance available for preferred stock dividends, after interest charges had been met, was $392,942, equal to 10.7 per cent., against earnings at the rate of 11.7 per cent. on the preferred, the previous year. After paying preferred stock dividend and setting aside $10,000 for bad debts reserve, a surplus of $163,252, equal to 6.13 per cent. on the common stock, on which no dividend has yet been paid, remained to be carried forward to surplus account, bringing total surplus to $969,225. A year ago the surplus available for the common stock was $205,213, equal to 7.56 per cent.

The profits and loss and surplus accounts of the two years compare as follows:—

	1913-14.	1912-13.
Manuf. pro.	$411,104	$481,502
Rentals	191,838	167,007
Total prof.	$602,942	$648,510
Bont int.	210,000	207,500
Balance	$392,942	$441,010
Pref. div.	219,690	215,797
Balance	$173,252	$225,213
Reserve	10,000	20,000
Surplus	$163,252	$205,213
Prev. surp.	805,973	600,760
Total surp.	$969,225	$805,973

Mr. D. Morrice, the president, in his report to shareholders, remarked that in view of the year's depression the statement should be found eminently satisfactory.

"Because of a desire on the part of the trade generally to reduce stocks during a period of financial stringency, the sales for the year showed considerable shrinkage, while there has been some increase in the manufactured stock. This stock, however, is absolutely staple and has been figured at conservative values, and it will all be needed as soon as business confidence is restored, as supplies in the hands of the jobbers and retailers have been much depleted."

Mr. Morrice pointed out that good spinnable cotton ruled high in price throughout the year, and as trade conditions were poor and competition keen, the margin of profit for the spinners was small.

All items of ordinary repairs and betterments necessary for the efficient upkeep of the plant were as usual charged to operating expenses, amounting for the year to $101,258.

The balance sheet shows considerable changes which reflect in general the conditions of slow business common to all industries during the year. Bank loans are up about $672,000 and against this is an increase of about $500,000 in cloth inventory. These are the two largest changes. Current assets show a good margin over current liabilities, $460,678, but this compares with a corresponding surplus of current assets amounting to $713,157 a year ago.

During April 1914 wool to the value of £12,464 was imported into Canada from Great Britain, compared with £9,700 during April, 1913.

The newly planted cotton crop of the United States showed a condition on May 25 of 74.3 per cent. of a normal in the report of the U. S. Dept. of Agriculture, issued June 2.

M. Hartmann Schmidt of Mazamet, France, was a visitor to Montreal and Toronto last week in the interests of his firm and appointed T. D. Wardlaw, of Toronto, as Canadian representative.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited

Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

New York Office, 206 Broadway.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, JULY, 1914 No. 7

Organization

Under the heading, "The Woolen Goods Section of the C. M. A.," an editorial running in last month's journal was so badly disarranged by the compositors that the sense was entirely lost. We regret such an occurrence and, considering the importance of the question with which it dealt, reproduce it in another column of this number so that readers who tried to get the sense out of it will be rewarded for their efforts.

We have said a good deal of late regarding the formation of a textile association and from talks with various manufacturers on the subject feel warranted in continuing our efforts in that regard. There is undoubtedly a great need for some sort of organization of the textile manufacturers of Canada. This has been duly demonstrated by events of the past few months, some of which have been discussed in recent eitorials in this journal, notably that dealt with in last month's issue, referred to.

The textile industry, especially the woolen section, is perhaps more in need of thorough organization than any other Canadian industry. This is seen in the legislation passed affecting the industry, in our education facilities, in the publicity the industry should receive, in the absence of facilities to direct the enforcement of laws passed to assist the industry, such as the dumping clause in the Customs Act and many others.

If there had been organization in this latest case immediate good would have been forthcoming, but there are other just as important issues that have not receive careful and concerted attention. This applies to our appraisement system. Dry goods are being dumped into this country every day at values far below the market price in the country of origin. Such practices do not benefit the consumer. It is seldom that staples can be bought at reduced prices and staples form the greatest proportion of this country's consumption of dry goods.

The other day we saw a slaughter sale of silk goods in a local departmental store. The excellent values drew our attention, and in conversation with the general manager of the store, he said in plain words that the dumping clause of the Customs Act had been evaded, but added that the consumer was receiving the benefit. But is it not true that the consumer who wears silk skirts and other silk goods can afford, or ought to be able to afford, to patronize home industry even at a higher cost than might otherwise be the case? Such practices obstruct the development of a silk manufacturing industry in this country that would give employment to a large number of highly-trained and highly intelligent workmen. Surely there is some way in which the intention of the authorities can be called to such evasions of the law.

It will have to be done by the industry most effected, and the most efficient way of doing it is through the offices of its own association. A CANADIAN TEXTILE ASSOCIATION within a year is a good slogan for every textile manufacturer in Canada.

The Proposed Merger

Reports which appeared in several of our newspapers the other day regarding the amalgamation of two of the largest knitting concerns in the country, viz., Messrs. Penman's Limited and the Eagle Knitting Company, appear to have been rather premature. In a statement to a leading Montreal financial paper Mr.

C. B. Gordon, president of Penman's, stated that the report was incorrect and that at the present time his company did not wish to form any new amalgamation. It is quite common property, however, that negotiations have been going on for the past two or three years between the two companies with a view toward a merger and those familiar with the operations of the concerns are not surprised at this announcement, although they are quite contented that any official recognition of the merger will be withheld until the mass of detail in connection therewith is cleared up.

It is stated that the Moodies value their holdings in the two concerns, the Eagle Knitting Company and the Eagle Spinning Company, at a million and a quarter dollars and that if the merger with the Penman Company is consummated the business of the Hamilton concerns will be conducted on precisely the same basis as formerly, for a period of at least seven years, under the management of the present owners. Confidence is expressed in well informed quarters regarding the favorable outcome of the negotiations now pending.

Penman's Limited are at present the largest knitting concern in the world and hold a very strong position in the domestic trade. Until now they have made no apparent effort to enter the ladies' wear market. Their selling organization extends throughout the Dominion and the product of such a mill as the Hamilton concerns could be handled with little additional expense. At the same time the position of the company would be considerably strengthened in so far as the distribution end of the business is concrend. The merger if completed will have a far-reaching effect on the knit goods industry in Canada, perhaps unfavorable to many of the smaller mills at present in the business.

Canada's Trade For Last Fiscal Year

The statement of Canadian trade for the last fiscal year recently issued by the Department of Trade and Commerce shows that the total trade in merchandise for the year was $1,073,766,098, an increase of $26,697,554 over the preceding fiscal year. Imports totalled $618,328,874, a decrease of $51,671,315 from the previous year, while exports totalled $455,437,224, an increase of $78,328,869 over the previous fiscal year.

Our trade with the United Kingdom totalled $354,265,529, as compared with $316,641,431 for the previous year, a net increase of $37,624,098. Our trade with the United States totalled $611,245,164, as compared with $608,266,237 for the previous fiscal year, a net increase of $2,979,227. Our imports from the United Kingdom showed a decrease of $6,718,666 and a corresponding decrease took place in the imports from practically every other country, while our exports increased in every case except the Argentine Republic.

Our imports of cotton amounted to $37,601,310, compared with $37,951,599 during the fiscal year 1913. Curtains, $594,841 compared with $738,875. Fancy goods, $4,879,431 compared with $5,000,874. Flax, hemp, jute and manufactures of $8,963,057 compared with $8,794,962. Gloves and mitts, $2,722,130 compared with $2,793,606. Silk and manufactures of, $9,689,305 compared with $9,170,912. Wool and woolens, $31,438,223 compared with $33,649,791.

Correspondence Course in Textiles

The University of Wisconsin has under consideration several specialty courses which should appeal to the educational authorities of this country. One of these courses embraces a study of textiles—their history, manufacture and handling—from the salesman's point of view, while another will make a detailed study of the selling of men's clothing. The main idea of the courses, which are conducted by correspondence, is to teach the salesman the way to sell goods and, what is just as important, the nature and quality of the goods he is endeavouring to sell. Efficiency is the goal of the teaching, and the success that has attended the attempts already made in Wisconsin and other Western States indicates a large and growing field for development. When we stop to think of the position the occupation of retail selling holds among all the callings of this country the importance and necessity for such instruction is clear.

Trade Prospects Brightening

There is a decidedly better and more optimistic tone prevailing among the textiles trades just now than for some time. Manufacturers' agents and jobbers speak more confidently of the outlook and, although there has been no great improvement in business as yet, indications are that the approaching season will be quite satisfactory in most lines. Stocks throughout the country are said to be reduced to a very comfortable level, so that if confidence is restored, placing orders should be well up to former years. Of course, a good deal depends on the coming crop and the trade is marking time until they see the outcome. Present conditions point to a bumper harvest, and if such is the case business in the textile trades should improve immediately.

OILS AND SOAPS USED IN TEXTILE MANUFACTURING

By HERBERT CARTER.

(Specially written for the Canadian Textile Journal)

The quality of the different Oils and Soaps made use of to-day in Bleaching, Dyeing, Calico Printing, and the textile industries generally, and they are very largely employed in these, it may be remarked, has a much more important effect upon the results obtained, whether they are good, bad, or indifferent, than most people suppose. In order to ensure excellence of production those which are most suitable for the special purposes to which it is intended to apply them should alone be utilized, and a right selection very often will not only improve production but also cheapen the cost. Accordingly, those engaged in these industries should possess, at least, some knowledge of the different grades of oils and soaps.

Soap is thought to have come to the Romans from Germany, and it is believed that the detergents in use in earlier times were composed of the ashes of plants, and other purifying agents. Soap may be described as a chemical compound, or mixture of chemical compounds resulting from interaction of fatty acids, and fats with alkalis. The usual characteristics of a soap are a certain greasiness to the touch, ready solubility in water, with formation of riscid solutions which on agitation yield a tenacious froth, or "lather," an indisposition to crystalize, readiness to amalgamate with small proportions of hot water into homogenous slimes which on cooling set into jellies, or more or less consistent pastes. Soaps give an alkaline reaction, and have a marked acrid taste in a pure condition, a state never reached in practice. They have neither smell nor color.

In the 13th century the manufacture was established at Marseilles, and in England during the next century. Chenreul, by his chemical experiments and investigations carried out at the beginning of the 19th century, revolutionized the art of making soap, and the extent of the industry. His researches were made into the fats and oils. The invention of Leblanc's process was another circumstance which contributed largely to the above. By this caustic soda is obtained from common salt. Potash soaps if made from the solid fatty acids are soft, and soda soaps, although manufactured with fluid-olein are "hard," but there are great variations according to the prevailing fatty acid in the compound.

Soap, when it is dissolved in a large quantity of water, suffers hydrolysis, with formation of a precipitate of acid salt and a solution containing free alkali. The reaction is very complicated. Chevreul discovered that a neutral salt soap hydrolysed to an acid salt, free alkali and a small amount of fatty acid. Nearly all soaps are precipitated from their watery solutions by the addition of a sufficient quantity of common salt. Potash soap with the same reagent undergoes double decomposition, a proportion being changed into soda soap with the formation of potassium chloride. Ammonia soaps have also been manufactured, but not with much success. H. Jackson, in 1906, patented the preparation of ammonium oleate directly in the washing water, and it is maintained that to clean articles it is only necessary to immerse them in the water containing the preparation, and then rinse them. Rotondi, in 1885, regarded a neutral soap as hydrolysing to a basic salt soluble in both hot and cold water, and an acid salt insoluble in cold and sparingly soluble in hot. Chevreul's views were confirmed in 1894 by Krafft and Stern. The extent to which a soap is hydrolysed depends upon the acid, and the concentration of the solution; it is also effected by the presence of metallic salts, i. e., calcium and magnesium.

In the Leblanc process caustic soda is manufactured from the black-ash liquor. The density of the liquor must not exceed 13 deg. Be., or the reaction will be reversed by the calcium carbonate being attacked by the caustic soda. The impure solution of sodium carbonate is heated to boiling, and the lime added with agitation by means of an air blast. When causticization is complete the contents of the vats are allowed to settle, and the supernatant liquor is drawn off from the lime mud, and evaporated to dryness, and to fusion, the impurities having been largely removed in the meantime by oxidation and fractional crystalization. The superior advantages and economy of high grade caustic need no argument. It is true of this product that the best within certain limits is the cheapest.

Potassium carbonate was the first alkali used in the soap industry. It was converted into the caustic form by primitive causticization with lime whence the liquor obtained, on settling the mixture, was used for saponification. The potash soap thus made was grained with salt whereby an interchange of alkali occurred with the formation of a hard mixed soda and potash soap. The first use of soda ash in soap is attributed to Van Haagen, of Philadelphia, shortly after the Civil War. The oils and fats employed by makers of soap are got from both vegetable and animal sources. An oil does not differ very much from a fat, it is merely a question of climate or temperature as to whether a particular body makes its appearance in a solid form, or a fat, or a liquid as an oil at the ordinary temperature of the place in which it is.

Soap in Textile Manufacture.

Two kinds of soap are employed in the textile industries—hard soft and soft soap. Quite a variety of soaps are made, and the purposes to which they are put are various. Calico Printers use soap very largely in the final processes of washing and cleaning the printed cloths, and so far as the alizarine and mordant dyes are concerned, soap helps to brighten these and fix the color. A soap liquor of about 1½ lbs. soap to 50 gallons water is the one, as a rule, employed. The best soap to use in dealing with printed calicoes and similar goods should be readily soluble in water, so oil soaps are the most suitable. They must be kept neutral, as any free alkali is liable to alter the tints of some of the colors, and cause them to run, which is a serious fault; and they must not leave a disagreeable smell behind them. Marseilles soap answers the purpose very well. Tallow soaps must not be used.

In the silk trade soap has long been used in the ungumming or boiling off of the raw silk, and in many processes of silk dyeing. In the woollen trade it is employed in the milling or fulling of woollen fabrics, and also in the scouring and cleaning of wool: then again in the finishing and cleaning of cotton and in the manufacture of jute, linen, hemp, and other fibres used in textile manufacturing. Soaps that suit the scouring of woollens are not suitable to use in the processes of calico printing, or to make use of for boiling off silk.

Soaps employed for the milling or fulling of woollen cloths after they have been dyed should be ones easily soluble in water, and there should be no free alkali or free fat in them. The latter is necessary in order to prevent any change in the color of the dyed goods occurring, and to prevent the color running; further, to ensure that the fibre when it has been passed through process will be soft, supple and firm to handle. In this case well made soft soaps are the ones that should be employed. Those made from olive, cotton, or other liquid oils. If a soap containing too much free caustic alkali is used for scouring wool it will spoil the surface of the wool by raising the scales and removing the lustre. For the very best wools a soap that is neutral, and preferably a neutral potash soap, answers the most satisfactorily. Grey mottled soaps made from bone, tallow, cotton oils, and other fats of a very good quality are also suitable.

The procedure employed in the manufacture of genuine mottled soap is the same as for ordinary settled soap up to the settling of change. There is no better process for the manufacture of general purpose soap than the grained settled, and any departure from it is in the direction of sophistication and inferiority of product. A mild neutral soap is the best for textile purposes.

The wool scourer very often employs a neutral olive oil soap, or, on account of its cheapness, a neutral curd or a curd mottled brand. Curd soap is made by boiling the fat with alkali and removing the unused lye. The oil mixture used differs in the several manufacturing countries, and the commercial name of the product is correspondingly altered. In Germany tallow is the chief fat, in France olive oil occupies the chief place, and the product is known in Marseilles as Castile Soap. In England tallow and palm oil are largely used. But in all countries a mixture of several oils enters into the composition of curd soaps, and the propertise used have no fixidity. For each ton of soap to be made 12 to 16 cwt. of oil is needed.

For unfilled mottled soap soft stock is killed, rosined, if rosin is used, and strengthened as with an ordinary settled soap. If it be desired to purify the soap by a partial separation of a nigre, water is carefully added and boiled until proper conditions for the separation of impurities by settling are obtained.

Soft soaps cost more than hard soaps, as they are made with caustic potash, but they answer quite satisfactorily with the wool fibre. The reason why soft soaps suit best for the treatment of the wool fibre, giving it a softer handle and more silky gloss than if hard soap had been used, cannot be given. Raw wool contains some soap and the wool fat possesses great emulsifying properties, so making it easy to clear away from the wool. The following is an analysis of the wool fibre: Water, 23.48; soap matter, 21.13; wool fat, 9.26; wool fibre, 43.20; dirt, 2.93. The soap matter is sometimes called wool perspiration, suint or yolk. It is soluble in water.

The melting point of the fatty acids cannot be determined in the same apparatus and by the same means as those used for the fats themselves, because the acids are soluble in alcohol.

The readiness with which highly hydrated soap as grained settled soap dries presents some difficulty in an accurate determination of the amount of water originally present. With a fresh cake the sample may be taken by cutting the cake through the middle into two parts and collecting the shavings cut from the entire freshly cut surface. If the cake has been exposed for some time the sample should be cut from the interior of the cake. Care must be taken that all portions of the cake weighed out for analysis are of the same consistency as, for example, the determination of one in gredient should not be made in a portion taken from the interior of the bar or cake. In the determination of the moisture from 2 to 3 grains of the shavings are weighed into a small beaker and placed in the hot closet, where it is allowed to dry to a constant weight. The loss in weight is water.

The soap employed by silk throwsters for putting in the troughs in which they steep the raw silk are expressly made for the purpose in some cases. Silk washing needs to be done very carefully, as it only requires the gum to be softened so as to cause the silk to wind free, and great care is taken by the throwsters not to steep the silk in overheated suds, as there is a difference of 15 deg. of heat in the climates where they are made.

The soap maker should be informed of the kind of water that is used by the wool fuller, and make the soap, if any, to counteract all the mineral impurities of the latter. The cloth is sprinkled with a soap liquor before it is put in the eyelet hole of the fuller, and very great care needs to be taken by the soap maker, or this soap will catch in the cloth and leave the face streaky, then the fuller will be put to great trouble and expense to bray out. This braying is so made that it kills the patches or streaks made in the cloth and brings the color well upon the face, and a good soap would be one so made that no difficulty would be experienced by the fuller by bringing his cloth clean out. Such a soap should be made to work with the water.

One authority says, as a mild scouring agent for the better classes of wool potash or soda soap is decidedly the best. Satisfactory results are always got with these if the soap is of good quality and free from excess of caustic or corbonated alkali. Other things being equal, the most soluble soaps are to be preferred, such as potash soaps or soda soaps made from oleic-acid. An average soap solution may contain 30 to 50 gr. of soap per litre of water (4.8-8 onz per gall.). An addition of ammonia to the soap solution is often made for the purpose of increasing its detergent properties. An important matter to be remembere when using soap is that the water should be as free as possible from lime and magnesia to avoid the formation of lime and magnesia soaps. Olein and resin soap likely aid emulsification in the scouring bath, while seek, which is often used, is effective by reason of its alkalinity. Sodium carbonate is employed with or without soap. Patent, or scouring substitutes, should be avoided. They are either useless or can be made by the scourer himself more economically.

For the dyeing of many of the direct colors in cotton, soap is frequently employed to the extent of 3 to 3½ per cent. of cotton dyed. No trouble arises here in the choice of the soap to use, any good well made soap will prove satisfactory, and soaping after the dyeing process is always one in the dyeing of Turkey Reds, Alizarine Reds, and Para Reds, on cotton. The work has to be done carefully. It has the effect of brightening the color. For cotton cleaning an alkaline soap should be used and for the cleaning of printed cottons a neutral olive soap is the best, for, in this instance, free alkali and resin are detrimental. Olive oil soap, free from caustic alkali but often with sodium carbonate, is frequently employed for cleansing the silk fibres, although hard soaps, free from resin, are also often used on account of their cheapness. For the removal of tarry stains pearl ash soap suit well, and for carpet cleaning ox-gall soaps are good.

Oils are very largely use in the textile industries; they consist principally and, in some cases wholly, of carbon and hydrogen. They are readily inflammable, and insoluble in water. When the grease and dirt has been removed from wool, the wool is always oiled to prepare it for spinning, and when the wool has been spun into yarn and woven into cloth, the oil must be removed from it. This is accomplished by boiling the wool in alkaline solutions, soap being or not being used. If soaps are used, those ordinarily used in the washing of wool will be found satisfactory. If the oil employed on the wool is of an acid nature an excess of free alkali in the soap will do no harm; it may be either in the form of caustic soda or carbonate of soda, for this excess will practically be neutrailzed at once when being used by the oleic acid. Sodium carbonate is also used in the scouring liquors in addition to the soap. If the oil is composed principally of a fatty oil a neutral soap should be used and dependence placed largely on the emulsifying properties of the soap. Soft soaps are in this instance the best, and if a little caustic potash be added the woollen manufacturer will find it to help him greatly in extracting the oil. The oils used for oiling wool are, in England, chiefly got by the distillation of Yorkshire grease. Some works only sell one quality of wool oil, others sell three qualities; the first is got from the second distilled grease, the second is pressed from the same, the third is pressed from the first distilled grease. Oils having a great proportion of hydro-carbon cannot be so easily scoure out of the wool as those which have not.

Gexlon says the fats and oils are organic salts; that is, they are organic acids in which the H is replaced by an organic radicle, and the acids vary according to the nature of the fat, and ordinary or hard soaps are sodium olearate mixed with the sodium salts of other acids, the soft soaps are potassium stearate. If some of the soap thus prepared, i. e., by heating fat with soda or potash be treated with excess of hydrochloric or sulphuric acid, it is decomposed, stearic acid is liberated, and being insoluble in water, floats to the top if the mixture is shaken up with ether the stearic acid will be dissolved. On addition of a solution of a lime salt to a solution of soap a curdy precipitate of calcium stearate is got, this salt being insoluble. Hence hard waters which contain lime destroy a certain quantity of soap.

THE TRANSMISSION OF POWER BY ROPES

By EDWIN KENYON, of William Kenyon and Sons, Ltd., Dukinfield Eng.

So far as I am able to judge, the outstanding feature of the enquiries hitherto held by this Institute, upon the various methods employed to convey the power developed in the prime mover, to the productive machinery, is that of discovering the nearest approach to the irreducible minimum of wasted effort, acknowledging, as we must, the impossibility of realising upon every atom of energy expended in the pursuit of our project.

Therefore at the very threshold of our present discussion, and before entering into those details, on the mastery of which depends our ultimate success, we cannot do better than tackle the question of efficiency. So many theoretical barnacles have attached themselves to this problem that one experiences the greatest difficulty in forcing the point of any conclusions based upon the more definite findings of actual practice, much less driving home the argument.

Take, for example, the theory of declining efficiency as velocity advances, beyond 4,800 feet, so persistently upheld in several of our engineering text books? Traceable probably to the many times proven effect of centrifugal force upon rotary movement generally, and particularly noticeable in belt driving. This retarding action is allowed in such lists to exercise its virulence to the extent of reducing the economical duty of a 1¾ in. diameter rope, running at 7,000 ft. per minute to 29.5 h.p.

Experiment conducted in the United States with a view to ascertaining "The efficiency of Rope Driving as a means of Power Transmission"—long accounts of which were published in our technical journals so recently as the August of last year, appear to confirm such conclusions, but only, be it understood, from the standpoint of American practice, clearly defined in the opening statement of the experimenter.

Without troubling to wade through the elaborate description of apparatus employed, or the various figures formulae, and plots submitted in the report, we will confine ourselves for the moment to just two typical examples bearing upon the effect of speed on efficiency. A drive is plotted which shows efficiency falling so low as 85.4 per cent. at 5,500 fet. per minute from an initial velocity of 2,500 ft. While a power curve exhibits the brake horse power gradually advancing from 100 at 2,500 ft. to 160 at 4,500 ft., then rapidly declining until it regains the starting line of 100 B. H. P. at 5,500 ft., with Manilla ropes 1 in. diameter.

The Charlottenburg experiments, previously conducted under the auspices of the Society of German Engineers, cover a much wider field of resarch, but are far from agreeing with the American conclusions. For example, a long paragraph in the summary of acquired data is devoted to the "Influence of Velocity," in which efficiencies under various tensions are given. These show a considerable fall at the lightest loads, while an effective tension of 286 lbs. per 2-in. diameter rope (which is somewhat below the usual calculations) represents a drop of from 0.98 to 0.96 per cent., or a total depreciation of only 4 per cent, at velocities ranging from 2,544 to 7,680 ft. per minute.

These tests also serve to confirm other facts brought to light under actual working conditions, which need not now be enlarged upon; such, as the deleterious effect of jockey pulleys, stretch of ropes under heavy driving strains and square ropes being less efficient than round ones, "because they must receive larger initial tension to run steadily."

Further German tests taken between the 5th and 12th of August last and published in the proceedings of the Society for 1913 add weight to the evidences of advanc-

Read April 7th, 1914, at The Textile Institute, Manchester.

ing efficiencies under increasing loads. These data are tabulated at 95.5 per cent at a tension of 137 lbs. and 98.3 per cent at 365 lbs. per 2-in. rope travelling 6,900 ft. per minute, thus representing a total loss of only 1.7 per cent., which is said to include "bearing friction and air resistance of brake and rope pulley."

Quite naturally the Professors in charge of these experiments concentrated their attentions upon the ropes manufactured in their own country. So much for commercial patriotism, which our leading technical colleges might do worse than emulate. For it is to be deplored that, while so much valuable data has been acquired through such well-equipped agencies, the British experimenter in the field of power transmission is left pretty much to his own devices. He must either be content with such conclusions as may be worked out in his own laboratory, or dogmatise on primary causes from the effects produced under conditions prevailing in general practice after years of patient enquiry, simply because there is no court of appeal to affirm or reject his decision and give the reason why. Granted that an elastic medium, whose quality varies with material and make, stands in the way of reducing rope driving to an exact science; that can scarcely invalidate the search for the hitherto elusive factor which militates against the mathematical accuracy of our calculations. Until this is decided, we shall be always confronted with the difficulty of producing a definite list of powers in conformity with graduating speeds.

The two last-mentioned experiments conform so nearly to the discoveries of 30 years ago—confirmed by every step in our subsequent progress—as to make it absolutely certain that with a well-designed installation on which good cotton ropes are used, the index of centrifugal detraction may be safely removed a considerable distance beyond the 4,500 ft. velocity determined by the American tests, or the 4,800 ft. suggested by the before-mentioned tables.

While it may not be advisable to push the proposition of constant power transmission by ropes to the utmost limit of mechanical endurance (which may mean a rim speed of 20,000 ft. or 30,000 ft. per minute for a properly-made steel pulley), all the evidence obtainable from actual experience goes to prove that we may safely reckon upon a continued accession of power in the ratio of speeds up to at least 7,000 ft. per minute.

About ten years ago what was regarded as a risky experiment was successfully carried out by speeding up an ordinary cast-iron pulley to 6,050 ft. The engine now develops 2,200 h.p., 2,000 of which is being transmitted by 32 ropes 1¾ in. diameter—50 per cent. above the discounted list just discussed.

It needs but little searching to discover the reason for the wide difference of opinion. Certainly the American experimenters make no secret of their intention to demonstrate the feasibility of pre-conceived ideas, founded upon what is known as the continuous system of rope driving. This system entails the use of jockey pulleys mounted upon a weighted carriage designed for the purpose of maintaining an equality of tension, which is never realised, as they direct a single rope across the entire drive, after completing the circuit of primary and secondary pulleys, in as many laps as there are grooves to fill (see Fig. 1).

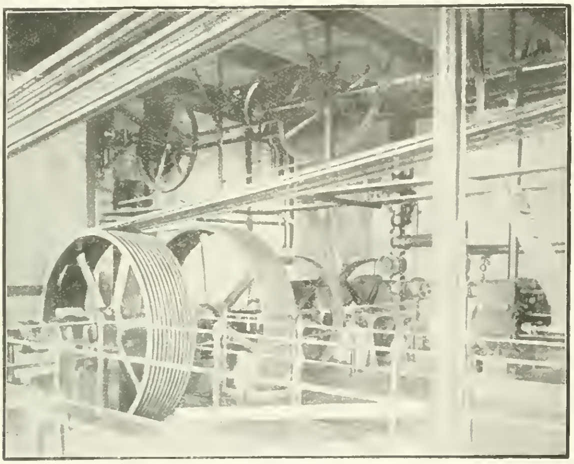


Fig. 1.

A serious defect of continuous driving is that of having to depend upon one rope, the splicing of which has a habit of giving way at unexepected times, involving long stoppages during the tedious process of replacement; whereas, on the English or multiple system, a damaged rope may be laid aside, awaiting a favorable opportunity for repairs while the rest do the work. Worse still, nothing but manilla ropes were employed, and these were run in shallow, open grooves of 60 degrees. Anything more conducive to loss of efficiency due to unnecessary friction, creep, slip, and lack of impact, it would be difficult to conceive. All this, notwithstanding the fact that cotton ropes are compressed into and withdrawn from grooves of 40 deg., with so little effort that any friction resulting therefrom is treated as a negligible quantity. Not only so, but because of their superior flexibility, they are more durable, and will transmit a much higher rate of power than manilla.

These qualities and the adoption of the multiple system are sufficient to account for the complete ascendancy gained by cotton over the harsher fibres in this country. Excellent results have also followed the replacement of manilla with cotton, both in Canada and the United States.

That elasticity plays a most important part in the economy of rope driving cannot be gainsaid. Else why should cotton which is 50 per cent. weaker than manilla transmit considerably more power? The answer is discoverable in their relative conditions. The last-mentioned more quickly gains the permanent set, where elasticity ceases. On the other hand, driving tension stretches the working side of a cotton rope, which bulges out again to something like its original thickness immediately it passes to the slack or "idle" side. This resilience, due in a measure to spiral activity, and more pronounced in the three-strand combination than any other make, may account for the ready recovery from fatigue, and for the consequent longevity of cotton ropes, which under favorable conditions will continue to do good service for over 20 years. Some ropes made upon what has become favourably known as the patent inter-stranded principle, fixed in the September of 1878, are still driving the card room of a Lancashire cotton mill. This is considered an exceptional case, and not too desirable from the maker's point of view.

An instance scarcely less remarkable, however, is that of a flour mill drive, where ropes of the same class have been engaged upon day and night duty for 21 years. When examined at the end of last year they appeared to warrant an extended lease of life before replacement might be considered necessary.

Other ropes evidently not so well placed, were renewed after 14 years of practically constant running at a paper mill in Scotland.

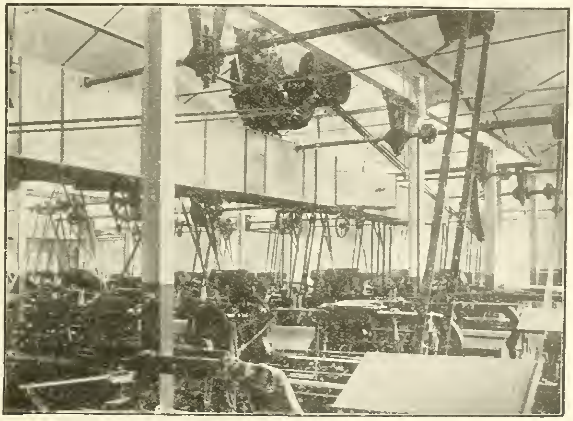
In order to corroborate German evidences on the question of higher duties, we must leave the textile industry with its refined processes, calculated to such a nicety that the engineer may be instructed exactly what energy to provide and how to distribute that energy throughout the entire concern, and seek less favourable conditions, where more rigorous treatment accelerates investigation by shortening the period of endurance.

Iron rolling mills are probably more severe on ropes than any other class of driving, owing to the sudden application and gradual release of the load, as the ingots of heated metal are drawn out to the required shape and dimensions. This type of machinery may, therefore, not only serve as a medium for testing the validity of laboratory experiments, but may also be used to decide comparative durability between various methods of power transmission, seeing that the lives of ropes are cut down to about one-fifth of their ordinary existence on cotton mill drives.

Mr. J. Ingham, of Bolton, who has had considerable experience in rolling mill driving, has compiled a list of friction losses from indications taken upon an electro-rope driven sheet mill. The rope design load is set down as 500 H. P. with friction at 3½ per cent. When a peak of 900 H. P. is reached the friction is brought down to 2 per cent., but runs up to as much as 113 per cent. at 150 H. P., or 25 per cent. of the normal load.

How discounting the power of loads may lead to misapprehension when estimating comparative values, was strikingly manifested by calculations made after a personal inspection of several mill installations in Yorkshire, where steel belts have substituted leather or ropes. In one case a 10-inch leather belt was replaced by 3⅓ inch steel. This, however, gave a considerable amount of trouble and had been twice renewed during a run of about 15 months, a third being in use at the time of the visit. The cork sheathing on the pulleys had also been stripped. These mishaps were attributed to a very slight but not permissible fault in lining up the shafts.

Another firm desiring more power, speeded up their engine from 60 to 80 revolutions per minute, thus adding 23 per cent. to the power hitherto successfully transmitted by five ropes 1¼ in. diameter, which, owing to their enhanced velocity would just as effectively have carried the larger load. The firm, however, regarded this as a favourable opportunity for realizing the advantages promised by the adoption of steel belts. The grooves of their 12-ft. fly pulley were accordingly encased in the usual way, the driven pulley being enlarged from 6 ft. to 8 ft. Now this drive always favoured the use of thicker ropes, and had it been designed for two ropes 2 in. diameter, an economical and by no means unusual size, they would have only



Rope Drive in Weave Room at Magog.

occupied a space of $6\frac{1}{4}$ in., as against 8 in. for the steel belt and about $9\frac{1}{4}$ in. for the five $1\frac{1}{4}$ in. ropes. Wearing surface, it should be noticed, is governed by sectional area, while the total weight remains a fixed quantity and has no more effect upon bearing friction than the strain of a taut steel belt. It is, therefore, advisable to arrange for the heavier sizes whenever pulley dimensions will allow.

Information acquired at two other concerns enabled the investigator to approximate relative costs of steel belts and ropes. Some 16 months ago a progressive firm of woollen manufacturers adopted steel belts, and were evidently prepared to go the whole length in complying with the exacting demands of this new venture. For they lined up the shafts to the true parallel, fixed stronger bearings and increased the size of their pulleys from 30 in. for ropes to 36 in. for belts running driven 4 ft. 2 in. diameter. Three ropes $1\frac{5}{8}$ in. diameter would under these conditions transmit more than the appointed load of 140 H. P. The present cost of these ropes, including splicing, is £11 10s. 0d., as against about £22 10s. 0d. for the 6 in. steel belt.

The following provides more definite data on the question of relative charges:—

A steel belt just under 8 in. wide and costing £88, including £5 for fixing, replaced a double leather 22 in. wide. The quotation for the latter at the time of the replacement was about £139. Four ropes 2 in. diameter would prove superior to the estimated power at £42, including fixing, or less than one-half the cost of the steel and one-third the leather belt.

A good example of cost differences between ropes and woven belts for even duty is provided by a high-speed turbine drive. The first lot of belts gave a

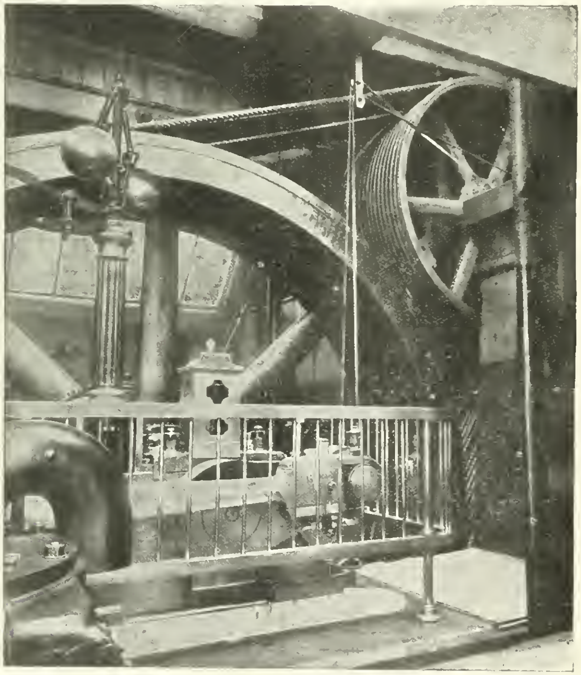


Fig. 2.

at 220 revolutions per minute. The peripheral velocity was thus increased by about 20 per cent. and power in about the same proportion.

Under the improved conditions considerably more duty might have been imposed upon four ropes $1\frac{3}{8}$ in. diameter at a cost including fixing of £11. The charge for the belt was stated to be about £19.

In another part of the mill where it was found impossible to carry out the necessary alterations with the same exactitude, the steel belt gave so much trouble that it was ultimately removed, and ropes were again employed, to better advantage than before, because of readjustments.

Still another case, that of a driving pulley, 5 ft. diameter, making 360 revolutions per minute, and a considerable amount of trouble and were renewed after six months' running at a cost of £150. Six years ago these were replaced with ropes $1\frac{1}{4}$ in. diameter, delivered and fixed for the sum of £47 6s. 2d. The ropes are still doing good service.

When investigating a more recent and much-advertised case—where a saving of 60 H. P. in about 340, or just over 17 per cent., is said to have been realized over ropes by the introduction of steel belts—it transpired that the entire section of the mill thus controlled had been remodelled. New and fewer shafts and bearings had supplanted over thirty-year-old arrangements; in fact, everything had been modernized.

To what state of efficiency this department was reduced prior to the carrying out of these improvements may be gathered from the declaration that a slip of 10 per cent. was manifested in the ropes, accompanied by even greater frictional losses.

Much to our surprise the steel belts at this mill gave off a crackling sound, so intense that conversation near by proved impossible. On the other hand, rope driving is practically noiseless.

The unfortunate habit of attributing to the transmitting medium itself all the benefits derivable from the introduction of new methods, makes that mysterious bourn, known as the unbiassed opinion, all the more difficult to reach.

As well credit ropes with the entire gain of 50 H.P. in 800, and an enhanced spindle speed of 3 to 4 per cent. when the whole of the mill gearing was overhauled and rearranged to accommodate the replacement of two superannuated engines (one spur gear and the other rope-driven) with a well-appointed modern engine, equipped with new steam raising appliances.

The engines referred to are vertical cross-compound by John Musgrave and Sons, Ltd., and develop 1,100 H. P. to provide against extension. The above figures provided by the Manchester Steam Users' Association, do not therefore represent the total sum when working up to full load.

Another mill in the same neighborhood gained so much as 7½ per cent in spindle speed and saved 16 h.p. at 540. Just recently 7 per cent. of frictional loss was recovered at a rope driven cotton mill by simply errors of alignment.

Suppose, for the sake of argument, we presume upon the total abolition of rope drive and bearing friction. It would, on well attested engineering authority, be impossible to realize upon more than 5 per cent. at the utmost, or according to the Charlottenburg tests, 2½ to 3 per cent on a properly designed rope drive. That negligence in readjustment and renewals does most effectually militate against efficiency may be gathered from indications taken at a Yorkshire woolen mill, which show a waste of 60 H. P. on a total of 150 H. P., or 40 per cent of the entire load, after throwing off all machine belts.

Chain driving, the governing principles of which are set forth by Mr. Hildage, whose paper is rendered all the more acceptable by his frank acknowledgment of those peculiar limitations, the attempted over-stepping of which often discredits what might otherwise be turned to valuable account.

Rope driving claims no exemption from this general affliction. There are, however, several points of agreement which might be mentioned. For example, positive transmission on well-designed rope drives has been placed beyond doubt by expert tests taken on ring frames at an Oldham spinning mill, where it was found that calculated speeds from driving to driven pulley were maintained without any detectable variation. Loss of spindle speed is usually discoverable in the bands driving from the tin rollers.

Mention is also made of theoretical and practical differences in efficiencies, varying from 99 to between 98.5 and 97 per cent. So slight a difference for ropes as the 98.3 per cent. of the German tests, may therefore be neglected. Although goverened by wheel diameters in both cases, speed ratio difficulties are usually met by adding more rope to make up for contact losses. But ropes are at a disadvantage when used in quantities on small pulleys less than, say, 9 in. or 10 in. diameter

As demonstrated by Fig. 2, which reproduces a mill drive in Dundee, where 360 H. P. are transmitted with pulleys only 8 in. apart, short centres are no impediment to successful rope driving. Many instances might be quoted where even less clearance is allowed. When the speeds of both shafts are alike, the greatest possible pulley contact is available.

(To be continued)

Bleaching With Perborine

The first oxygen compounds which price permitted for consideration in mill use were the peroxides, and the good results which have been obtained with these compounds and their method of application is now so well known, that it does not need to be commented upon here.

During the last two years the price of perborate of soda has come down considerably and experiments which have been made to use this compound for bleaching have proven very successful, and it certainly deserves interest on account of its simple method of application.

Perborate of soda appears on the market under the name Perborine. It is an odorless white crystalline powder, which is non-inflammable, and can be stored without danger of explosion. It will not lose in strength unless stored in a rather hot place. In solution perborine will only disengage oxygen while hot, so that no loss occurs when letting the cold or lukewarm bleaching bath stand.

To bleach with perborine it is only necessary to dissolve the required amount of it in the liquor, heat up the bath, enter the goods and when a good white has been obtained, lift and rinse them. The strength of the bath to use depends upon the degree of resistance offered to the oxygen by the natural coloring matter on the fibre. The average amount to use for 100 pounds of material is from six to eight pounds, correspondingly less for the succeeding baths.

The bleaching may be done in a vat of white wood, stone ware or enamelled metal. It is best to keep all metal except lead out of contact with the liquor. The coils for heating the liquid indirectly with steam, should be made of lead.

Vegetable fiber goods are entered in the bleaching bath at 212 deg. F., animal fibers at 200 deg. F. When bleaching cotton the goods must first be boiled out thoroughly to remove the natural grease and other impurities which adhere to the fiber mechanically. When bleaching silk or half silk the material is boiled out before bleaching with a good olive oil soap, free from alkali. When any of the perborine remains in the bath undissolved, it will in no way harm or tender the goods, although it may come in contact with them. Tendering in spots and turning brown of the silk does not occur when using perborine. Tussah silk is boiled out with 3 per cent soda ash, then entered in the bleach bath and afterwards rinsed in a bath acidulated with muriatic acid.

As bleaching with perborine is an oxidizing process, the goods are not tendered and they do not turn yellow after a good white has been obtained, as the oxidized natural coloring matter has been removed from the fiber by rinsing the goods. They are left with a soft handle and retain elasticity and tensile strength.—Textile World Record.

Profit Sharing as a Solution of the Wage Problem

By PROF. W. W. SWANSON

Profit sharing has been tried in various industries as a solution of the wages problem, but it has met with only indifferent success. As a rule, workingmen fear employers who come bearing gifts. In not a few instances their suspicions have been justified, for the plan has not been carried out on a generous or fair basis. But it cannot be denied that there are possibilities in the plan if properly worked out. No doubt the solution of the wages problem will depend upon the working out of some scheme that shall harmonize the conflicting claims of labor and capital and give the worker some share of the profits of the enterprise.

One of the most remarkably successful plans that have been worked out, developed in a small Connecticut town near New York in 1892. A man who had begun business in a small way was facing severe competition and had a hard time to hold his own. He called in consultation a couple of his heads of departments and offered them an interest in his business, the interests to be paid out of earnings. He told them that he did so for the sole purpose of increasing their interest in their work and hence in the success of the factory.

These two department heads woke up. A new spirit began to spread in the shop. After one successful year a stock company was formed and other department heads were taken in. These men were permitted to pay for their shares with their earnings. The company started with less than $50,000 capital and employed about 100 men. At the end of seven or eight years the directors were so satisfied with the experiment that they decided to carry out the same principle with all their men, though in another way.

The opportunity to take up the plan was offered to all men who had been in the employ of the company for one year. By the contract agreed upon, the men share in the profits of the company, and also the losses, should such occur. The profit is ascertained on the basis of the actual business and a standard form of inventory. Six per cent. is first deducted, to be paid on the capital actually invested. The balance of the profit remaining is divided between the company and the individual workmen in the proportions that the actual capital invested bears to the total wages of the men entering into the contract. Each man, therefore, gets a share of what goes to labor depending upon the raio of his wages to the total wages paid.

The company, to protect itself, against loss and to make the plan practicable, retains 10 per cent. of the wages of the men as a basis for the scheme. At the end of the year each worker has, from the inception of the plan, drawn his wages together with dividends amounting to between 6 and 7 per cent. of the sum involved. If a man leaves the company he may at once draw his back wages or elect to leave them with the firm until the end of the year.

The plan has worked like magic on the quality and extent of the output. Most of the employees now share in the profits of the company. New men sometimes complain and threaten to leave, not because of pressure brought to bear upon them by the foreman as under the old regime, but because of the watchful supervision of their fellow-workers. They are encouraged to stay with the company, however, and try to make good, being promised a contract at the end of their year if their work merits their remaining with the corporation.

The company's capital actually invested has grown from $50,000 to $500,000 during these years, 1892-1914, and all that has been added has been gathered by the superintendents and the men. A workingman who receives a cheque for $100 to $175 at the end of the year is filled with graitfication and pride in his work. The men place 60 per cent. of their dividends in savings banks, or in homes of their own. They are successful men, and filled with all the courage and energy that come from successful work gladly done.

The company has not been without troubles and difficulties to face. At one time a strike involved every wood-working shop in town, and the men with a class-conscious spirit, that cannot but be admired, joined the movement even at the risk of loss to themselves. However, every man afterwards returned to the works, and no bitterness remained. Indeed, to-day, after twelve years of operation, the plan is working more smoothly and with more conspicuous success than in the past.

Here, then, appears to be one avenue of escape out of the impasse that exists between capital and labor. We must not look to the large corporations to take the lead. The solution of the labor problem will depend upon establishing a harmony of interests between capital and labor everywhere throughout the country, in the many small undertakings as well as in the large corporations. Only by establishing such a harmonious relationship can any permanent results be achieved.—Journal of Commerce.

THE WORLD'S SHEEP POPULATION.

It is estimate that the total number of sheep in the world is about 620,000,000; of this total the European countries are credited with contributing 182,500,000, while Australasia ranks second with 117,000,000, and South America third with about 109,000,000. Russia is foremost among the European countries with 45,800,000, while the United Kingdom comes second with about 29,000,000. Of the South American flocks Argentina contributes about 66 per cent., or 67,000,000 sheep, the remainder being credited to Uruguay. The Asiatic flocks are estimated at about 92,848,000, and of this total Turkey in Asia claims about 45,000,000, while the remainder is distributed largely between Asiatic Russia and British India. Africa contributes about 48,000,000 head.

The total number of sheep mentioned in connection with North America is about 63,467,000, and of this number 53,000,000 is credited to the United States. The small quantity of wool produced in the United States is not sufficient for her requirements, and there is no doubt but what the changes in the new tariffs will increase the importation of raw materials and probably decrease that of manufactured goods.

The value of raw wool imported into Canada during the fiscal year ending March 31, 1914, amounted to $1,872,089, compared with $2,068,028 for the same period last year and $1,555,395 for the year previous.

At the recent meeting of the International Cotton Federation, held in Paris last month, it was announced that the increase in production of cotton in India had been from 250,000 to 600,000 bales.

BLENDING AND PREPARATORY PROCESSES IN WOOLEN SPINNING---XIII.

THE BLENDING OF WOOLS

By JOHN W. RADCLIFFE.

In the making up of blends for the subsequent manufacture of woollen yarns or fabrics, there are at least three very essential factors to take into consideration. In the first place, we have the quality or nature of the materials used; in the second, the value of the mixture, and the third, uniformity in mixing the colors, if the blend is to be a colored mixture. It must be remembered that once the blend has been made and subjected to the process of scribbling, there is no means of rectifying mistakes, as no intermediate process exists between carding and spinning, where anything can be added to or taken from the stock.

Exactness is therefore an essential qualification for a good blender, as a woollen manufacturer may either succeed or fail by the management of this very important department.

Before dealing with the selection of materials and colors, to meet the requirements of specific types of yarns and fabrics, it may be advisable to enumerate at least one method of ascertaining the proportions of a blend, to be made at a given cost per pound.

One of the best methods is that known as the "alligation medial" principle, which is really the affirmed mean of two or more numbers.

To illustrate the application of this principle, let it be supposed that a blend of materials is required, the value of which must be 20 cents per lb.; and suppose the blend must consist of 5,000 pounds weight and be made up from the following materials:—

Merino lambs wool at	30 cents per lb.
Merino lambs wool at	24 cents per lb.
Merino shorts at.	19 cents per lb.
Cotton laps at.	14 cents per lb.

It is first necessary to arrange the values and link one above the mean value of the blend with one below the mean, that is, link 30 with 19 and 24 with 14 to have the mean value of 20, required.

It will be observed from this calculation that two of the materials are above the mean value of the blend, whilst two are below it. Therefore in order to give an honest estimation of the blend, the highest values of the blend must be neutralized by the lower values, and vice versa.

To do this properly the arrangement of the values can be made as given as above, or, if preferred, link 30 with 14 and 24 with 11, to have the mean value 20, required.

Then by taking the difference between one of the higher and lower values and arranging the numbers in such a manner as to cause the higher values to neutralize the lower values, the calculation can be proceeded with.

It will, of course, be obvious that such a quantity of the higher valued material will be needed as will neutralize the effect of introducing the lower valued material. The difference between one of the higher values and the mean value must therefore be placed opposite the lower value to which it is linked, and vice versa.

Thus from the first arrangement given we have 1 part of 30, 6 parts of 24, 10 parts of 19, and 4 parts of 14, a total of 21 parts.

From this arrangement it will be gathered that 1 part at 30 cents will be required to 10 parts at 19 cents to give a mean value of 20 cents, whilst 6 parts at 24 cents will be required to 4 parts at 14 cents to produce the same effect.

Or if the second arrangement of linking was taken, we have 6 parts of 30, 1 part of 24, 4 parts of 19 and 10 parts of 14, a total of 21 parts.

By this arrangement of linking we have 6 parts at 30 cents, 1 part at 24 cents, 4 parts at 19 cents and 10 parts at 14 cents. Of course, the linking can be arranged according to the convenience of the blender and the nautre of the blend to be made.

Having arrived at the number of parts of each material, relative and consistant with the others which have to form the blend, it is an easy matter to find its value in pounds, when the weight of the blend be put down as known. Thus in the example given, the weight of the blend is to be 5,000 lbs., and as the total number of parts equals 21, the weight of each part may be determined by dividing the weight required by the number of parts in the blend, thus:—

Weight of blend, 5,000 lbs. = 238.09 pounds weight of each part.
No. of parts, 21.

Then by taking the first example we have for a mean value, 5,000 lbs. at 20 cents.

1 part	30c × 238.09 =	238.09 lbs.	at 30c.
6 parts	24c × 238.09 =	1428.54 lbs.	at 24c.
10 parts	19c × 238.09 =	2380.90 lbs.	at 19c.
4 parts	14c × 238.09 =	952.36 lbs.	at 14c.
21 parts.		4999.89 pounds.	

This example may be proved as follows:

238.09 pounds at 30 cents	=	7142.70 cents.
1428.54 pounds at 24 cents	=	34284.96 cents.
2380.90 pounds at 19 cents	=	45237.10 cents.
952.36 pounds at 14 cents	=	13333.04 cents.
4999.89 pounds	=	100297.80 cents.

Therefore 100,297.80 ÷ 4999.89 = 20 approx.

In order to illustrate the application of this principle to an odd number of quantities, suppose a blend of 2,000 lbs. is required from the following three materials:—

New Zealand slipe at 20 cents.
New Zealand noils at 15 cents.
Shoddy at 12 cents.

The subsequent value of the blend to be 16 cents per lb.

It will be seen that two of the values are below the mean value of the blend, and only one above it, so that both the lower values will have to be liked to the one higher value, that is, to have a mean value of 16 cents we link 20 with 15 and 20 with 12.

When this has been done, the differences between the two lower values and the mean value must be placed opposite the higher value, and the difference between the higher and mean values beside those of the two lower values; that is:—

4 + 1 = 5 parts at 15 cents.
4 = 4 parts at 15 cents.
4 = 4 parts at 12 cents.

Total.. 13 parts.

Then, as there are 2,000 lbs. in the blend to be made, and 13 parts in the arranged averages, one part will represent 2,000 ÷ 13 = 153.84 lbs. The calculation may be worked out as in the previous example thus:—

		Lbs.		Lbs.	Cts.
4 + 1	= 5 parts	X 153.84	=	769.20	at 20
4	= 4 parts	X 153.84	=	615.36	at 15
4	= 4 parts	X 153.84	=	615.36	at 15
Total..	13 parts.			1999.92	

The quantities in this blend would therefore be:—
769.20 lbs. of New Zealand slipe at 20 cents.
615.36 lbs. of New Zealand noils at 15 cents.
615.36 lbs. of shoddy at 12 cents.

This rule is similarly applied if there are several constituents below the mean value and only one above it, as in the following example:—

Suppose a blend of 3,000 lbs. is to be made up from the following:—
Queensland greasy lambs wool at 26 cents per lb.
Queensland recombed noils at 23 cents per lb.
Adelaide greasy lambs wool at 22 cents per lb.
Adelaide recombed noils at 20 cents per lb.
The mean value of the blend to be 24 cents per lb.

This calculation would resolve itself as follows. Linking 26 with 23; 26 with 22, and 26 with 20, we have:—

4 + 2 + 1 = 7 parts at 26 cents.
2 = 2 parts at 23 cents.
2 = 2 parts at 22 cents.
2 = 2 parts at 20 cents.

Total.. 13 parts.

Then 1 part would represent $\frac{3000}{13}$ = 230.76 lbs.

Therefore—
7 X 230.76 = 1615.32 pounds at 26 cents.
2 X 230.76 = 461.52 pounds at 23 cents.
2 X 230.76 = 461.52 pounds at 22 cents.
2 X 230.76 = 461.52 pounds at 20 cents.

1999.88 pounds at 24 cents approx.

Again, suppose there is in stock 680 pounds of cotton waste at 12 cents per lb. and it is desirable to use it up in a union blend. How many lbs. of wool at 26 cents per lb. would be required to produce a blend with a mean value of 16 cents per pound? The whole of the cotton waste to be used in making the blend.

Then by the same principle, it is essential to find the affirmed mean of the two qualities; that is, to have a mean value of 16 cents, we have 4 parts at 26 cents and 10 parts at 12 cents.

Then let 10 parts equal 680 pounds, which is the weight of cotton waste in stock, and by simple rule of proportion the value of the 4 parts of wool can be ascertained, which will represent the weight of wool required, thus:

: 10 : 4 : : 680 : X.

or $\frac{680 \text{ X } 4}{10}$ = 272 lbs. wool at 26 cents.

The accuracy of this calculation may be proved as follows:—

680 lbs. of cotton waste at 12 cents = 680 X 12, or 8160 cents.
And 272 lbs. of wool at 26 cents = 272 X 26 or 7072 cents.

The total number of pounds in the blend will therefore be 680 + 272 or 952 lbs., and its value in cents will be:—

8160 + 7072 or 15,232 cents.
15232 ÷ 952 = 16 cents, the mean price of the blend per lb.

These calculations can be arranged to suit the requirements of any blends that are made up to the standard of a mean value.

The Woolen Goods Section of the C. M. A.*

The Canadian Manufacturers' Association is in annual convention in Montreal this week. Many subjects are being discussed, both in connection with events of the past year and the propaganda for the coming year. There is a certain feeling of contentment over the tariff legislation this session and also over the results obtained in other features of the commercial activity of the Dominion. There is one section, however, that is far from satisfied. That is the "Woolen Goods Section." But we have not heard of any serious attempts being made to hold a meeting of this "Section" in order to discuss the events of the past year as directly affecting the woolen industry or the course to be followed during the coming year.

The woolen industry is recognized as one of national importance to the country and yet the present state of the industry is deplorable. Even more pronounced this year than for some time past. The question naturally arises as to whether organization and co-operation would not be effective in bringing about a change of conditions.

During the past year efforts have been made to secure relief and there is every reason to believe that some success was obtained. These efforts would have met with even greater success but for the counterwork done by certain members of the industry who had sufficient influence to obstruct the good work for reasons absolutely foreign to the best interests of the woolen industry. Do such practices not require illumination? Surely organization and co-operation would squeeze out such individuals and counteract such political influence they may have.

We believe the time has arrived when better organization is necessary, and if the Woolen Section of the C. M. A. does not provide the proper co-operation on the part of the manufacturers of the Dominion, a separate association should be formed, or at least a separate organization. It should not interfere in any way with the C. M. A., but there are a great many things to be taken up that are not being dealt with by the Woolen Section and that require immediate and concerted action. We trust that the textile manufacturers of the Dominion will soon awake to the possibilities of an association.

* This article appeared on the editorial page of last issue, but was so badly re-arranged by the compositors that we have deemed it advisable to run it again in this issue. We regret such occurrences, which are sometimes unavoidable.

PRACTICAL TUNING AND CONSTRUCTION OF POWER LOOMS.---IV.

ROPE DRIVING IN WEAVE SHEDS

By BEAUMONT METTRICK.

In most of the weaving sheds of this side of the water, driving by means of ropes for main shafts is in general use, it having gradually superseded the old style of spur gearing and belt drives. A few of the newer sheds use independent electric driving either group or single machine drives, and a few are fitted up with the silent chain drive.

Some Advantages of Rope Driving.

The cost is less than that of the belt or spur drives. A good cotton rope can be bought at about 1/4 to one-third of the price of belting, to give the same amount of power.

It gives practically a positive drive, the amount of slip being so minute, owing to the gripping of the rope by the grooves in the pulleys, that it is not worth considering, that is, if load, size of pulley, and length of drive are calculated for.

It is silent in working, and is easily kept in condition. It is not affected much by the fluctuation of power required, owing to sudden stopping and starting of the looms, as the rope will expand and contract spirally with the varying of the load, therefore ropes that are required to run at a good high speed should be started and stopped slowly, allowing the speed to grade evenly, if not, the ropes are unduly stretchd and are liable to be torn apart, rather than slip.

Methods of Rope Driving may be divided into two two classes::—(1) The English or direct individual drive, this system consisting of endless bands of ropes as many bands as grooves in pulleys, and these connect the driver and follower pulleys directly. Fig. II. (2) The American or single rope drive, this system consisting of one long endless rope wound around the pulleys, running in all the grooves, and tensioned by an extra sliding pulley, which is weighted to take up any slackness of rope, or variation in length of rope (Fig 12).

The English system has been found to answer satisfactorily in England, for driving shafts in weaving sheds, as it is more convenient for the style of work done. There is always a reserve of working ropes, in case any one rope breaks, so that it is not necessary to stop the engine for any length of time in case of a breakage, as the repairing can be done during meal times, or after working hours. It is also claimed that a certain amount of frictional resistance is saved by this method, and the grooves and ropes do not wear as quickly, the writer's experience being that this varies considerably according to size of rope and grooves, that is whether the ropes fit tightly in grooves or not.

The American system has been found to work to advantage, where exposed drives are required. In this case, the tension of the rope alters, according to the atmospheric conditions, therefore automatic regulation is necessary to keep the tension even. It is also found to be of advantage where long drives are necessary, and no counter shaft can be used as it prevnts excessive sagging of the rope, which often results in rope slipping off the pulley, or riding on the next rope. It works satisfactorily for drives in the scouring and dyeing departments, where the humidity of the atmosphere varies greatly. The chief disadvantage of this system is that extra friction and pressure are brought to bear upon fittings and ropes by the weighted pulley W.P., and continuous running depends upon one rope and one splice holding out (Fig. 12).

Management of Rope Drives

Covering of Pulleys. It is advisable to cover all large pulleys when possible, especially on line shafts, above weavers. If not covered, a strong current or draught of air is set up, which greatly inconveniences the weavers in that neighbourhood. It is also claimed that a saving in horsepower consumed is effected, by covering pulleys.

Diameters of Pulleys. A certain minimum diameter must be set up for rope pulleys, according to the thickness of the rope used. A three strand or 1 in. diameter cotton rope should not be worked on less than a 30 in. pulley, and the minimum size of pulley should

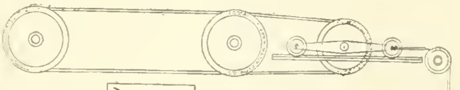
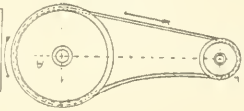


DIAGRAM 12.

DIAGRAM 13.

DIAGRAM 14.



vary in a proportion of 30 to 1, according to thickness of rope, that is, for a 1 1½ in. rope, the pulley should not be smaller than 45 in. diameter. This diameter should be increased whenever possible, as the larger the pulley, the less bending required of the rope, therefore the longer the life of the same.

Relation of Driver to Follower.

These pulleys should be arranged where possible, to allow the slack or idle side of rope to be in the top position, as in Fig. 13, or, in case of a vertical drive to rest upon the large pulley as in Fig. 14. This arrangement gives the best results, the transmission of power being greater and steadier, owing to arc of contact between the ropes and pulleys being greater. If the amount of the load required varies considerably, such as drives for heavy carpet looms, or the distance of the span of the rope is longer than usual, the rope may be run with the slack side at the bottom, and give better results, as this helps to keep the ropes from rid-

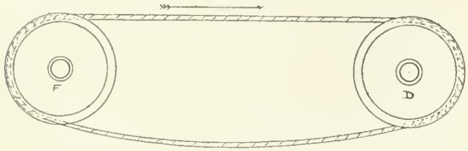


DIAGRAM 15.

ing over each other, as they are held in the grooves of the pulleys by the tension of the pulling side being at the top (Fig. 15). There will always however be a certain amount of loss of speed to account for, when fixing size of pulleys for this style of drive.

Different Conditions of Drives.

(a) Short Centres.—This rope drive is much better adapted for short drives than the ordinary belt, and has been found to work successfully, when replacing centres, with very little slip, this varying according to ratio of pulleys.

(b) Driving at an Angle.—The rope drive is a very suitable one for any type of angular drive, and by using guide pulleys, difficult corners may be negotiated with ease, without any noticeable loss of power. Care should be taken to have the size and grooves

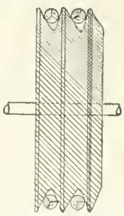


DIAGRAM 16.

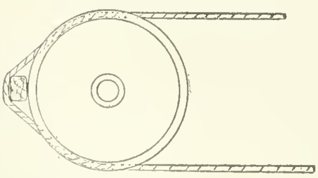


DIAGRAM 17.

of guide pulleys large enough to prevent excessive gripping and bending of rope. For driving shafts that are not exactly parallel, pulleys with tilted grooves are sometimes employed (see Fig. 16), which gives a sectional sketch of a two grooved pulley. The grooves should be smooth and well polished to allow ropes to slip as low into groove as possible.

Fig. 17 illustrates how ropes are sometimes blocked up, when they have to stand for any length of time. This prevents them from shrinking excessively, owing to damp atmosphere, and also prevents strain being imparted to the shaft bearings, when the shafts are again started.

Dressing of Ropes.

This is usually done in the making of the ropes. If this dressing dries up, it is advisable to apply a good hard dressing, which the rope makers usually supply. If the rope is greasy an application of whiting, or other oil absorbing substance is advised, afterwards cleaning both rope and pulleys of any foreign matter.

Chain Driving.

This style of driving shafts and looms is now advocated under certain conditions, it having many advantages such as:—(a) It gives a positive drive; (b) The efficiency claimed is very high, 99 per cent being claimed for a perfect drive, ignoring friction in shaft bearings, etc., and a series of tests, accounting for friction of motor and shaft bearings have been 95 per cent to 98 per cent of efficiency (ordinary wear and tea is said not to lower this factor to any great extent). (c) Economy of power is also claimed, especially if shaft or looms are driven from motors, and short

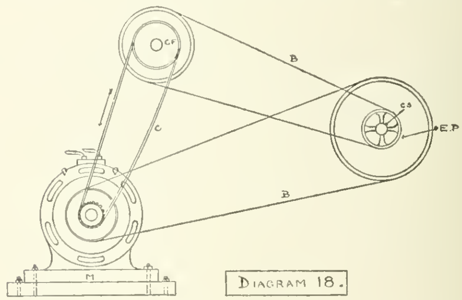


DIAGRAM 18.

centres are used. (d) There is a saving of space, as extra counter shafts can in many cases be done away with. See Fig. 18 for example of this fact. The diagram illustrates how a double reduction of speed transferred to line shaft and driven by belts, was substituted by a chain drive, thus doing away with counter shaft, two pulleys and extra belting, at the same time allowing a saving of space. B. shows belting, E.P. extra pulleys; C chain; M motor and C.F. chain follower.

Cost.—The first cost is much more than that of rope, belt, or spur gearing drives, unless the shafts are so spaced, that is with short centres, that rope or belt pulleys only need replacing by chain gearing, which can be done effectively, if shafts are set true, then the cost may compare favorably with others.

The life of chain depends upon various factors, such as distance between centres, size of gear wheels, amount of load driven, and condition of shafts and bearings. The chains require constant attention, and some system of drip lubrication to ensure good wearing, and efficiency in working.

Distance between centres. This style of driving is limited to a maximum below 20 ft. horizontally. Above this distance, it is not advisable to work, without using counter shafts.

Crossed Drives. It is not possible as yet to drive with a silent chain gearing in this manner, and only by the use of three chain wheels can this drive be accomplished by using bush roller chains, therefore it is more expensive

Non-Positive Drive.—When a positive drive is not required, or is dangerous to use, an arrangement can be adopted, called a shearing pin joint, which allows the chain to break at a certain tested overload or strain. When this device is used, the chain should be well guarded to prevent accidents.

When this drive is adopted for driving power looms, a drive as shown in Fig. 19 is advisable Here a small motor may be used for driving two line shafts, also power may be saved, by allowing any two rows of looms to stand, when not required. When the shed is driven from the main engine, line shafts fitted under

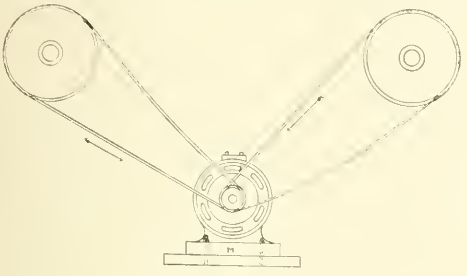


DIAGRAM 19.

the floor are advised, as this allows for a shorter drive, and more light above the looms. One disadvantage is that the looms cannot be arranged for two rows to be driven by one line shaft, without using the equivalent to a crossed drive, that is three chain wheels for one row of looms. When summed up, this drive gives good results for short drives, giving greater efficiency in working, positive drive with a slight amount of elasticity between centres, and is useful for independent motor driven looms, of which more will be given later.

THE GERMAN TEXTILE INDUSTRY

The number of German joint-stock companies in the textile industry whose balance-sheet for the past year have now been issued is 127 according to reports just to hand. The total capital represented is £11,441,000 against £11,069,000 for the same companies last year. The total amount paid in dividends is £1,116,000 against £1,061,000 representing an average return on the capital of 9.7 per cent against 9.6 per cent. The following table gives a comparison of the various branches of the industry:

	Capital 1913-14	Dividend 1912-13	p. c. 1913-14
18 Cotton spinning	£1,602,500	9.9	10
9 Cotton weaving.	500,000	8.7	8.4
25 Spinning and weaving ..	2,391,500	8.2	7.6
16 Worsted yarn	1,722,500	8.5	7.3
2 Woollen goods..	1,255,000	10.9	10.1
15 Linen and jute	1,273,500	10.2	12.9
2 Silk weaving	387,500	9.2	6.1
8 Dyeing and finishing. ..	558,500	4.6	6.1
22 Other branches..	1,744,500	13.0	14.7

The improvement under the heading "linen and jute" is due to the better profits made in the jute trade, the year having been an unsatisfactory one for linen spinners and manufacturers.

The Bleaching of Silks

By JOSEF LOEBL.

The bleaching of silk may be accomplished in a number of different ways and by a number of different methods, among which may be mentioned the sulphur bleach, the permanganate bleach, the hydrogen and the sodium peroxide bleaches, the perborate bleach and the sodiumbisulphite bleach. While the silk mills have to figure with all of these different bleaching methods and others, according to the quality and the grade of whiteness desired in any grade of goods, they are not limited to such extent, nor do they have to use the precautions, as does the cleaner and the garment dyer. The reason for this is very simple. In the first place the mill deals only with new goods that have not been weighted, the weighting when done, coming after the bleaching process. On the other hand, the cleaner and garment dyer must take the weighting compounds into consideration when bleaching silk, also, the wear and the tear to which the goods have been subjected.

Silks that have been tin weighted cannot be bleached with peroxide for the reason that all of them depend in their action upon the oxygen that is contained in them. Oxygen has a very injurious effect on the metallic tin salts comprising the weighting of the silk and in uniting with these salts causes oxygen stains on the silk which cannot be removed. Thus silks that have been weighted must be bleached with the reducing bleaches such as the permanganate and the bisulphite bleaches. This being true, it is essential that the dyer be able to distinguish silk that has been weighted with one of the tin salts, such as phosphate or perchloride of tin. As a general rule such silk can be determined from the effect that perspiration has had on the fabric. Where perspiration, for instance under the arms, has caused weak, yellowish looking places, breaks in the goods and yellow or brownish spots that will not come out with hot soap, it is positive that the silk has been weighted with a tin salt. The chemicals contained in perspiration combined with the tin are so very injurious to the silk that even the closest woven silk cannot withstand this injurious action.

The bleaching of silk, until a comparatively recent date, presented a number of difficulties to all cleaners and garment dyers. The permanganate bleach was the only one available and the results from its use were never thoroughly satisfactory because this bleach is not permanent. If it was not handled by one thoroughly experienced in its use and combined with careful bleaching methods, careful rinsing, careful scouring and careful blueing, the original color of the garment would again show up when the silk was ironed in the pressing room. Nowadays, however, most of the difficulties of silk bleaching have been overcome by combining the perborate, permanganate and the hydrogen peroxide bleaches and the results secured are permanent and brilliant. Following are accounts of the different bleaching methods for silk most generally used.

Sulphur Bleach

This process is but little used and is given here to satisfy any curiosity on the subject and as a matter of information.

The silk is first cleaned and dampened and hung in a tightly closed wooden box, preferably over night, by burning in the box about eight ounces of sulphur for each ten pounds of silk. Repeat the process if necessary and then rinse the silk several times in lukewarm water.

Hydrogen Peroxide Bleach.

The pure concentrated hydrogen is a water clear liquid, but it is not very constant so that it can be stored only in weakly acid solutions of from ten to twelve volumes. Even this has to be stored in a dark cool place, otherwise the liquid will spoil for the reason that light and heat decompose it rapidly. Even some metals will accelerate the decomposition; therefore, only wooden, earthern or enameled bleaching tubs can be used and the heating is accomplished with steam flowing through lead pipes. There is a stronger solution of hydrogen peroxide on the market than that mentioned above and is known as perhydrol. This, however, is more expensive and decomposes just as quickly, under the same conditions, as the weaker solution. Due to the fact that hydrogen peroxide is sold slightly acid it is necessary to make the bleaching bath alkali again by the addition of ammonia or silicate of soda before using. The commercial hydrogen peroxide is diluted with from five to fifteen times its own weight of water.

The following is a good bath and will give good results: Twelve gallons of water free from iron; two gallons of hydrogen peroxide; three-fourths of a pint of silicate of soda and one pound of white soap in solution. The bleaching should be started cold and the bath heated slowly to 120 degrees Fahr., the goods being turned occasionally. If it is not desirable to give the goods continual attention during the bleaching they may be placed under a wooden lattice to keep them under the surface of the bath. If the goods are not sufficiently bleached after they have been in the bath for an hour or so the operation should be repeated after having replenished the bath with the necessary quantity of the bleaching agent. If it is desired a stronger bleaching bath than the one given can be made as there is no danger of injuring the goods with this process. After bleaching, the goods are acidulated in a cold bath with a two or three per cent solution of sulphuric acid, calculated on the weight of the material, and then rinsed.

The bleaching effect can be increased if the goods after being taken from the bleaching bath, are hung up damp and exposed to the rays of the sun. When dry they are dampened, again acidulated as described above, and rinsed twice. Whatever bleaching method has been used and whatever goods have been bleached the results will always be a yellowish white. To overcome this, bleached goods must be properly blued. It has been found that when articles are bleached with hydrogen peroxide and the blueing done before the bleaching process, the results are better and a saving in hydrogen peroxide results. However, it should be borne in mind that the older processes of blueing with indigo, carmine and methyl violet should be replaced by the better class of blue dyes such as alizarine cyanoles, formil blue, alizarine sky blue, etc.

Sodium Peroxide Bleach.

Sodium peroxide is a yellowish powder, which, when stored in tightly closed in tin boxes, will keep for a considerable length of time, even for years. This is one advantage of sodium peroxide as a bleach for silk is that it is thirteen of fourteen times stronger than hydrogen peroxide in its action, thus making the latter chemical the cheaper to use. Again, the sodium peroxide bleach will not exhaust, as does the hydrogen peroxide, and can be used over and over by replenishing some of the bleaching ingredients.

A sodium peroxide bleaching bath is prepared as follows: Sixteen gallons of water; one pound of sulphuric acid, 168 degrees Tw.; three-fourths pound of sodium peroxide added slowly to the water and acid solution and well stirred into it; enough ammonia or silicate of soda to make the bath slightly alkaline. The bleaching process is followed along the same lines as that described for the hydrogen peroxide bleach.

This bleach can also be used for all kinds of dress goods, either wool, silk, or cotton, or mixtures of any of them. In the latter case, however, it is better plan to replace the sulphuric acid of the bath by sulphate of magnesia in the ratio of three pounds to each pound of sodium peroxide.

Peborate Bleach.

Bleaching with sodium perborate is a very simple process. The well cleaned goods are bleached by preparing a bleaching bath as follows: Dissolve from two to three pounds of sodium perborate in ten gallons of water; enter the goods cold and heat the bath up to 120 degrees Fahr. and allow the goods to lie in this bath for several hours, or if it is preferred, over night. The goods are then taken out and allowed to drain and entered, without rinsing, into a scouring bath of 100 degrees Fahr., acidulated with sulphuric of formic acid. After a short time the goods are taken out of the scouring bath and rinsed twice. The scouring cannot be omitted as this developes the bleaching effect. The blueing is added to the scouring bath. The bleaching effect can be increased if some sodium bisulphite is added to the scouring bath. Some bleachers add to the perborate a solution of magnesium chloride in an amount equal to the weight of the perborate. Due to the fact that the results achieved with bleaching silk depends upon the quality of the goods, exact directions cannot be given. Goods that are badly damaged should not be bleached at all, but after carefully cleaning, if the white has a yellowish tint, the goods should be blued in the last acid rinse. This will restore the whiteness.

Permanganate Bleach.

To a cold bath add potassium permanganate to the amount of two per cent of the weight of the goods. Enter the damp goods into this bath and work them for about one-half hour after which time sufficient manganese dioxide has been formed on the fibers. The goods are then entered into a cold bath to which has been added six per cent of sodium bisulphide and again worked for one half hour, after which time one per cent of the sulphuric acid is added to the bath. The goods are then worked until they are perfectly white, after which they are rinsed. If desired the sulphuric acid may be replaced with muriatic acid and furthermore the sodium bisulphide and the sulphuric or the muriatic acid can be combined in one bath.

Bleaching for the purpose of dyeing fancy pale and evening shades must be done with the same exactness as bleaching to produce only white goods for the reason that any impurity in the bleaching will show up after the dyeing process. All bleached goods should have a soap passage before dyeing, while the addition of some sodium perborate to the dye bath will clear up the color, producing clear and pure shades. National Cleaner and Dyer.

Automobile Tire Fabrics

By ALVIN KINGSBACHER.

A Paper read at the Thirteenth Annual Meeting ofthe Alumni Association of the Philadelphia Textile School.

It is the rule and not the exception to start a technical treatise with the preface that the subject such a tremendous amount of material upon which to write that the author is necessarily limited in time and space. Modestly, I must admit that time and space are not the only things which limit me in a subject of this kind.

The subject is a big one and, strange to say, its bigness lies not only in its possibilities, but in its very realities. The present day application of tire fabric to industry and to society is enormous, and one may naturally but wrongly infer that a greater development is apt to result from the present unprecedented demand for it.

I am prepared to contradict the belief—widely current, generally accepted and apparently supported by fact—that tire fabric is in its experimental stage. There have been so many innovations attempted, such as the substitution of ramie for cotton, the twisting of a wire with the component cotton threads of the yarn and the experimentation with other than plain weaves such as leno and similar ones—that the failure of all these has not only removed the possibility of further development in tire fabric, but has reflected greater merit on its present qualities and construction. In mentioning these various experiments it may be well to make evident in a brief manner the cause of their failures.

The substitution of a stronger material for cotton has necessitated the introduction of a fibre which has not the necessary properties of elasticity and flexibility. Any increase in strength without these qualities would not be considered an improvement, but rather a detriment. In twisting wire with cotton threads the difficulty encountered is to secure a wire of such a material as will possess the same elasticity as the cotton.

Another feature of this construction is that the wire will tend to cut the cotton or other fibrous material.

In using leno or other weaves, which, by crossing the threads, yield a stronger fabric, the objection arises from the cutting action of the threads. The effect of tire service on a fabric is so peculiar that it would not be long before the threads would cut each other in the places where they cross. From these observations of what has already been tried, it is natural to suppose that tire fabric has long since ceased to be an experiment. It stands to-day as a scientific certainty and is as much a standard commodity as army duck or any such similar fabric.

If I may be permitted a prophetic indulgence, I wish to say at the outset that tire fabric has reached its height to-day, that to-morrow, with increased knowledge of rubber compounds and tire construction, the importance of tire fabrics will be greatly diminished. Even now the tire manufacturers, by using better and tougher rubber compounds and by employing better methods of tire construction, have made it possible to use carded and combed Egyptian fabrics, and in some cases even Peeler fabrics, whereas formerly Sea Island tire fabric was used exclusively.

Do not let this somewhat decreasing importance in respect to the fabric give you the idea that it is not a vital factor in the tire. It is the body, or technically, the "carcass," and upon it to a great extent depends the durability and strength of the tire.

It is not my intention, nor have I the ability, to expound the theories of tire manufacture. My experience has been gleaned, firstly, in a cotton mill running exclusively on tire fabric, and, secondly, in a tire factory as fabric analyst. It is my desire to combine these experiences in such a way as to give you not only a fair idea of how tire fabric is made, but also what is expected of it by the tire manufacturer.

The automobile tire or pneumatic tire, as it is called, is a complex organization and combination of fabric and rubber. It has been created like most other inventions, to meet existing demands, and having arrived at its present efficient stage, has succeeded in establishing for itself a monopoly, opposed to which countless devices designed to supplant it have not even made an impression.

The name automobile tire fabric is generic. It includes many kinds of fabric which are used in the construction of a tire, but the most important of these and the one that is used in greatest quantity is the building fabric. It is estimated that of this style alone about forty million square yards are used annually. In addition to this building fabric there are various other fabrics that go into the making of a tire. These sundry fabrics include special constructions known as chafing fabric, breaker fabric and other fabrics such as Osnaburgs, sheetings and tapes. The last two are used more especially in the process of tire manufacture and are not an inherent part of the tire itself.

Before approaching the subject of tire construction, I wish to outline in a crude and desultory manner the various processes through which the fabric must go before it becomes part of a tire. When the fabric is received at the tire factory it is inspected by the proper officials, and of this I shall deal at greater length later on; but in this connection it is well to state that not all tire factories maintain a department of this kind. It is to the credit of the Firestone Tire and Rubber Company, with whom I am more familiar, and a few others, that they do maintain this department. It speaks well for a high standard of quality, and the rigidness and thoroughness of inspection in regard to fabrics betokens a similar care and exactness in the selection of other materials and in the various processes of manufacture.

After the insection comes the drying process. The fabric is run over hot rolls and all the moisture is extracted, as it is essential that the fabric be dry before it is coated with rubber. The "calendering" or "frictioning" process is the means of forcing the rubber compound into and onto the fabric. The spaces or "pores" in the fabric are filled with rubber and then the fabric is "skimmed" or coated with a layer of rubber. The fabric is now ready to be cut into strips, and the cutting is done on a 45-degree angle in order to secure a greater strength and to prevent the unravelling of the threads in the strips. These strips in various piles, depending on the size of the tire, are built on a mould of iron core. This in short, is the preparation of the fabric for the tire.

The building fabric, as previously mentioned, is the body of the tire. It is the most important fabric, and as such must possess above all—strength, flexibility and elasticity. The fabric is a plain weave, and weighs approximately 17.25 ounces to the square yard. The yarns from which this fabric is made are 11-22.5 or 11-23. The twist in the single yarn is from 14 to 16 and the ply yarn is 4 to 5 turns per inch. The texture is 23 ends and 23 picks per inch. The gauge or thickness of the fabric is .040 inch. The water content should not be over 5 per cent. The take-up is found to be about 14 per cent. and the contraction of filling about 10 per cent., leaving normally a difference of 4 per cent. in the amount of warp and filling yarn stretch. This is an important point in the construction of tire fabric. It is obvious that if the difference is too great, the filling, when the fabric is subjected to a strain, will arrive at its straight length before the warp, and will consequently weaken or break before the straight length of the warp is reached. When the percentages of crimp or bend in the warp and filling are about equal or within 5 per cent. of each other the warp and filling will tend to reinforce each other. In my capacity as fabric inspector I have analyzed so-calle tire fabrics which had 32 per cent. take-up in the warp and 7 per cent. stretch in the filling. The difference of 25 per cent. made them totally unfit for use in tires, although the fabrics were in every other respect perfect.

Building fabric is used in various grades, but the construction remains the same. Sakellaridas, or cotton grown in Egypt from Sea Island seeds, is a material that has become very prominent. The staple is longer and stronger than Sea Island, but isn't quite so elastic. In color, it is a yellowish white, a compromise between Sea Island and Egyptian. Long staple Sea Island, combed Egyptian and carded Egyptian are also used in great quantity, chief and most important of which is Sea Island.

Strength obviously is the paramount feature in a tire fabric, and upon this factor there cannot be put too much emphasis. Every tire manufacturer, even though he has no fabric inspection department, has at least a tensile strength testing machine. They have various ways of testing, and each method results in a different standard of strength. For example, breaking a 3-inch strip in a 2-inch jaw is virtually testing two inches of fabric, but will yield a higher strength test than if just two inches are tested. This is because the two inches in the former case are reinforced by the threads adjacent, although not held in the jaws of the machine. The standards of strength which I will give you is based on a different method of testing and yields a lower but truer breaking strength. A piece of fabric is unraveled down to one inch, representing in number of threads the exact texture of that inch. This strip of fabric is placed in the jaws and tested for strength, and can indicate no greater strength than the exast number of threads in that inch actually possess. According to this method of testing we arrive at the following standard for strength in building fabric:—

Sakellarides..	Warp, 340....	Filling, 360
Sea Island...	Warp, 310....	Filling, 320
Combed Egyptian	Warp, 275....	Filling, 285
Carded Egyptian	Warp, 260....	Filling, 270

A question may arise as to the cause of the difference in warp and filling strength. When it is remembered that the warp is woven under considerable tension, this difference in strength is readily understood.

The breaker fabric is applied on the tire just beneath the tread, and its purpose is to protect the building fabric and to distribute the shock that the tire necessarily receives on the road, over as great a surface as possible. There are many and varied construction of breaker fabric, each manufacturer having his own particular weave and construction. The average breaker fabric, if such there be, is somewhat similar in construction to the building fabric in respect to the yarns. The texture is very much lower in order to permit large openings in the fabric to accommodate more rubber than the other fabrics. The weight of the fabric varies, of course, with the construction, but usually is somewhere around 10 ounces to the square yard. Twelve ends and thirteen picks per inch give the necessary openness to the fabric. The weave will vary anywhere from a plain weave to a mock leno. It is made of Sea Island, combed Egyptian or carded Egyptian. It is difficult to set a strength standard for this fabric, as any change in texture, weave or yarns will greatly modify any standard which may be placed upon it. However, with a construction such as outlined above the breaking strengths would be as follows:—

Sea Island	Warp, 160....	Filling, 180
Combed Egyptian	Warp, 140....	Filling, 155
Carded Egyptian	Warp, 115....	Filling, 130

The chafing fabric is used on the side walls of the tire, where more flexibility is required and is of necessity a lighter fabric. It is a plain weave, weighing 9 ounces to the square yard. The yarns are 4-22.5 or 4-23. The gauge or thickness is .022. There are 34 ends and 34 picks to the inch. It is made of Sea Island or combed Egyptian and the breaking strengths are as follows:—

Sea Island	Warp, 155....	Filling, 170
Combed Egyptian	Warp, 125....	Filling, 140

The other fabrics, Osnaburgs, sheetings and tapes, need no particular mention, as they are standardized fabries and differ in no respect from the fabrics that are on the market to-day.

Before discussing the inspection of the tire fabrics, I want to touch upon some of the precautions that are taken in the mill in order to turn out a perfect fabric.

The spinning of the yarns is, of course, an important step in the work and it follows that unless the maximum strength of the cotton is secured here the succeeding processes of manufacture cannot yield a suitable tire fabric.

The twisting of the single yarn into ply yarn is not such a simple problem as it appears. When 11 single threads are twisted into one, there is always a possibility of one or more threads breaking and the twisted yarn continuing in its whirly course with a fewer number of component threads than the requirements demands. This feature is known as "dropped ends" and is a serious weakness when found in the fabric. It is absolutely essential that every piece of yarn should have its required number of component threads its entire length; and to twist it with this unfailing accuracy involves the human element more than the mechanical, as the result depends largely upon the skill and alertness of the operatives.

Throughout the entire handling of the yarns, warp and fabric there must be avoided any contact with oil, dirt or grease. Rubber will not adhere to an oily or greasy fabric and the tire manufacturer is very particular in regard to the cleanliness of the fabric which he buys. The mill runs its looms on all grades of tire fabric and it is not always easy to keep the different grades of yarn separate. A weaver may be running one loom on Sea Island and another on Egyptian and may inadvertently mix the bobbins, weaving into a Sea Island fabric one or more bobbins of Egyptian yarn. Such a fabric is said to have "mixed filling" and is generally rejected by the fastidious fabric buyer.

It is important that there be no broken or knotted threads. When a filling thread breaks the pick is pulled out entirely and the loom started with a new pick in its proper shed. In the case of a warp thread the yarn is spliced; that is, two or three component threads are knotted at a time in different places so that the binding of a broken yarn does not make a bulky knot.

There must be no holes in the fabric, and everything about the fabric must be even and uniform. After the weaving comes the mending, burling, mill inspection, finishing and packing. The fabric is rolled, and wrapped with paper and burlap for shipping.

The fabric, being a plain weave and of heavy construction, appears to most people as a very simple one, but this idea is abandoned when the number and diversity of tests which the fabric must undergo at the tire factory is represented. These tests may be divided into two classes: the physical and the visual inspections.

The physical tests include tests for strength, weight, thickness or gauge, texture, take-up, contraction of filling and water content. When these physical tests are made and found satisfactory the fabric is run over an electrically lighted inspection perch. This is the visual inspection and by its means every defect or irregularity in the construction of the fabric becomes apparent.

In the beginning of this article, I ventured the opinion that the fabric is no longer an experiment; and when you read over the following points which are looked for on the perch you may agree with me that no experiment could possibly meet these rigid requirements. The irregularities that are looked for are as follows:—

Loop Knots	Drop End Yarn
Warp Knots	Split End Yarn
Beat Ups	Oil Stains
Bad Beat Ups	Hard Twist Yarn
Uneven Fabrics	Soft Twist Yarn
Slack Filling	Mixed Warp or Filling
Slack Ware Ends	Mispicks or Double Picks
Pulled-in Selvage	Smashes
Reed Marks	Floats

While the presence of any one of these may not of itself constitute sufficient grounds for rejection, a combination of several of them or the frequent recurrence of one of them, would place the fabric in the imperfect class and render it unfit for use in tires.

These strict specifications and requirements for tire fabric will give you an idea of its importance in the building of tires, and may contradict in a sense the statement made in the beginning that with increased knowledge of rubber compounds and tire construction, the importance of tire fabric will be greatly diminished. These two need not necessarily conflict, as in its present form the pneumatic tire of to-day requires all the strength, flexibility and elasticity that can possibly be brought forth in a fabric, but with a prospective advancement in tire building and the possible substitution of a solid resilient substance for air, the fabric may, as prophesied, become less important than it is now.

The second largest acreage ever recorded and with the prospects of the production probably equal or better than those of last year, was reported by the United States Department of Agriculture on July 1, as the condition being 79.6 per cent. with the area in cultivation as 36,960,000 acres. The condition of the crop is lightly less than one per cent. below the average condition on June 25 for the past ten years. Bad weather early in the season caused a low condition in a number of states, but during June conditions in those localities greatly improved.

Preventing Bad Waste in Cotton Mills

By H. D. MARTIN.

Paper read at the Thirteenth Annual Meeting of the Alumni Association of the Philadelphia Textile School.

There are four places in a cotton mill where a great deal of bad work can be made unawares, and which can be prevented.

These places are the picker room, drawing frames, spoolers and chain quillers. These four departments of textile processes require much more attention than they usually receive in many mills. The reason why these processes are less supervised than others is because they appear so simple. These machines can take care of themselves. Any cheap hands will do to operate them. While many hours will be spent in close observation of a loom, speeder or card, these four machines are making the bad work which causes the misled observer to spend his time at the loom as otherwise.

These four machines, particularly the pickers and drawing frames deliver goods very fast. Either can make enough bad work in one day to cripple succeeding results for weeks. The mills succeeding the best are those paying particular attention to their pickers, drawing frames, spoolers and chain quillers.

The defects arising from these processes form a very interesting study. Taking the picker room for example, if the machines are not operated and watched by as good help as can be secured by any other part of the mill, the following defects are sure to be passed along for mischief-making in the succeeding processes:

Uneven laps—these may vary as follows: The first half of the lap may be heavy and the rest of it light, or vice versa; or the lap may be run in short lengths of thick and thin places; or a whole lap may be heavy and a whole lap light. There are still two other kinds of uneven laps. The mottled lap which is full of places where one can see through it. The other is the one-sided lap—being made light on one side and heavy on the other. So there are six kinds of uneven laps, all of which may cause untold trouble in the succeeding processes. It requires a man of good judgment to detect these different derangements, find their cause and remedy the trouble.

It is uncommonly believed that because one lap weighs the same as another and up to weight, that they are alike and all right. Not so. A lap may be full of thick and thin places and yet be up to weight.

The next series of bad weight is that which emanates from stock being improperly cleansed of impurities. A dirty lap may weight the same as any lap made of good stock, and there can be all the varying degrees of dirty laps.

There is another cause of bad work, and that is mixed work in all of its varying forms. Careless hands may mark laps wrong, and mix the raw cotton grades.

Incidentally might be mentioned the wear and tear of the machinery, waste of oils and waste of good stock, which should go into the regular work. When good, conscientious workmen are employed on pickers, they will not only spend their time doffing laps, but will take pride in watching their machines throughout to see if the fans are working right, beaters sharp, cages free, bearings properly oiled, cotton well opened, laps properly weighed and marked, also that the evener motion is working right. Where there are sufficient machines it will pay to have a good picker room boss who will spend his time on the efficiency end altogether. For want of care in this line, pickers have been known to run a long time with a fan stopped, beaters dull, cages plugged, bearings improperly oiled and machines improperly adjusted. And worst of all, the evener motion making uneven work instead of even. It will also pay to study the relative speeding of beaters, fans and machines as a whole, according to stock used and other local conditions.

There is a wide range of different speeds on pickers which would seem unnecessary. Why a fan in one mill should run from 1,800 to 2,500 and in another mill 800 to 1,500 on similar work is a quandary. It is the same with beaters and other machines. Another thing which looks strange is to see fans running in different directions.

It may seem strange to say that these machines may make very much the same kind of bad work that the pickers make. But this is so. There may be long stretches of coarse slivers or long lengths of fine. There may be the alternate short lengths of coarse and fine lengths. While some cases of slivers may be all coarse and others all fine. Then there may be the mottled sliver which is full of cuts—cut-sliver, so-called. And there may be one-sided slivers—heavy on one side and light on the other. The bad work made on the drawing frames does much more harm than that on the pickers. For the cárds can undo and average up some of the uneven, dirty and mixed work of the pickers. But the cards do not remedy all the bad work. They have enough to do without remedying bad work. If the pickers turn over perfect work to the cards, much better work will result all along the line. But the bad work made on the drawing frames has no remedial agency. It stays bad and creates more bad work to keep it company.

Like the picker room, it will pay to have carefully selected workers on these machines. Dirty work is also caused by allowing the clearers to go unpicked too long at a time. Work can also be mixed, thus damaging valuable processes ahead.

Clearers should be frequently picked. Stop motions should be in good working order. Care should be given to have the cans evenly distributed at the back. If cans are started full on one delivery the tension will vary until there will be too great a difference between full cans and empty cans on that delivery. There are two ways of remedying this matter—that of having one-half the cans full and the other half full on the same delivery. By the time the half-full cans run out, the full cans are half full, etc. Or the cans may be put in so that they always average about one-half full. This is not hard to do by careful hands.

One cause of bad work is the filling of cans too full at any point. It is very important to scour these machines often. Drawing frames work hard. They requiring a breathing spell and time to take a bath, as it were. Fluted rolls, roll necks, roll ends, bearings all easily get clogged, gummed, dried out, causing much bad work. Flutings should be kept clean, sharp and bright.

There are also nice scientific points to be determined in connection with the good management of drawing frames. There is a great deal of bad work on drawing frames, on account of the speed being too high, drafts too great, feeding too light or too heavy, and the spread of the sliver. Many mills have improved the quality of their drawing by narrowing the spread, so that the angle from the converging point at the trumpet to the edge of the sliver at the point where it leaves the rolls may not be so acute. That is to say, that if the spread is six to seven inches it may be better to reduce it to four to five inches, so to speak, according to the work run.

Another important point to consider well is that of the distance between rolls. The proper gauging of setting rolls is one which requires skill and good judgment by the room boss or superintendent.

On these machines much bad work can, and is, being made where poor help cause the following defects:—

1. Wasting good stock.
2. Knot ends too short.
3. Slip-knots.
4 Knots too large.
5. Ends of knots too large.
6. Loose ends.
7. Double ends.
8. Lapped ends.
9. Mixer yarns.
10. Lumps allowed to pass.
11. Chafed yarn.
12. Strained yarn.
13. Soiled yarn.
14. Soft filled spools.
15. Soft yarn allowed to be spooled.
16. Cut yarn allowed to be spooled.
17. Single yarn allowed to be spooled.
18. Cocked yarn allowed to be spooled.
19. Spools too full at one end.
20. Spools not full enough at either end.
21. Spools unevenly wound.
22. Underfilled spools.
23. Overfilled spools.

It is the same with above machines. Bad work of the following kinds is the result of poor help:—

1. Strained yarn.
2. Double ends.
3. Bobbins too large at top.
4. Bobbins too small at bottom.
5. Bobbins bunchy.
6. Bobbins too soft.
7. Bobbins of mixed yarns.
8. Bobbins of wrong taper.
9. Dirty yarn on bobbins.
10. Bobbins filled too large.
11. Bobbins filled too small.
12. Twists and knots defective.
13. Mixed colors.
14. Mixed bobbins.

A plant which may be struggling under such conditions is in no shape to hold its own. What is the use of having the pick of the help on other processes wading through the spoiled work made by careless help on the most important preparatory processes in the mill?

HAVE OPENED NEW YORK OFFICES.

The Zittau Engineering Works, Limited, of Zittau, Germany, engineers to bleachers, dyers, finishers, printers and mercerizers, have opened a New York office at 200 Fifth avenue, with Mr. A. W. Buhlmann in charge, who will look after the Canadian and United States business of the firm.

The value of the raw cotton imported into Canada during the fiscal year ending March 31, 1914, amounted to $9,752,437, compared with $8,735,191 for the same period last year and $7,932,467 for the year previous.

Operating Costs and Economics

By CLYDE E. MURRAY.

Address delivered at the 10th Annual Convention and Exhibition of the National Assn. of Hosiery and Underwear Mfrs.

In the realm of Natural History we learn of the existence of a law which makes for the survival of the fit. Similarly, in manufacturing, certain laws operate to insure the survival of the efficient.

The easy-going manufacturing methods of our grandfathers are gone the way of the tallow candle and the flintlock. In these days, when a variation of five per cent. in cost may mean riches or ruin, eternal vigilance is the price of success.

Manufacturers to-day find themselves between the devil and the deep sea—between the "devil" of constantly increasing cost for materials and labor and the "deep sea" of constantly increasing competition.

There is a certain form of competition to which the manufacturer cannot well object, namely, to that of the man who knows exactly what his goods cost and whose prices, if low, reflect advantages actually secured through volume or by reason of highly efficient methods of production. The form of competition which is most dreaded, however, is that of the man who, having no proper knowledge of cost, sets prices which preclude the possibility of there being an adequate profit in the business for anyone.

The natural accumulative effect of this unintelligent competition was really the prime factor in causing the formation of associations in various lines with the consequent agreements relative to sales prices. Recent legislation, however, has tabooed these selling agreements and manufacturers find themselves contending with the same old discouraging competition. Despite this fact this legislation has been a beneficial move in that it has forced manufacturers to approach the problem from an entirely different angle, namely, uniform cost-finding methods. No matter how many selling agreements might be in force the evil of manufacturing some portion of the product at a loss would still be in evidence without an exact knowledge of final costs. Absence of this knowledge forces a manufacturer to govern his selling price by that of his competitor. His competitor is just as liable to be producing at a loss. In fact, more so, as the natural law of competition has a tendency to lower selling prices from year to year due to the sending out of leaders with an attractive price attached and the almost utter impossibility of getting that price back to its original figure.

This is true in your line as well as many others. A number of industries, however, have awakened to the fact that it is business suicide to continue as they have been doing, and through the activity of their association officers have adopted cost methods. Wherever this measure has been adopted the desired results have been immediately and almost automatically attained. No manufacturer will continue to produce a line of goods in the face of conclusive proof that he is exchanging a dollar for eighty or ninety cents.

It is perhaps indulging in generalities to too great an extent to say offhand that maunfacturers of knit goods do not know what their various lines of goods cost to manufacture. Unfortunately, however, it is true that so large a percentage of manufacturers lack such knowledge that the effect is to reduce profits for all.

The manufacturer of knit goods to-day faces the combination of advancing costs on material, labor and expense, together with the keenest sort of competition on the selling end of the business. Under such circumstances profits would undoubtedly be sufficiently reduced if all competition were based on an exact knowledge of costs. In the absence of such knowledge it is not surprising that conditions are far from desirable.

If we were able to make a canvass of the entire industry we would find a large number of manufacturers who would cheerfully admit their ignorance of this important matter, and who would, at the same time, defend themselves by claiming that the clerical cost to be incurred in determining manufacturing costs would be in itself so great as to be prohibitive. We, in turn, cheerfully admit that cost finding, like any other good thing, can be and has been carried too far. But for every manufacturer who goes too far into the matter there are hundreds who do not go far enough. This is notably the case in the knit goods industry.

This fear of over-elaboration in details and consequent excess of clerical cost, is largely responsible for the conditions which exist in the industry along this line. Yet, despite the fact that there are refinements of cost keeping which are profitless, there is a happy medium of cost knowledge which all who expect to survive must in time acquire.

We accept the pound and the yarn as units of weight and measure and yet as we use them in business they give us results only within a reasonable degree of precision. In the same way it is possible to devise for any business a method of determining cost, which, while free from hair-splitting distinctions, will give wholly acceptable results with clerical economy.

It is usual in the knit goods industry to prepare an estimate of the cost of each line at the beginning of the season in order that an equitable selling price may be set. This condition of affairs always has existed, and an estimated cost will always be a necessary part of your business. Very few manufacturers, however, have sufficient knowledge of the variations in cost which occur during the actual production of the goods.

The estimated cost and the actual cost determined after the production of the articles in question will show variations at every point; in the weight of the yarns used, the amount of waste made in cutting, etc., and in the amount of trimming and supplies issued from stock. The labor cost will vary, especially under the day-work wage payment plan and expense will, of course, vary widely under changing production conditions.

The work of the cost expert is to present with clerical economy all these percents of discrepancies and variations as they occur in such a way that manufacturers may always know the relation between his actual costs and his assumed costs as expressed in his estimates.

Entirely apart from the matter of variation between estimated and actual costs, many manufacturers have been misled by an improper treatment of manufacturing expense in computing estimates or costs. In applying such expense the heretofore accepted method in the knitting industry is to use as a basis the unit of dozens or a combination of labor and material. Both of these methods are obviously incorrect.

Consider them in the order named: That the dozens method is incorrect will be apparent if a study of the detail of manufacturing expense items is made. Such a study will show that expenditures of this nature are incurred, practically without exception, in order to keep the workmen employed, and, hence, may be equitably applied to the various lines produced only in relation to the productive labor hour, the machine hour or other factors which reflect the elements of time.

To show more specifically how possible it is to be misled by the allocating of expense upon the basis of the dozen manufactured, let us suppose that a concern produced last season a line in which the cheaper grade predominated. Their estimates of expense costs for this season would naturally be based on a production possible under last season's conditions. Assuming that this season the sales run largely into the better grades, the production in dozens will drop off correspondingly and the actual profits will fall below the esimates for the simple reason that expense was improperly treated in the estimates.

Manufacturing expense ordinarily approaches in volume the productive labor. Its misapplication, therefore, is just as misleading as would be an equally incorrect handling of the direct labor charges. How many manufacturers would consider satisfactory the averaging of labor charges in their estimates on a basis of the dozen manufactured?

As compared with the dozen method, the allocation of expense in relation to productive labor would have the effect of reducing the calculated cost of the grades which are cheaper from a labor standpoint, at the same time throwing the burden on the more expensive lines. Such a distribution of expense is, however, correct and will produce costs which will be comparable from season to season, for the reasons stated.

Applying expense on a combination of labor and material is even more inaccurate than the dozen method The value of material in a dozen garments or a dozen hose should have no bearing upon the amount of expense charged to that garment or hose. Let us consider a hosiery mill manufacturing a line ranging from $2 to $30 per dozen. Admittedly there is very little more labor on the $30 number than on the $2 number. Yet, ten or twelve times the amount of expense would be assessed against the former than against the latter. Analyizing expense by items fails to show why this should be. There should be no greater charge for administrative expense, for taxes, insurance, depreciation or general expense as reflected by any increase in the labor cost. The $30 number takes up no more space moving through the plant, nor, in fact, costs any more to the manufacturer, so far as expense is concerned, with the possible exception of a slightly increased charge for interest on money borrowed to carry the higher priced material.

The reflection in the unit cost of this method of expense application is to show a lower cost on the cheaper grade and a much higher cost on the better grade than is actually the case. This is just the opposite to what it should be to allow for an intelligent setting of selling prices.

To illustrate further: Some years ago we served a manufacturer of ladies' underwear who had just sent out an attractive leader. The cost of this number was figured as usual and showed about five per cent. profit. Over five thousand dozen had been sold by their selling agents before we were in a position to submit a final cost. This final cost, however, showed that they were taking a thirty per cent. loss instead of a five per cent. profit. The loss amounted to over $12,000 on that one number. By using a combination of labor and material on which to apply expense this manufacturer had assessed his $12,000 against his higher grade numbers with a consequent increased cost for those numbers. Competition, however, prevented him from obtaining a proportionately higher selling price for the better grade.

When we consider that the knit goods industry is using two methods of cost finding, both incorrect, which are diametrically opposite when reduced to the final unit cost it is not surprising that conditions are unsatisfactory.

This question of costs is not one of merely academic interest. It is, as a little thought will show, a matter of real concern, for if costs are to be utilized to the greatest extent as guides to executive judgment, the cost of each article must be calculated so accurately as to reflect its individual status as a profit earner.

From the standpoint of the individual manufacturer the adoption of uniform cost methods merely marks the primary step in effieiency. Unquestionably uniform costs mean the survival of the fit, or, in other words, the survival of the efficient. With a logical basis, however, on which to operate and the knowledge that if a competitor is underselling it is because he is a better executive and has a more efficient mill, the manufacturer finds himself with something tangible to work upon. It then behooves him to study his own costs and determine just where he is lacking.

A lot has been said, written and done the past few years about efficiency in the metal working industries, and these industries are becoming more and more efficient. The average knit goods manufacturer will claim, and rightly so, that his business is different. Yet this does not lessen in the slightest degree the fact that the knitting business is just as susceptible to installation of efficiency methods as is any other line.

Lack of time and the risk of getting into a discussion of detals, which might be out of place here, prevents an exhaustive talk on possible economies. There are, however, a few subjects of vital importance which might be mentioned in passing. Of these a consideration of the need of scientific production methods should come first.

A production system, to prove thoroughly effective, should cover a number of points. It must insure that stocks are maintained at certain limits, such limits to be set with a view to the demand during the past periods. It must consider the money tied up in carrying raw material, cloth, stock, goods in process and finished stock. It must consider the time required to replace that which is withdrawn. It must minimize the lost time factor of the knitting machines. It must insure a sufficiently well-balanced stock in process in the finishing departments to obtain the maximum amount of machine and operator efficiency. It must insure all of these and more. Yet this particular phase of manufacturing in the knitting business receives less attention than any other.

The ordinary mill carries some of its yarn from three to six months before attempting to use same. A large per cent. of cloth is frequently carried over from one season to another due to the prevailing custom of allowing the cutting or finishing overseer to determine the cloth requirements. Following the sequence of operations we find the finishing department benches piled ceiling high with goods in process and so on onto the finished stock with its oversupply of some numbers and shortages on others.

Reducing the queries to figures, how many manufacturers are able to produce $300,000 a year with a maximum yarn stock of ten to twelve thousand dollars? With a maximum cloth stock of eight or ten thousand dollars? With a maximum finished stock that will enable them to turn their money over three or four times a year and eliminate the shortage evil? How many are assured that all goods will be delivered to finished stock one week after cutting? All of these are entirely possible, and, at the same time, insure a sufficiently well-balanced stock of goods in process to eliminate any loss of time on the part of the operators or machines waiting for work.

It is an admitted fact that the knit goods manufacturer is slower in deliveries than any other class of manufacturing. Also, admittedly, the fact that the business is seasonable allows a reasonable exense. There is, however, one underwear concern in this country, dealing with the retailer direct, that has built up a $2,000,000 a year business due almost entirely to the fact that they were able to deliver goods on promised dates and were in this way able to take the business from their competitors. Needless to say, this concern has realized the possibilities of and had adopted scientific production methods. What one manufacturer has accomplished is possible for another.

Next in importance, and just as essential, in order to approach ideal manufacturing conditions, comes the need for incentives to the operators. Local conditions undoubtedly govern this phase of manufacturing to a considerable extent due to labor difficulties in some sections.

There is little need to emphasize to you the importance or value of piece work or bonus method of wage payment. The fact that the piece work method is so widely used throughout the industry proves that you appreciate the advantage of this idea. Very few underwear concerns, however, are at present using wage incentives in all departments of their business.

Let us consider the operations in their natural sequence: The day work wage is common in the Winding Department, yet this operation offers an exceptionally good field for piece work. Here the simple unit of pound may be used. To show the possibilities on this operation I would mention the case of a concern I served some years ago. The winding girls in this plant were receiving four dollars a week. By speeding up the machines, forcing the girls to tend three sides instead of two and installing piece work we obtained a cut in the labor cost ranging from 40 to 80 per cent. and enabled the girls to increase their earnings to seven or eight dollars a week.

Piece work in the knitting department, while common in the hosiery business, is the exception in the underwear. The idea that an increase in poor cloth would follow any speeding-up of operators has apparently prevented the majority of manufacturers from installing an incentive on this operation. By the use, however, of a supplementary bonus scheme for a decrease in poor cloth it is possible to reduce this latter factor to a minimum and at the same time receive a maximum production. I have also found that the ordinary knitting department overseer overlooks the matter of machine speeds. I have found it possible, for instance, to increase the speed of an ordinary latch needle machine, running on medium cloth, from eighteen R. P. M. to thirty-seven R. P. M., and obtain a lower percentage of poor cloth.

The washing and drying has apparently offered prohibitive difficulties owing to the inability to determine an equitable unit on which to base a rate. I have recently served a concern, however, where, by the standardization of bleachers, with a consequent stardardization of time and the installation of a bonus scheme, based on the ratio of one class of goods to another, we were able to produce an average of eight thousand pounds of cloth a week with two men. Prior to the installation of this scheme there were six men in the department. I might say, in passing, that some mechanical changes were necessary in order to accomplish this, but these will be paid for within a few months by the saving in labor and allow a handsome saving subsequent to that time.

The laying out, marking and cutting of cloth with an additional bonus for decrease in waste has proved thoroughly effective when performed by piece work.

Summarizing briefly, the formula for increasing labor efficiency may be expressed in a few words—time and motion study and the standardization of performances.

Before closing I want to say a few words about the general condition of the knit goods industry from a profit or loss point of view. In other words, how does your business compare as a profit-earner with other industries? First, let us consider what a satisfactory return would be. If we were to consult the manufacturer of steel he would tell us that a profit of from 50 to 75 per cent of the gross sales would be satisfactory. This business, however, is hardly a typical industry from a manufacturing point of view.

There are many manufacturers engaged in producing special or patented articles who might make even larger profits than are to be found in the steel business.

The average manufacturer engaged in the manufacture of a staple line, however, considers 12 to 15 per cent on the gross adequate. This under ordinary circumstances, would represent from 16 to 20 per cent of the capital invested.

From this we should deduct the 6 per cent which capital can earn in natural investments, leaving about 12 per cent to be secured in return for the risk which is taken and the extra effort expended by the man who devotes his capital to manufacturing.

Admitting that this would be an adequate return let us compare this with the facts as they exist in your business and your will admit that some action is necessary.

It is a difficult matter to obtain statistics regarding the profits accruing from any given branch of industry as the majority of manufacturers keep this to themselves for obvious reasons. From statistics which are available, however, and our own personal experience has substantiated them to a greater or less extent, we understand that of the 1076 knit goods manufacturers, caitalized over $10,000, in this country, only about fifteen per cent are paying regular dividends. In other words, eighty-five per cent of the knit goods manufacturers are not receiving the 6 per cent which their capital would return were it invested in stocks or bonds.

From this it would seem that the necessity for discovering some means of increasing your profits is a vital one.

As this condition has been caused by unintelligent competition the only way to remove the condition is to correct the cause, and this can only be accomplished by uniform cost-finding methods.

A cartel or combine, embracing all the dyers and finishers of silk and half-silk piece goods in Switzerland, has been formed, similar to the combine of yarn dyers already in existence. The organization will introduce standard prices and terms of credit on July 1st. Agreements have been entered into with the other similar Continental silk dyeing cartels. England is the principal market for Swiss silks.

"The Economy of Distribution as Relates to Sound Credits."

By J. H. TREGOE.

Address Delivered at the 10th Annual Convention and Exhibition of the National Association of Hosiery and Underwear Manufacturers.

There is prominent in all that has been said to you this morning this definite thought—economy and diminution of waste, and now I am going to direct your thoughts for just a few minutes to an element which is not considered usually by the practical man. You have been considering in conventions the questions of style and quality, of cost and of trade-marks, but there is one primary element that has the same effect upon your enterprises as has air upon human life, and that is the purchasing power. I could not venture this morning to give you an idea that would touch upon the practical end of your business, and I merely want to present this element, the purchasing power, which has your enterprise in the same grasp, and surrounds it, as the atmosphere the earth, and that purchasing power is not our money, for our money wealth of $3,800,000,000 would not carry on our domestic commerce. It is not our bank deposits of $22,000,000 resting in the depositories of this nation, for that would not carry on our domestic commerce. It is our credit—that mysterious, unseen element—that affects the success, the progress, of every manufacturer in this convention. When the wheels of your factories are idle, when the workmen are standing around with hungry eyes and hungrier hearts, it is usually because the purchasing power has been affected, the credit system has browen down. I just want you, in considering this subeet, gentlemen, to do a little intensive thinking. We people of these great States have come by our riches with so little effort that beyond contradiction we are to-day the most wasteful people under God's heavens and now comes the time not only for intensive work for the utilization of the backyard, for the raising of that which will sustain, of intensive farming on a large scale, but intensive thinking. When you are considering the hum of your machines, when you are looking upon those people to whom you will dole out their weekly allowance, when you look in your ledger and mark the profit and loss account, remember above all things the element that is affecting it is the credit system. We have every reason to be proud, as a people, of our credit system. No people in the world give as much credit and bestow as much confidence upon one another as do the merchants of this nation. Buyer and seller never meet one another; shipping goods thousands of miles, never expecting to see that buyer, and yet, notwithstanding our commercial morality, I want to say to you to-day, without fear of contradiction that our avoidable bad debts, waste per annum is not less than $200,000,000. There are but few men this morning in this convention who are not paying a greater tax to the bad debts and fire waste of this nation than they will pay under the income tax law, and yet you are doing it unconsciously. The waste of the country is taxed ultimately upon every citizen of the nation, whether that citizen be man, woman or child; and now we want to attack this waste; we want you to consider the economy in production as related to distribution. Business has three elements; first, the need; last, the satisfaction of the need; and midway between the two, the ability to satisfy the need. Eliminate the first and last and you have affected the continuity of business transaction; eliminate the second, and you have destroyed it entirely. Now, as we have physical laboratories for physical tests, why wouldn't it be economic to have laboratories to gauge possible distribution or consumption, so that we can regulate our production? We continue the wheels of industry no matter what the consumptive ability of the nation is. If we do that it means cheapened credit; cheapened credit means bad debt waste, and bad debt waste means higher cost of living to the individual consumer. I am as sure, gentlemen, as I can be that in presenting this thought to you, you are getting a new phase of industry to-day; you are recognizing this perfectly new element that is affecting enterprise, and whilst coming into convention here we know that conditions in this country are subnormal to-day, we are wondering what has happened. I will tell you, in plain, simple words, what has happened; the purchasing power of the nation has been affected, and not only of this nation, but we are responsive to the whole world movement for credit, world-wide, is under a strain to-day. Now, be thoughtful. You are part of a tremendously big and honorable Commonwealth, and when considering the question of economy in distribution and production, bear in mind also the thought of commercial morality, for we can have no higher expression of patriotism, gentlemen, than to stand unitedly for an honest, commercial Commonwealth. We want the business men of this nation never to trade principles for dollars. In the goods you produce, put proper quality and never misrepresent them. In distribution, never strain the buying power or the financial and credit standing of the buyer. Endeavor to maintain the delicate poise between him who needs, him who produces and him who distributes—the science and system of it all. Oh, gentlemen, we are striving to inspire these ideals in our business men and the association I represent is endeavoring to cultivate and develop in our business men this this expression of high ideals, honesty and honor in that which we do, and if we stand by them and maintain them the generations are not far away when America will be the world's model for honest and progressive trading.

NEW INCORPORATIONS.

The National Waist Company, Limited, Montreal. Capital $45,000. To manufacture and deal in ladies' waists, suits, skirts, children's wear, whitewear, costumes, dresses for women and children, both wholesale and retail. Dominion charter.

The Drummond Shirt Co., Limited, Drummondville, Que. Capital $300,000. To take over the Drummond Shirt Co., Limited, and carry on the business of manufacturing, selling, buying and dealing in shirts, collars, haberdashery and clothing. J. A. Gendron, W. A. Molson, George Brackbank, Harry Tucker and C. H. Lalonde, of Drummondville, incorporators. Dominion charter.

Dominion Linens, Limited, Guelph, Ont. Capital $300,000. To take over the business of the Dominion Linen Mills, Limited. Ontario charter.

Mr. A. Hoegger, presiding in Manchester at the annual meeting of the Cotton and Wool Dyers' Association, recently, said the diminution in their trade during the final eight months of the year was about 1,000,000 lbs. of yarn per month below the average. Contrary to anticipation, they had benefited little from the new American tariff, and from the Balkan States there had not been the customary volume of business.

Eastern States Letter

(Special to the Canadian Textile Journal)

Providence, R. I., July 8. — The failure of the great jobbing house of the H. B. Claflin Company of New York, closely followed by the burning of the Naumkeag Steam Cotton Company's plant in the great fire at Salem, Mass., overshadowed everything else that had gone before during the month.

The first mentioned caused a sensation throughout the United States, for the firm was second only to Marshall Field and Company of Chicago in the amount of goods bought from the mills and sold to the dry goods houses throught the country. It is estimated that the liabilities of the company amount to $35,000,000 while the assets are set at $44,000,000. These are characterized by those who are in close touch with the situation as being composed of "quick liabilities and slow assets."

Practically all of the mills in the East were hit by the failure, but the amount of the losses which they will sustain, if there be any losses, will be comparatively small, because most of the mills had all sales guaranteed by the company, and therefore the accounts are secured. It is believed that the losses will be very small, because of the fact that there are ample assets to take care of the acounts that are outstanding.

The mills which had the greatest amount of orders from the failed firm were those owned by B. B. and R. Knight in Rhode Island and Massachusetts. The H. B. Claflin Company was for years, the biggest customer on the Knight's books, and when the crash came the manufacturing company had on hand many orders from the Claflin Company.

All of the mills, however, have found other outlets for their goods, and there has been no seroius effect of the failure among any of the manufacturing plants since the crash came. The ultimate consumer is still buying goods, and Claflin was but a distributer. The ultimate consumer will not buy so many goods as he bought before the crash came, that is certain, but in the meantime, stocks are low, and the goods are needed, therefore the mill owners predict that they will be able to keep the plants going on their present schedules until the new cotton year arrives. In this opinion they have the support of nearly all of the selling agents in New York and elsewhere.

President William M. Wood, of the American Woolen Company sailed for Europe on June 20th, and will study manufacturing conditions abroad at first hand. He was accompanied by Moses Shuttleworth, agent of

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the Washington Mills of the company, and by Vaughn Jealous, wool buyer for all of the mills of the company.

President Wood has maintained since the beginning of the year that it was possible to sell a certain grade of goods in England and other countries of Europe, and to that end he opened a London office sometime since. This office has done some business and it is the intention of the head of the largest woolen and worsted company in the world to see what is needed to make the sales force over there effective.

This trip abroad is the first that President Wood has made in some years, and it is believed in textile circles here that he will come back loaded with information that will be of use to his company in fighting the competition that it is getting at this time.

The Bureau of Foreign and Domestic Commerce of the United States Government has organized an exhibit of woolens and worsteds, including much useful information about their manufacture and their selling price, and is sending it about the country for the purpose of showing the manufacturers and others what foreign countries are doing in these lines. The exhibit opened on June 26 at Boston, and they will stay there until July 9. They will then be shown in Lawrence, Mass., Lowell, Mass., Worcester, Mass., Philadelphia, Passaic, N. J., New York city, and Chicago. They will be on exhibition until the middle of September. Providence is making an effort to secure the samples for exhibition but it is not known at this time whether or not the effort will meet with success.

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The past month has been the time when numerous graduates of the textile schools of the country are sending out their announcements that they are ready to take care of all the vexing mill problems which have bothered the regular millmen for years. The Philadelphia Textile School, the New Bedford Textile School, The Lowell Textile School, the Bradford-Durfee Textile School of Fall River and the textile school of the Rhode Island School of Design have all added their quota to the already large list of competent mill superintendents, designers and overseers, and have closed for another year.

At each of the schools banquets were held, and the graduates of former years were back in large numbers to tell about their experiences in the world, bucking against the men who had not been in school for many years. The largest number of graduates from any one school were sent out by the Philadelphia institution.

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The third quarterly statement of the National Association of Wool Manufacturers issued as of June 1 shows that throughout this country there is less machinery stopped than there was on Dec. 1. According to the figures of the report, the percentage idle is as follows:

Percent of idle machines to total.

	June 1.	Dec. 1.
Looms wider than 50in. reed space	24.6	24.9
Looms less than 50 in. reed space . .	25.	27.2
Woolen cards, sets	19.4	21.4
Worsted combs	15.5	23.1
Woolen spinning spindles	25.8	22.7
Worsted spinning spindles	18.1	26.

The various mills are busy at this time turning out the samples that will be shown for Spring, 1915, and it is said that the American Woolen Company will open about July 15th, with the other factors following closely. This will be one of the latest openings in years, and the reason is said to be that an attempt is to be made to keep out the imported fabrics as they were kept out during the past season.

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To combat the evil of the boll weevil the Government is making experiments looking to the shortening of the cotton season by an appreciable degree. The details of this system have been published in a booklet issued by the Department of Agriculture, and this booklet is being sent to all of these cotton planters who wish to have it. The short season will do more than combat the boll weevil, for it will help all of those farmers who are situated in counties which have severe droughts.

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An important measure which will eventually legislate out of existence the gambling which has been done in cotton futures passed the House of Representatives on June 29. This measure is known as the Lever bill, and it is designed to regulate cotton exchanges through the exercise of the taxing power. A like bill has already passed the Senate, and the proposition is now thrown into a conference committee of the two Houses. The bill has the support of the Southern leaders, who have been conducting an agitation against the cotton exchanges for many years past.

The bill requires exchanges to accept Government established standards in grade and levies a tax of 1 per cent. a pound on all contracts for future sales. Contracts that do not comply with the Government standards are each to be taxed $500. Advocates of the bill say that this provision is prohibitive, and that it will do away with all futures gambling.

Various rules are laid down for the cotton exchanges and they are required, among other things, to keep open accounts of all sales, whether for actual delivery or in futures. These accounts are subject to examination of the officers who are charged with the collection of the taxes. Sales for delivery must be reported, despite the fact that no tax is levied on this kind of sales.

The penalties attached to the bill for violations include fines ranging from $100 to $2,000, and any natural person may be imprisoned for a term of not less than 60 days nor more than three years at the discretion of the court. The bill also provides for the standardization of uplands and Gulf cottons separately. It is expected that Congress will pass a law containing the best features of both bills before adjournment.

The United States Wool Market.

The depression that exists in nearly every market in this country cannot seem to affect the wool markets, and the buying goes steadily on, with prices hitting nothing but the high spots. During the past month the shipments have been averaging about 5,000,000 pounds of wool a week, this exceeding the shipments of a year ago by about 100 per cent.

The price question on wools is interesting everybody, and there is no man connected with the trade who will venture a prediction as to when the upward tendency will cease, or what the top price will be when the final heights are reached.

One feature of the past month has been the fact that the domestic and the foreign wools have reached about the same level in point of sales, and throughout the month they have held to that level fairly well. Total receipts at Boston since Jan. 1, have been about 76,000,000 pounds of domestic wools and about 111,000,000 pounds of foreign wools.

Probably the non-resistance to the increasing price of foreign wools accounts in a large degree for the great amount of business that is being done. During the week ending June 27, the sales of domestic wools reached a total of 150,000 pounds of Utah at 55 to 58 cents; 100,000 pounds of Soda Springs at 22½ to 24 cents in the grease, or 57 to 58½ cents scoured; 100,000 pounds of Colorado, at 22 to 22½ cents in the grease or 55 to 58 cents clean; 75,000 pounds of Wyoming from 22½ cents to 24 cents; 100,000 pounds of Oregon at 56 to 60 cents, clean; 80,000 Colorado 57 to 60 cents scoured and 90,000 pounds of Wyoming at an estimated cost, clean, of 55 to 57 cents.

The total receipts at Boston for the same week were: domestic 5,106,091; foreign 501,270. This compares with 1913 as follows: domestic 3,297,480; foreign 440,990. The total shipments of wool during that week amounted to 5,019,554 as against 2,162,508 in the previous year.

The rush of the previous month to get all of the wool possible in the shortest possible time continued throughout the past month, and the prices held up to their former levels, and in many cases went to still higher marks. During the first part of the month the reports were that renewed buying had been the business of the day, and that the highest prices of the season were paid for the clips.

Many of those in touch with the wool market thought that the prices paid for some of the clips were far too high, but this had no effect on the buyers who were determined to secure all of the wool possible no matter what it cost them.

Fleece wools also brought high prices throughout the month, and the sales of these wools were large in the aggregate. The majority of the sales were made around 25 to 27 cents, and when the price reached upward to 30 cents there was a slight falling off in the haste which buyers displayed in coming forward, and fleeces began to drag for the time being.

Woolen and worsted mills have purchased freely during the month of foreign wools. Transfers were estimated as being close to 11,000,000 pounds during that, this including both low and medium grades. Crossbreds sold well throughout the month, several thousands of bales being disposed of at one sale, the price being 66 to 67 cents for 64s and 60 to 62 cents for 58—60s.

The territory wools were pretty well cleaned up by the middle of the month, and were to be found either in the hands of the dealers or those of the manufacturers. Several dealers bought New Mexico at a scoured basis of close to 60 cents, which is called excessive by most of the buyers.

The close of June found a stronger feeling in the wool markets than at any other time during the month. Although many efforts had been made during the month to depress the markets to a more normal level, they had not met with success, and the trend was still upward for all wanted wools. The advance of from one-half to one cent a pound for South American 40s—44s did not hold back the manufacturers to any great extent, and it was reported that they were taken freely of these wools at the advanced prices.

The bulk of the wools now remaining in the hands of the growers are either under option or already contracted for. Recent advices from Utah, Wyoming, Idaho, New Mexico, Colorado, Arizona and Texas, indicate that most of the desirable wools have been covered up, and that what remains is not of good quality.

Trading was brisk throughout the month in the Boston market but Philadelphia was quiet. The small stocks which were in the hands of the dealers in Philadelphia account for the quietness of the trade.

Four carloads of machinery for extracting fibre from the flax plant has recently been shipped from England to Western Canada. A large factory has been established at Rosetown, Sask., capable of producing 2,000 tons of fibre per annum, which is used as binding material with gypsum for the manufacture of plaster board.

Our Old Country Letter

(From Our Special Correspondent).

London, June 25, 1914.

Since the "Canadian Textile Journal" was last published, I have been on a visit to Blackpool—the favorite watering resort in the north of England for Lancashire mill hands— attending the ninth international Congress of Textile Workers. The proceedings lasted a little over one week and forty-four of the delegates were English, fifteen were from Germany, nine from Austria, seven from Belgium, three from Holland, and the rest from Canada, America, France, Switzerland, Denmark, Hungary and Sweden. Altogether, the Congress represented societies with a total membership of 510,363. The Blackpool municipal council gave the Congressmen a civic reception, after which the president (Mr. W. Marsland) delivered his address. A long discussion also took place on the possibility of doing something to regularize the supply of raw cotton and to prevent it from being subject to speculation, a discussion which did not lead, however, to any definite resolution on the part of the Congress. Mr. Tom Shaw, the secretary, in his report stated that in England the question of fines imposed on workers in mills, shuttle kissing, and artificial humidity in weaving sheds had been very much under notice and there was hope that fines in the mills would soon be abolished by law. The report was fully discussed and the question of adequate supplies of cotton sprung up and an inquiry was demanded. It was pointed out that the inquiry would also have to apply to wool and jute, as these inadequate supplies injured workers. A congress man pointed out that the inquiry was a matter for the States of the whole world. It would have to be an inquiry into how the raw materials of the world were manipulated. As long as the raw materials were in the hands of private persons there was bound to be speculation and gambling. It was agreed eventually that the International Committee might consider the question of inadequate supplies of raw materials.

The next important question under review was the employment of children of less than fourteen years old in mills should be made unlawful and a resolution supporting the subject was proposed and carried, the English delegates voting against it. Mr. Ben Turner, president of the Yorkshire Woolen Workers, supported the resolution in a decided speech and said half time had been abolished in the woolen trade and only existed in the Yorkshire worsted and cotton mills at Halifax and Bradford, while the wages paid were the lowest in Yorkshire. He was in favor of raising the age to 14 years. The education of the child ought to be, he thought, between 10 years and 14 years of age and trade continuation schools, like what was in Germany, were necessary. All the foreign delegates spoke of the injurious effects of child labor in foreign mills. All the woolen trade delegates voted for the resolution, but Mr. J. Cross (Lancashire Weavers) said the child labor question would be raised at the annual meeting of the United Textile Workers' Association in a few weeks in the hope that the debate would have made some impression upon their people. Diplomacy and armaments were next talked about, as was also the shuttle kissing problem, otherwise the mouth-threading of shuttles, which the Congress contended should be abolished for the protection of mill workers' health and to avoid accidents. A resolution demanding an international law on the matter was passed. The proceedings closed on Saturday, June 13th, and Herr Rossell (Germany), in proposing a vote of thanks to the English delegates for their kindness, said that all the Continental masters had yet a great deal to learn from their English brethren. The Congress meets in 1917 at Lyons.

While the workers were meeting in Blackpool the International Cotton Federation members were sitting in Paris, and before leaving for the French capital, the president, Sir Charles Macara, of Manchester, had an interview with the German, American, and other foreign Ambassadors on the question of cotton. He also had dinner with Mr. A. S. Terrill, of New York and Chicago, who has done a great deal in carrying out the recommendations of the International Cotton Congress as regards the growing, packing and marketing of American cotton. Sir Charles Macara said in regard to his interview with the American Ambassador, that the United States not only grew five-eights of the crop of the world, but were, after England, the owners of the largest quantity of cotton-spinning machinery. The Ambassador, he added, fully realized the closer co-operation of growers and spinners of cotton and associated himself heartily with the efforts that were in progress for adding the States to the nations who were banded together in the International Federation.

Mr. H. A. Newton, of the English Flannelette Association, recently read a paper before the Drapers Chamber of Trade, in the course of which he pointed out that notwithstanding all the legislation introduced and the misdescriptions applied to it, flannelette of good quality was much safer against fire or accident than calico, longcloths, muslin, nainsook, or voile. This had been thoroughly demonstrated at the testing house of the Manchester Chamber of Commerce. There was no cotton fabric which would stand the government test for inflammability after all chemicals had been removed by washing and ironing, and no more danger attached to the use of good flannelette than to any other fabric made from cotton. The prejudice against flannelette was promulgated to push the sale of other fabrics.

The Trade Board is holding an inquiry into the proposal to have a British Empire trade mark, but the proceedings will not be finished for some time to come. Nearly all the Chambers of Commerce are against the proposal, as it is feared it would greatly interfere with the trade marks of merchants and manufacturers whose particular goods are noted by marks. It is fully anticipated the proposal will not be accepted.

Hewson's Still Idle

Affairs Still in Hands of Committee and No Decision Has Been Reached.

The Halifax correspondent of the Journal of Commerce writes, under date of June 29, as follows:

"The Hewson Pure Wool Textiles, Limited, whose mills are located in Amherst and whose secrities are largely held in Nova Scotia, is still inoperative and there are no signs of a resumption.

"The mill has been closed down for several months following the discovery of the company's financial difficulties. The shareholders appointed a committee to inquire into the management and brought in a report censuring the manager and proposing a plan of reorganization which would wipe out the common stock, turn the preferred shares into common, make the bonds preferred stock and give precedence to a proposed new issue of bonds for $150,000.

"So far as known no action has been taken on this report. It is stated that a certain Halifax capitalist agreed to take $100.000 in bonds if others would put up $50,000, but no move to supply the smaller amount appears to have been made and meanwhile there is looming up a big law suit over the affairs. George E. Corbett, of Annapolis, has collected a fund to defray the expenses of the action associated with a shareholder from Newfoundland and one from Prince Edward Island.

"Mr. Corbett has prepared writs which will be issued in a few days claiming from the directors, on behalf of themselves and of the other preferred shareholders, a return of the moneys they invested in the preferred stock, which amounts to $250,000. Corbett claims that the representations of directors make the latter liable for the money in question and he says he will take the case to the highest court in the fight to obtain what he calls "restitution" from the directors.

"The affairs of the Hewson Company were ventilated at the recent session of the legislature by Mr. Carter, one of the members for Cumberland, but no action was taken in the House. Corbett asserts that he will stop at no half measures but will push the case to the extreme limit.

"A great deal of feeling has been aroused by the embarrassment of the Hewson Company. In the Annapolis Valley particularly the secrities of the Company, in its bonds and preferred shares, are very freely held, and while the bulk of the shareholders are taking no open part in Mr. Corbett's proceedings, what he is doing is being watched with eager interest. Personally, Mr. Corbett's holdings are said not to be very large. He obtained a considerable sum from a number of the security holders to enable him to proceed and if he is successful non-subsribers as well as those who contributed will benefit.

"The cessation of work by the company is an unpleasant thing for the industrial life of Amherst and of this province, as well as being a somewhat severe blow to those who were willing in the hope of profit, to help along a provincial manufacturing industry. There will be sincere rejoicing should the company get out of its present position, of which, however, there is no immediate prospect"

The Turkish Rug Industry

Turkish rugs are made at some twenty-six centres scattered over Asiatic Turkey. Excepting that the yarn is now machine-spun, none but hand labor enters into the various operations connected with their manufacture. In the olden times it was purely a home industry, and special designs were handed down from generation to generation as precious family heirlooms. These designs are still used by numerous families in various centres; but the requirements of modern markets have caused carpet-making to be systematized so that carpets are now usually made to order from designs which are either copies of antique originals or else new conceptions worked out by European designers.

Among the best known centres of the rug industry the following may be mentioned: Oushak, which produces a heavy carpet, often with a "Turkey red" ground; this carpet is very popular in the United Kingdom, and is usually known as the "Smyrna" carpet. Demirdji and Ghiordes also produce heavy carpets, but they are usually woven in lighter colors, and are especially in demand in Continental markets. Sivas and Konia produce the finest carpets, i. e., those with the greatest number of knots to the square inch. Coula, Melas, Sparta and Kutahia are noted for the finer weaves in classical Oriental designs, both Persian and Anatolian. Some districts produce two or three grades of carpets, but at Sivas the finest carpets are exclusively made.

Six of the largest rug manufacturing and yarn spinning firms in Asia Minor combined in 1907, and a powerful company, with a capital of over £1,000,000, now to a large extent controls the production of rugs in Anatolia. There are also two important private firms, as well as numerous native manfacturers who deal mostly in the Oushak qualities.

The exports of rugs from Turkey have increased very rapidly during recent years, the value of the exports in 1910 from Smyrna being £730,000, of which the United Kingdom is credited with £530,000 worth, a large proportion of which was transhipped to other countries. It is noteworthy that, according to statistics, the increase is greatest in the cheaper grades.

The industry will in all likelihood remain firmly established in Turkey. In the first place, labor, which is nearly all female, is likely to remain cheap for many years to come in Anatolia, and hand-made rugs with hundreds of thousands of knots to the square yard demand cheap labor. Even a skilled weaver cannot earn more than 2s. 6d. a day in Anatolia, and the average earnings are about 1s. a day.

Sentiment also plays a large part in the popularity of the Turkey rug, and even perfect "Turkey rugs" if made outside Anatolia would be considered spurious. Indded, "perfect" rugs are not aimed at. The Moslem idea that it is offensive to Allah to claim perfection for any human handiwork found its expression in the ancient carpets by some small defect being always voluntarily introduced. Nowadays, too, weavers are discouraged in many cases from producing rugs of so mathematically accurate a design that they would be indistinguishable from machine-made carpets. The associations of artistic romance and ancient beliefs that attach to the Turkey carpet make it unlikely that its manufacture could be started in western countries with success.

In addition, it is evident that the development reached in the organization of the Turkey rug industry in Anatolia further militates against the likelihood of the premier industry of the Ottoman Empire being faced with a rival manufacture elsewhere. Labor long trained in rug-making, native wool and spinning factories in the country, the accumulated knowledge of generations—all these tend to make the Turkey carpet industry a factor of importance in the commercial future of Turkey. Temporary crisis may adversely affect Anatolia in these coming years, but it may be safely assumed that the carpet industry is based on a sound and lasting foundation.

The Niagara Silk Co., Ltd., Brantford, have taken out letters patent to manufacture silk goods. The capital is $150,000. The incorporators are A. J. Baker and J. T. Shanahan, of Buffalo, N. Y.; Fred Mann, Joseph Ruddy and G. S. Matthews, of Brantford, Ont. Work has commenced on the erection of the building, to be 3-storey, 165 ft. by 52 ft.

Our Bradford Letter

(Special to the Canadian Textile Journal)

Bradford, June 30th, 1914.—A general improvement in the cloth trade of the heavy woollen district about Dewsbury cannot be reported, though a few houses are busy with small orders that arrived in the course of the past two weeks. Stout wearing tweeds, quiet in design, are mostly favored by buyers acting for dealers in Canada and Australia, also royal and navy blue serges. Something is being done in costume cloths for ladies, and it is expected that in the near future this branch will be fairly well patronised. With the United States Dewsbury and Batley firms are doing fairly well and there is a confident belief amongst the manufacturers that the sound cheap cloths supplied to the States will establish themselves as they have done with Canada.

This is a point Canadians should not overlook, viz., cheap tweeds and cheap cloths capable of standing a twelve months' wear and tear. In Ossett the cloth trade is dull, but there is a better feeling at Morley. Little business in overcoatings is being transacted.

Birstall and Ravensthorpe manufacturers are fairly active with army and police cloths, but in carpets things are dull on home and export account with the States and Canada. In the Spen Valley, mills are busy but not to be compared with the rush this time last year. All the mill owners are complaining very bitterly of the high rates they have to pay for wool and consequently ordinary prices are very firm. In rugs there is not much doing, but the blanket market of Earlsheaton, Mirfield and Dewsbury are a little busier. The trade, however, is not up to its usual standard of briskness and Canadian orders amount to very little. Liversedge flannel works, though not fully employed in all departments, are improving their output. Neither are the dyers or finishers fully employed.

At Leeds, the Canadian trade, I am informed on very good authority, has lately caused bitter disappointments and dullness, with the result that there is a quieter tone. No doubt the high prices of goods has something to do with the quiet tone and buyers are ordering only what they absolutely need. There is only a moderate demand for tweeds and serges of lower qualities, but high priced goods such as worsteds are very slow of sale. Orders appear to be fewer and smaller for future delivery. The woollen merchants are fairly busy, but say they could do with more. Manufacturing concerns at Hawick, with the exception of about three, are practically idle and complaints are being made that orders for the winter season are not coming in at all well. The few mills who are better off report that they have sufficient to keep the machinery going till they start on next season's goods. The prospects for next season are said to be fair as first samples are being well taken up. Spinners are well employed, but there is no push for delivery of yarns. Dyers are slack. Hosiery makers have plenty of work, but not quite so busy as they have been.

At Huddersfield there is no improvement in business which proceeds on quiet lines. It cannot be said that there is anything like depression, but compared to the volume of trade at the corresponding period of lest year, I am informed there is a considerable falling off. Evidence of inactivity is more marked in the worsted than in the tweed department, though all classes of manufacturers are handicapped by the reluctance of buyers to place contracts for large bulk for forward delivery and the situation arising out of the firmness of wool sales causes no little perplexity. The home demand for worsteds is poor, owing to the high prices, but if prices were lower there is no doubt trade would be more brisk. In tweeds and serges the home trade is more active.

The Canadian demand for tweeds is slower than usual and the same may be said in regard to serges. Fine worsteds are selling well with Americans and on the Continent. In the worsted mills machinery is not too well employed and in many cases holidays have had to be extended for the employees. Next spring's demand for ready made clothing is active and several houses have large orders on hand.

As wool has continued to advance in price, a little more life is noticeable in the flannel trade of Rochdale. Ordinarily flannel prices have been slow in following the upward movement of wool, but manufacturers have now been compelled to raise their prices of flannel for new orders. Indeed, they are in a strong position to advance prices, for new production is more limited than it was a few years ago. They are executing contracts, and for years stock lots have not been thrown on the market to disturb trade—which shows in this respect that the business is sound. From Canada there is a fair demand and the trade with the Dominion keeps steady. In the hosiery trade at Leicester, while some manufacturers complain of a check in the demand, a fair average trade is being done all round and there are signs of improvement in the Canadian and State orders received.

In the Lancashire weaving and spinning mills trade is not too brisk, while the linen factories at Barnsley, Belfast and Londonderry report an improvement, the medium grade goods particularly moving off very quickly.

IN DEFENSE OF SHODDY AND WOOL BY-PRODUCTS.

The National Association of Wool Fibre Manufacturers of the United States have recently issued a statement as an explanation and a defense of shoddy and other wool by-products. All are familiar with the many forms in which wool is now used for clothing, and the variety of other purposes. In explanation of the actual wool available for these products the statement says, in part:

"The raw material for these products comes originally from the sheep, and the sheep of all countries yield approximately 1,468,000,000 pounds(scoured weight) of wool each year. This in the aggregate is a large quantity, but there is a loss of about 3 per cent in manufacturing scoured wool into cloth, so that the wool grown throughout the world each year would produce 1,027,600,000 pounds of wool cloth ready to be made into clothing. This also is a large quantity, but let us consider how many there are to use it. The people living outside of the tropics number approximately 1,169,000,000, and for them wool covering is a necessity that grows greater the farther north or south they live, all of these 1,169,000,000 people must have the protection of wool, regardless of age, sex, or occupation. If the 1,027,600,000 pounds of cloth made from the annual production of wool were divided equally among the people living outside the tropics, each person would receive 14 ounces per year, equal to a light-weight cloth 44 inches square, about enough to make a respectable girdle."

Mill and General Textile News

Messrs. Thos. Waterhouse & Co., Ltd., Ingersoll, Ont., are adding 5 new knitting machines and several finishing machines for the manufacture of fine underwear. The machines are from Scott and Williams and Wildman Manufacturing Co.

Chas. H. Porter, late superintendent of No. 1 mill, Paris, Ont., is now with Julius Kayser & Co., Brooklyn, N. Y., in a similar capacity.

It is expected that the new plant of the Arnprior Felt Co., at Arnprior, Ont., will be completed about the end of August. The building is 3 storeys, 105 ft. by 50 ft., with picker room and store house outside. The new plant will be equipped with 3 sets cards and other equipment for the manufacture of pulp and paper makers' felts. The company is at present manufacturing at Galetta, Ont., and, we understand, are very busy.

The plant of the Lachute Knitting Co., Lachute, Que., was burned to the ground on June 5. The total loss is estimated at $40,000, of which $25,000 is covered by insurance. Of late this plant has been engaged almost entirely in the manufacture of paper makers' felts. The company has not yet decided to rebuild.

T. H. Warren has lately taken charge of the spinning department at T. H. Taylor & Co., Chatham, Ont.

Messrs. Horn Bros. Woolen Co., Ltd., Lindsay, Ont., have received permission to increase their capital stock from $100,000 to $195,000.

The Oxford Worster & Linen Manufacturing Company of Dorchester, N. B., is reported taken over by a group of outside capitalists, acting through the Nova Scotia Trust Company. The intention of the new management is to increase the plant and extend the sales area of the company throughout the Dominion.

Our Hamilton correspondent writes, under date of July 9th, that "the final steps toward the merging of the local concerns, the Eagle Knitting Company and the Eagle Spinning Mills, Limited, with the Penman Company of Paris, and several other knitting concerns, will be taken in the very near future, it is said. Colonel J. R. Moodie, president and joint proprietor, with his three sons, of the two local firms, stated to your correspondent to-day that he was not as yet ready to make any announcement. He would not deny, however, that negotiations tending toward the merger are being carried on.

Mr. C. B. Gordon, president of Penman's, Ltd., when seen regarding the report, stated that that company did not want to form any new amalgamation and expressed himself as satisfied with present conditions. No denial to the report has yet been made.

The tariff changes announced in the Finance Minister's budget on April 6 last, in so far as they involve increased duties, became operative throughout Canada on July 2.

The Independent Silk Co., Ltd., with headquarters at Montreal, Que., have taken out a Dominion charter to carry on business as silk manufacturers, dyers and merchants. The capital is $100,000.

The binder twine factory at Walkerton, Ont., wh[ich] has been closed for some time, will resume operat[io]ns this month.

Halifax reports state that certain interests th[e]re have offered to put up $100,000 on a new bond issue [fo]r the Hewson Pure Wool Textile, Ltd., of Amherst, N[.S.], if Amherst and other people furnish $50,000. [Th]is would become the premier security of the re-organ[ize]d company, the present bonds and preferred stock be[in]g each pushed downwards and the common stock wi[pe]d out altogether. In the meantime there is no sign [of] a move to accept the $100,000 offer from Halifax.

The death occurred in Regina on the 7th inst. [of] Arthur Bates, a former superintendent of the Stormo[n]t Mill, Canadian Cottons, Limited, Cornwall, Ont., a[nd] later of the Cornwall and York Cotton Mills at [St.] John, N.B.

Trade Inquiries

The names of the firms making these inquiries, w[ith] their addresses, can be obtained only by those espe[ci]ally interested in the respective commodities upon a[p]plication to: "The Inquiries Branch, the Departme[nt] of Trade and Commerce, Ottawa," or the Secretary [of] the Canadian Manufacturers' Association, Toronto, [or] The Secretary of the Board of Trade at London, T[o]ronto, Hamilton, Kingston, Brandon, Halifax, Montre[al], St. John, Sherbrooke, Vancouver, Victoria, Winnipe[g], Calgary, Saskatoon, and Chambre de Commerce [of] Montreal. Please Quote the Reference Number whe[n] requesting Addresses.

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506. **Binder twine.**—A South African importer ask[s] for samples and prices on Canadian-made binder twin[e].

508. **Duck.**—A South African importer makes i[n]quiry for samples and prices of Canadian-made duc[k] for tent making.

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529. Overalls.—Several South African importe[rs] are prepared to consider quotations on overalls; sa[m]ples of cloths and illustrations requested. Prices mu[st] be f.o.b. Montreal or St. John.

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530. **Overalls.**—Several South African importers ar[e] prepared to consider quotations on overalls; sampl[es] of cloth and illustrations requested. Prices must b[e] f.o.b. Montreal or St. John.

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532. **Shirts.**—Several South African importers ar[e] prepared to consider quotations on working skirts, Ox[]ford cloths, blue and black striped denims. Samples o[f] cloth and illustrations of shirts required. Prices mus[t] be f.o.b. Montreal or St. John.

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533. **Underwear.**—Several South African importer[s] are prepared to consider samples of Canadian fleece[d] underwear. Prices must be f.o.b. Montreal or St. John. Samples and illustrations requested.

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534. **Underwear, fleeced.**—Several South African importers are prepared to consider samples of Canadian fleeced underwear. Prices must be f.o.b Montreal or St. John. Samples and illustrations requested.

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535. **Duck.**—A South African importer asks for samples and prices on Canadian duck for tent making.

THE MARKETS

THE WOOL MARKET.

There is practically no change to note in the condition of the market here since last month. The demand from the mills has been strictly hand-to-mouth and outside the buying done from the farmers and local dealers very little business has passed. The Ontario clip is about all marketed, being held in dealers' hands. Several good shipments were made during the month to United States buyers, who, it is said, will take up most of this year's clip, but of late the demand from that quarter has fallen off somewhat. Dealers are confident, however, and prices are holding firm.

The fourth series of Colonial sales opened in London on July 7 showed an advance in the early sales of 5 to 7½ per cent. on merinos and fine crossbreds. Selections generally have not been equal to last series, but prices even for poor selections are unchanged on the low end. Latest cables state that greasy merinos and medium crossbreds are bringing 5 per cent. over the May series and that opening prices on good selections are firmly maintained.

The net quantity bales available for this series totals 146,500, of which 106,700 bales are New Zealand, for which the demand both from the Home Trade and America has been very active. Sales during the past few days have been chiefly in sellers' favor.

BRITISH WOOL.

(Special to the Canadian Textile Journal).

London, June 30, 1914.

British wool is firmer and there is no disposition on the part of sellers to grant the slightest concession to buyers. This state of affairs has existed ever since the last colonial sales, with the result that manufacturers in most cases have had to raise prices to a higher level in order to meet the increased cost of production. These prices are materially affecting trade. English wools are also moving slowly, and with the advent of the new clip everybody seems to be letting things have a rest. Buyers are of the opinion that English wool should be purchased at two cents less than the price paid last if it is to be of any use to-day. So far Irish wool has been secured at one cent below last year's prices, but the supply is somewhat limited this year. Business in tops is quiet as regards merinos and crossbreds, and the same may be said of the yarn trade. Botany spinners are complaining of the slowness of trade and the reluctance on the part of their custimers to take up contracts.

BRADFORD WOOL MARKET.

(Special to the Canadian Textile Journal).

Bradford, June 30, 1914.

The raw material is still ruling the situation at Bradford and topmakers who can sell wool are able to do more satisfactory business than turning out the combed article. Fine tops are being sold in small quantities and this also applies to the raw material. All quotations may be said to be unchanged, though sales are stated to have been put through at the fullest price current in the market. Merinos of all sorts are in a very strong and firm position, and so far as the spinning trade is concerned, this also is better than crossbreds, for the largest amount of work which spinners have in hand is for fine yarns, such as are used for the best quality fabrics. Crossbred tops are steady in prices, but business is limited so that it is virtually impossible to test prices. Medium descriptions are still firm and sellers will not accede to the low offers of buyers on any account. Cape wool and tops are exceedingly dear, partly for the reason that this class of wool is somewhat scarce. The American demand is moving further and further down the scale owing to the high quotations and very little is also being done with Canada. There is a very fair enquiry for crossbred wool for scouring. The persistent inquiries for low class wools is gradually strengthening the hands of the topmakers, but concessions they will not grant and are not likely to do so for some time to come. Indeed, the tendency is upwards.

English wools at Bradford are moving very slowly, owing to the fact that users are unwilling to come up to the level of prices asked. Quotations are steady. Fleece wools are going on a high basis, while Irish wool in some cases has gone at one cent. below last year's prices.

In Mohair some buying has been done, both in Turkey and Cape, but the best demand still continues to be for the Turkey sorts on account of prices taking an easier turn a couple of weeks ago. Generally speaking, users of wool are testing the sellers daily to see if there is a likelihood of any particular description to be obtained at a lower level and this is the state of affairs that has been going on since the London sales. Business is most unsatisfactory in the wool market, but this may be attributable to two causes, viz., high prices and dullness in the principal manufacturing centres.

Alpaca firsts are going at about 35½ cents to 36 cents, while inferiors are exchanging hands at full prices.

DUNDEE JUTE.

(Special to the Canadian Textile Jorunal).

Dundee, July 1.

During the past week or two there has been great depreciation in the Dundee jute market. Fall after fall has been recorded in the price of raw material, with spinners disinclined to make a move. First marks for August shipment are going at £26, but very little business has been done. Spot jute has been affected by the collapses in new crop prices and first marks in warehouse were offered at £31 10s. and £32. Hessians in 10 oz. 40in. are offered at 19s. 9d c.i.f. Buenos Ayres July-September, and bids at 19s. 6d. receive due consideration. All prices have been dislocated and owing to dullness very little has been tested in any section—in fact, all goods have been depreciating in value and actual limits were quite unknown. Heavy goods are similarly situated. Common 8lb. cops at 57 cents have been nominal, while the most that can be expected for spools is 57 cents to 58 cents. Raw jute holds the position as regards the resumption of business and the market is consequently waiting. Since the beginning of January Hessians have dropped from 7 cents to 7½ cents. Though the jute supply at this centre is 300,000 bales less at present compared with last year, there is little or no request for material, hence the reduction in prices. Four months have still to go before the importation of jute can be commenced in quantity. So far no price of importance has been mentioned for new crop Daisee, which, in view of last season's crop failure, is regarded with more than usual concern. Prices are now first marks, £31 June, £32 spot; first marks, £26 red SCC-B-c. grade; £24 15s. August.

At London the market has had a quiet and depressed appearance during the past month. Values for all positions have receded, but more particularly for New Crop, which have declined about 60s. per ton on reports of satisfactory growing conditions and some Calcutta selling pressure. Native First marks August shipment are offered at £28 15s. Present crop values show a decline of about 20s. per ton from opening rates, but values are more nominal than real in the almost total absence of business. "Native Firsts" for shipment are quoted at £32 5s., on spot at £32 10s. Medium grade top numbers sold spot Hamburg £29 5s. Daccas assortment £32 5s. Lower qualities entirely neglected.

The Hamilton Industrial Exposition

The Hamilton Industrial Exposition which was opened in the armories here Monday morning, July 6th by the lieutenant-governor, Sir John Gibson, and continued for two weeks, was not as great a success from point of numbers as the exposition held during Centennial week one year ago. This was accounted for because of the big iron and steel companies having made no entries, also a falling off of entries by the Textile manufacturers.

The large hall of the armories was profusely decorated with flags and bunting, intermingled with which was hundreds of prettily colored electric lights single and in groups, all of which were turned on at 11 o'clock opening morning when Sir John Gibson, accompanied by Mayor Allan, opened the exposition.

At the exposition held one year ago, nearly a dozen textile manufacturing concerns of this city were prominent among the textile manufacturing concerns of this city were prominent among the exhibits. This year, however, only two textile concerns was represented, and this falling off was one of the regretable features, as the textile exhibit of last year, was the outstanding feature of the exhibition.

The two textile firms represented this year were the Hamilton Cotton Company, and the G. D. Membery and Son, Company of Hamilton, both of which had exhibits of their goods which attracted no small amount of attention and favorable comment. Especially was this the case with the exhibit of the Hamilton Cotton Company. Their exhibit consisted of elastics, colored twines, bindings, sash cords, rope, lamp wicks, garter elastics in various colors, girth wicks, chenile curtains and covers, cottonades, and duckings, tennis marking sets, fancy bell cords, hose supporters, fancy yarns, etc. The entire arrangement of the booth was very prettily done. W. H. Shipman in charge

The G. D. Membery and Son exhibit, consisted of a neat and large display of bedding, pillows, mattresses, cushions, etc. which lines this company make a special feature of in connection with their factory here. One of the features of this exhibit which attracted considerable attention was the special hospital mattress, so designed by means of straps as to allow a patient to be carried without the use of a stretcher with the greatest of comfort and ease. E. Carpenter was in charge of the exhibit, and was kept very busy throughout the entire two weeks because of the large crowds which visited this booth.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, AUGUST, 1914 **No. 8**

Effect of War on Textile Industry in Canada

The great crisis that is now confronting the world will undoubtedly have a far-reaching effect on all lines of industry and commerce in Canada. We are virtually at war along with the Mother Country and, although there is not much danger that this country will be directly affected by invasion, we will feel the effects of the war in a corresponding degree to the deterrent effect upon the great industrial countries of the world directly engaged in the conflict. The effect upon the textile industry will be far-reaching.

We import something like fifty per cent. of the cotton goods, eighty per cent. of the woolen and worsted goods, thirty per cent. of the knit goods, ninety per cent. of the silk goods, and practically all of the linen and jute material consumed each year, and the great proportion of these imports comes from those countries engaged in the present conflict. Of course, Great Britain is the principal source of supply and, so long as commerce is not interfered with, our trade with that country will be little affected, except in so far as the high insurance rates and war risks act as preventatives, but undoubtedly considerable portion of the goods that would otherwise have been purchased abroad will have to be produced by domestic mills.

Buyers from all the large cutting-up and jobbing houses in the country have been in Great Britain and Europe during the past month or so, making purchases for next spring and summer goods, and in most cases buying was about completed. In the case of German, French and Belgian goods these purchases will in all probability be cancelled and there will likely be considerable difficulty experienced in obtaining shipment of goods at the proper time: that is, December and January, owing to the probable depression of the textile trades in England during the crisis as well as the dangers confronting shipping. This will cause a big demand for all such goods as can be duplicated by Canadian mills, while in other cases importers will either have to do without them or obtain them in the United States, which alternative appears rather impracticable, as the industry there will have all it can do to look after the home demand on the class of goods imported into Canada. This trade along with the demand for military cloths and materials will give a considerable impetus to practically all branches of the textile industry in Canada during the next few months.

The principal difficulty confronting our mills during this time will be the procuring of raw material. In the case of the cotton mills this will not be so evident. American cotton has dropped in price and will likely reach the lowest level in years in the event of a conflict of any duration. But a great deal of the supplies used in our mills, such as chemicals, dyestuffs, etc., has been purchased in Germany and Great Britain, and these will have to be obtained elsewhere. Moreover, the question naturally arises as to what extent domestic mills are equipped to manufacture cotton goods imported. At present the consumption of the class of goods manufactured here is practically all of domestic goods, while a glance at the customs returns will show that a large portion of our cotton imports consists of specialties and manufactures for which the Canadian demand is somewhat limited. Manufacturers will not think of equipping their mills in order to supply this temporary demand, but the industry will undoubtedly receive a considerable impetus during the crisis owing to the increased demand for the grades they are capable of manufacturing.

In the case of woolens, our mills are capable of manufacturing the most of the lines imported, but they are not equipped to look after the entire trade, either for quantity or quality. With the extra Government demand for military cloth and the orders already taken for spring 1915 they will be kept running to full capacity, so that it is probable that a considerable quantity will have to be imported from the United States. The difficulty here again will be the matter of obtaining supplies of raw materials. Of the 7,252,119 pounds of washed wool imported during the fiscal year ending March 31 last, some 3,929,650 pounds were imported from Great Britain, 776,350 pounds from the United States, 871,515 pounds from New Zealand, 688,204 pounds from France, and 986,400 pounds from other countries. The obtaining of these supplies, as well as the yarns, noils and tops, most of which are imported from Great Britain, will depend on the extent to which shipping is interfered with and the state of trade in Great Britain, although it may be possible to purchase the necessary raw material direct from the producing centres. Stocks of these commodities now on hand are small. Manufacturers have been buying only to fill actual wants and none anticipated the present situation, so that it will be necessary to import a large quantity in order to look after the extra demand.

Knitting mills are in a somewhat different position. With over eighty per cent. of the Canadian consumption of knit goods supplied by domestic mills, only a slightly increased demand can be expected. The difficulty will be in obtaining yarn and wool supplies. Domestic spinning mills will be called on to supply much of the yarn supplied abroad and some difficulty will undoubtedly be experienced in obtaining delivery. There will be a stimulation in the demand for some lines and Government orders will be heavy, so that the approaching season, which under ordinary conditions would have been a quiet one, will likely find all the mills fully engaged.

From present indications we believe that domestic mills will benefit for the time being. What the ultimate effect will be is a moot point.

Business Economics

No business is transacted, no industrial concern can be operated, without some of the rules and theories of political economy being followed. Economics underlies all features of modern industrial life, so that a study of the principles involved explains the whys and wherefores of practically every phase of commercial endeavour, the history and evolution of modern business and commercial systems and gives the student a knowledge that enables a closer and more concise insight into what is going on. Our school system does not afford the average youth the opportunity to study along this line, so that many are left ignorant of the theory, however much they might acquaint themselves and become familiar with the practical operation of those fundamental laws and subsequent history. The study of economics is a necessity to the ambitious youth, and if the opportunity to learn is not afforded in the schools it must be found elsewhere.

Business men and manufacturers who did not have the opportunity or have not taken it, have learned these laws from hard experience. They know the practical application without realizing the fact, but do not grasp the underlying principles and are not, therefore, in a position on many occasions to take advantage of opportunities offered or anticipate losses and disaster. This is not due to the fact that the principles are so involved or difficult to understand as to make the study a burden, but simply that too many men have a wrong conception of the whole study of economics, although they are following and conforming to those laws at every turn.

We are therefore pleased to announce to our readers that we have secured for publication in the Canadian Textile Journal, starting this issue, a series of articles on "Business Economics," by Prof. W. W. Swanson, of Queen's University, Kingston, Ont. The author will deal with this phase of the study of economics from as practical a viewpoint as possible, following closely the courses given in the best colleges in the country, and his treatises of the various subjects will undoubtedly be of much value and interest to our readers. The series will comprise about twelve articles and, if thoroughly appreciated, will be followed by a further study relating to other phases of commercial endeavour.

Textile Imports During Last Fiscal Year

There was a considerable falling off in the value of textile imports into Canada during the fiscal year ending March 31, 1914, which cannot be ascribed to any other cause than the general trade depression which has existed for the past eighteen months in practically all branches of trade in Canada. The total imports of cotton goods show a decrease of $1,029,447, as compared with the 1913 figures; wool and woolens a decrease of $3,593,731; while on the other hand the value of silk imports show an increase of $448,704, and flax, hemp and jute materials an increase of $27,844, as compared with the 1913 figures. The total value of the importation of textiles, including cordage, rope and twine, silks, cottons, woolens and worsteds, flax, hemp and jute materials, and raw materials, show a decrease of $2,947,084 from last year's figures.

It is interesting to note the position British and United States manufacturers hold in this trade with Canada. In the case of cordage, rope and twine Great Britain supplies less than 9 per cent. and the United States about 90 per cent. Of cottons Great Britain supplied 46 per cent. and United States 47 per cent. Of curtains Great Britain supplied 50 per cent. and

United States 19 per cent. Of flax, hemp, jute and manufactures of, Great Britain supplied 55 per cent. and United States less than 10 per cent. Of silks and manufactures of, Great Britain supplied 36 per cent. and United States 15 per cent. Of wool and woolens, Great Britain supplied 86 per cent. and United States 7 per cent., and of the total imports of textile materials Great Britain supplied over 57 per cent. Those of wool and manufactures of wool amounted to considerably more than any other item classified under the heading "principal articles imported for consumption into Canada" in the customs returns, being nearly 20 per cent. of the total importation of merchandise, and 50 per cent. of the total importation of textile materials from Great Britain during the last fiscal period.

The greater proportion of the woolen goods imported were woven goods, amounting to $21,442,414, as compared with the total importation of woolen fabrics valued at $28,667,836. The value of such goods manufactured in Canada amounts to about $500,000, so that over 80 per cent. of the total quantity of woolen goods consumed in Canada last year was imported, the vast majority being from Great Britain under the preference tariff. Surely these figures deserve the closest attention from manufacturers in this country.

EDITORIAL COMMENT.

A recent press dispatch from New York emphasizes the present situation and its effect upon the import textile business of Canada and the United States, stating that the prospect of textile competition from abroad is slight. The widening of the area of conflict in Europe, with the consequent closing of all manufacturing establishments, has convinced the most optimistic importers and handlers of European products that it would be impossible to make deliveries here on goods manufactured in the belligerent countries. The only possible exception is the British Isles. The cancellations of the sailings of the steamers of the German lines as well as of the French companies was regarded last week as serious enough, but now that the workers of both France and Germany have been called to service in the military and naval arms of their respective Governments it seems settled that deliveries for fall, winter, and possibly spring lines of textiles will not be made.

One result of the war in which England is now engaged is the already apparent effect it will have on the English cotton industry. For some time British spinners of American cotton have been curtailing and only the other day agreed to a three weeks' suspension of work between then and September. The Manchester Federation of Cotton Spinners has now urged such mills to arrange for the curtailment as speedily as possible. British textile trades will suffer more from the present conflict than any other industry in the United Kingdom.

Discrimination Against Domestic Woolen Fabrics

A common complaint among textile manufacturers and agents in this country is the very apparent prejudice in favor of foreign fabrics, or the prevailing idea that foreign fabrics are necessarily superior to those produced by domestic manufacturers. This idea has been taught by a few in the trade who are interested in selling foreign goods, but no one who is at all conversant with the fabrics maufactured by many of our mills places any credence on such tales. Still, the prejudice continues and our mills are compelled to recognize it in considering the competition of foreign textile manufacturers.

The fallacy was fostered years ago under the old tariff law with the United Kingdom, when practically all the woolens and worsteds imported were of a distinctly higher than average type, owing to the fact that the medium and low grade fabrics now coming into the country could not be imported profitably at that time. To assist in securing an unwarranted profit, some jobbers or merchant tailors placed foreign tickets on much of the better grade of their purchases from domestic sources, thereby creating in the minds of the ultimate consumers the false impression that all of the finer, high grade fabrics were of foreign origin.

Comparison of fabrics from the standpoint of intrinsic worth, perfection of manufacture, style, color and finish, will convince the unprejudiced investigator that the domestic manufacturer has made wonderful progress in the development of the industry—that Canadian woolen and worsted mills are as well equipped as those in any other country and are now producing fabrics which are fully equal to those manufactured abroad. Much of the domestic product is probably still sold as of foreign manufacture. The custom still exists to mark Canadian goods as foreign, but merchants feel indignant when their attention is called to the fact that much of the goods on their shelves is domestic make. These same merchants are the ones who should lead the movement to break down this prejudice. It is working against their interests, as in most cases they are innocent of any attempt to hoodwink the consumer. They buy in good faith and as they believe that nothing good can be made in Canada in the way of woolen or worsted goods they make little effort to ascertain the true origin of the fabrics they buy. It is surely a question that deserves serious attention from both merchants and manufacturers, and should be dealt with accordingly.—Journal of Commerce.

AUSTRALIA WOOL YEAR.

Dalgety & Co., Limited, Bradford, England, have received a cable from their Sydney branch stating that the exports of wool from Australia from July 1, 1913, to June 30, 1914, were 1,966,000 bales, an increase of 248,000 bales on the previous year, and from New Zealand 561,000 bales, an increase of 32,000 bales. The total for Australasia is therefore 2,527,000 bales, an increase of 280,000 bales.

The cable continues: The total sales of wool in the colonial markets up to date amount to 1,968,500 bales, against 1,805,000 bales at this time last year, an increase of 163,500 bales. The average value per bale is £13 4s. 11d., compared with £13 13s. 1d., and the average weight per bale 327 lb., compared with 321.2 lb. The all-round average is 9¾d. per lb., compared with 10 3-16d. for the previous year.

BUSINESS ECONOMICS

First of a Series of Articles Dealing With The Economic Factors Operating in the Modern Business World.

By PROFESSOR W. W. SWANSON.

A knowledge of the principles of economics is essential to every man who is engaged, directly or indirectly, in the affairs of the business world. Most men, unfortunately, are inclined to conduct their affairs by rule-of-thumb; but in the keen competition met with in the field of modern business, it is becoming more and more necessary for the business man to have a working knowledge of the economic principles involved. These principals are as operative in business as natural laws in the physical world. A knowledge of the laws of nature is essential for carrying on great business enterprises, transportation for example; but no less essential is a working knowledge of the economic factors operating in the modern business world.

Some men boast of their "practical" knowledge and scoff at such abstractions as laws, principles and underlying causes. Yet the most practical men, although they may not realize it, are generally the most opinionated theorists. They work upon the basis of theory, and apply principles to their business with greater or less success, year in and year out. The humblest of enterprises does the same thing.

The trapper in the black wilds who saw a flock of wild ducks winging their rapid way southward in the early autumn. deduced the fact that winter would set in early, and laid his plans accordingly. He rushed in supplies by boat and trail, and was still busy with his work when the iron hand of winter stayed the proceedings. Supplies were low, but prices were high; and he reaped the benefit. A simple illustration, to be sure, but it hammers home the point. It pays to understand the laws of nature, and business laws. Such knowledge compels success.

Aside from the old haunting, speculative curiosity which is inborn in man, which has made itself felt from time immemorial in Greek and Barbarian, bond and free, the modern man feels more than ever the absolute necessity of grasping knowledge for its own sake. Knowledge is power—a dynamic, irresistible force that makes for success in business as well as in every other sphere of human activity."

What is the Science of Economics?

Economics is that science which deals with the production, distribution and consumption of wealth. But it must be understood that the social point of view is always uppermost in the mind of the economist. That is to say, he studies wealth because of its bearing upon the prosperity of individual in particular, and of mankind in general.

But wealth is also the subject-matter of other fields of human investigation—of law, of ethics, of politics. It is, therefore, from a particular point of view that the economist approaches his work. His view is that of market value. Any thing, fact or condition, that affects value in the market comes within the scope of economic investigation. We may then define economics, in the light of what has been said, as that science which deals with the problems of market value. That is to say, the economist desires to learn why a commodity has value in the first place, and secondly, why its value is as great as it is. A study of the first problem involves the question of production, of the forces causing market values to arise: a study of the second phase of the problem—namely, why values are as great as they are—leads us into the field of distribution, of wealth, and explains why labor receives its particular reward, why interest on capital rises and falls, and why rents fluctuate under varying conditions. A knowledge of the principles involved in each case is of the greatest value to the business man producing goods under conditions that are constantly changing, and permits him to adjust his output to meet the particular demands of the market.

Classification of Wealth.

Since our science deals with goods in their value aspect, it is necessary to examine carefully the nature of economic goods, or wealth.

It is perfectly clear that goods that exist in superfluity, that are free, do come within the scope of our inquiry. Such goods as air, sunlight, water, and so forth, are generally free and hence have no market value. As they have no market value. they do not fall within the scope of economic investigation. It is not that the economist minimizes their importance; he recognizes that they are just as essential—perhaps more so—for the happiness, health and prosperity of the people as are economic goods. But as they are free to all, they do not present any problems of direct interest to him—that is, problems that arise from a study of market condition and market values.

The goods which form the subject-matter of his investigation, are those that are not free, and that satisfy a human want. Both these conditions must be present before market value can arise.

There may be goods that are relatively few in number, and yet valueless, because there is no demand for them. There are such things as scarce nuisances—that is, "goods" that may exist in relating firmness, but yet have no market value because there is no demand for them. Thus, the first essential for the emergence of value in an object is, that it shall satisfy a human need.

The second is, that it shall not exist in superfluity, that it is not so abundantly distributed that there is more of it than is necessary to supply the demand. We may, therefore, define wealth, as all goods which satisfy a human want, and that are limited relatively to the demand for them.

Economic Goods Not All Material.

Economic goods may be divided into two great classes. In the first category are placed all goods that are material, limited in amount, and that satisfy a human need. Examples of such are: Houses, clothing, furniture, coal mines, stocks and bonds, and so forth.

In the second class are placed all those immaterial goods that are limited in number, satisfy a human desire and are immaterial. Examples of these are: the good-will of a business, a doctor's practice, the connection of a promoter with a group of financiers, etc. —in a word, intangible goods, that may be bought and sold.

National and International Wealth.

In a sense, we may include in the sum total of a nation's wealth more than can be counted in from the combined wealth of its individual citizens. Thus, a good climate, favorable ports, proximity to the world's markets, the degree of enlightenment of its people, are all parts of the nation's wealth, because these factors have a direct or indirect bearing upon the prosperity and happiness of the people as a whole. And so, there are international possessions that make for the progress and prosperity—science, art, and literature, as well as all means and methods of facilitating international intercourse and trade. Therefore, the growth in knowledge, and the progress of all nations is of vital interest to the prosperity and happiness of each.

The Meaning of Production.

Man cannot create material goods. He may alter their shape, change their position and reduce the time required in transporting them from place to place. But he cannot create goods in the substantial meaning of that term.

When we speak, therefore, of the production of goods, what we mean is that man adds utilities to the raw materials $46,000. Was this a productive enterprise?

When a combination is formed in any line of industry, with diminished output as a result, but higher prices, can it be said that we have here a case of economic production?

The illustrations might be multiplied one thousandfold, but the same fact would always appear—namely, that there is a conflict in many cases between the claims of society and the welfare of the individual. The producer is not so much concerned—if he is concerned at all—with the abundance of the supply. The whole matter to him simmers down to one problem: How can I best increase my value returns, my net income from my business?

The diamond kings of South Africa take good care to control the supply of cut gems that go out from Amsterdam to the markets of the world. They are not concerned with making diamonds cheap, but of making them dear—at least as dear as is consistent with effecting a sufficient sale of them.

We now see clearly that economic production is a question of value, of the creation and enhancing of value in the market. To effect these ends it is necessary to impart to goods certain utilities in order that a demand for them may be created and stimulated.

Man cannot create material goods in any real sense of the term. All that he can do is to add utilties to goods—utilities of time, of place and of form.—He may transport goods from place to place; he may change their shape; he may effect economies of time in their use. Beyond this, man cannot go in the act of economic creation.

The Individual Point of View.

Once more we should emphasize the clash of interests that often arise between the individual business man and society at large. An individual business man, or a corporation, is not concerned with the mere weight or number of the goods placed upon the market. What the individual producer is concerned with is the value of his output. A high net return may be effected by diminishing the output. Abundance of want-satisfying goods for society at large and high income yields to individuals seldom go together. Over and over again our agricultural magazines emphasize the fact that big peach crops, or bumper wheat returns carry with them no particular cause for rejoicing, as far as the farmer is concerned. Scarcity and high prices suit the producers concerned much better. When these facts are kept in mind it will be evident that in economic discussion, these two viewpoints should always be kept distinctly separate. Only so may many economic pitfalls be avoided.

And much more will it be evident that the problem of market value can only be understood from the individual competitive point of view. Whatever society at large may wish, we are aware that men follow their own selfish interests in business, and leave the people at large to take care of themselves.

The Sources of Wealth.

The proverbial sources of wealth are: The fisheries, the mines the forests and agriculture. These are the so-called extractive industries, and for many years it was supposed that from these alone all wealth was derived.

The Physiocrats of France, that brilliant group of economists who appeared just prior to the Revolution, taught that land alone including in land all the extractive industries noted above yielded a "net product." The seed sown not only replaced itself, the capital employed, and enough to sustain the labor engaged, but a net product above all this—a clear gain on the transaction. Manufacturing, according to the Physiocrats, was a barren industry. However useful it might be, it yielded no net return above the replacement of the food and material used up in the process.

It remained for Adam Smith, whose great work, "The Wealth of Nations' appeared in 1776, to dispose of this contention once and for ever. He showed how the successive processes through which wool, or wood, or iron ore went added greatly to the value of the finishing product. In human skill, the capacity and genius of man to mould and change nature to his will, he found a fifth great source of wealth. And strange to say, what the great Scotch economist taught over a century ago is being offered to the public as something new to-day. Yet the truth needs to be emphasized, as was recently done by Professor A. E. Chamberlain. The development commissioner of the Great Northern Railway, in a recent address to Ontario farmers, said:

"Denmark, which is a little larger than the three counties of Essex, Kent and Lambton, Ontario, supports a population of 1,250,000 people. It exported in one year $101,000,000 of farm products—pork, dairy and poultry products. It did so because of a high development of the skill of the Danish people. They did it first by producing more per acre. Then they took a larger quantity of the raw product and manufactured it into a better finished product; or, we might say, marketed it in a better and more desirable condition. One may ship to London and Liverpool the same quantity of pork, dairy and poultry products as the Danish people export, sell them on the same day, and on the same market, and the Danish people will get approximately $8,000,000 more than the people with less skill will receive.

"The country lacking skill has to pay for that disadvantage, and the money has to go to those countries whose citizens have the skill. Canada has the four chief natural sources of wealth to a remarkabl degree. The fifth source of wealth, human skill, has yet to be considerably developed. When the four are combined with the one in this Dominion, some remarkable achievements should be accomplished.

(NOTE.—Prof. Swanson will take up and deal with "The Factors of Production" and "The Division of Labor," in the next article of the series, appearing in the September number. Editor.)

WOOL AND ITS MANUFACTURE

With Special Reference to Domestic Wools, their Grading, Classification and Use.

By T. REG. ARKELL.

(Pamphlet No. 3 issued by the Live Stock Branch of the Dominion Department of Agriculture.)

Although for twelve months in the year every resident of Canada, man and woman, depends for the maintenance of bodily warmth and comfort upon clothing made wholly or partially from wool, it is surprising how little the great majority of people really know respecting the various qualities and classes of cloth composing their wearing apparel, the source of the raw material and the process of manufacture. Everyone is more or less certain that wool comes from sheep, but not infrequently that comprises the limit of their knowledge. It is still more surprising, however, how poorly informed in too many instances is the wool grower himself anent the grades and purposes in manufacture of the wool he produces. Lack of information precludes the grower from disposing of his product to the best advantage. To assist farmers and city dwellers alike to gain a more complete and definite knowledge of the character of wools grown in this and other countries, and of the products manufactured therefrom, the wool exhibit of the Live Stock Branch, Dominion Department of Agriculture, is presented to the public.

The technical terms used in describing the various specimens in the exhibit may, perhaps, prove puzzling at times. Therefore, a full and concise explanation of these, and a popular description of the worsted and woollen processes of manufacture, outlining the essential stages in the transformation of wool to cloth, have been prepared in this pamphlet.

The Wool Fibre.

The wool fibre possesses many peculiar physical properties, which especially adapt it for textile purposes. It is covered with minute scales, apparent only under the microscope, and resembling to some extent those upon fish, which not only impart strength to the fibre but give to it its distinctive lustre. When a scale is injured or destroyed through disease, mechanical or other agency, a weak section will exist in the fibre at that point, thus decreasing its tensile strength and rendering it unfit to withstand the strain of the combing process in worsted manufacture. The interlocking or fitting of the scales of one fibre into those of another creates felting or close matting together of the fibres, which is a necessary proceeding in cloth production. The number of scales upon a fibre is very variable, depending upon the class or grade of wool. For instance, Merino wool, which is the finest, or has the least diameter, is frequently found with only a single scale surrounding the entire circumference of the fibre; a medium wool, as grown upon the Shropshire or Hampshire Down, two, three, or even more scales; and a coarse grade, represented by the wool of the Cotswold, Leicester or Lincoln, several scales.

Waviness or Crimp.

Examined casually, it will be observed that the wool fibre possesses a wavy or curled appearance, which is technically known as crimp. A heavy crimp produces compactness of fleece, and the closer the wool the more effectively will it retain the yolk or grease which exudes naturally from the skin of sheep and tends to prevent rain or snow from penetrating to the body. The degree of crimp bears a distinct relation to the diameter of the fibre. Fine wools have greater crimp than coarse. It has been estimated that Merino wool will bear as many as twenty-four to thirty waves per inch; Southdown, thirteen to eighteen, and Lincoln, only three to five. The average diameters of the fibres upon which were based the foregoing data were: For Merino, .00064 of an inch; Southdown, .001; and Lincoln, .0018. These figures will also serve to illustrate the extreme minuteness of the wool fibre. Compared with human hair, even Lincoln wool is finer.

Variations in Length.

Considerable variation occurs in the length of the wool fibre in the same fleece, as well as in different sheep. The shortest wool is upon the belly; the longest, on the thighs. Generally speaking, the coaser the wool the longer it is in the natural state, but this cannot be taken as a definite criterion, for many of the medium-wooled breeds have coarser, yet shorter, wool than the Merino. The length cannot be estimated accurately by merely opening the wool upon the sheep without a thorough examination of the extent of crimp. A fine Merino fibre may be stretched by hand easily thirty per cent beyond its crimped length, and by gradual pressure upon a machine fully that much more. The average range of wools in length is between two and eight inches, and the number of fibres growing per square inch, between 4,000 and 6,000.

Absorption of Dye.

In dyeing, the central portion of the wool fibre underneath the scales alone absorbs the coloring matter. The scales themselves become but slightly, if at all, changed. Where the scales are thick and cling firmly, the same rich effect cannot be obtained as where they are small and open. Therefore, this explains why one class of wool will not dye so readily as another and also why such care must be taken in the mill, in the manufacture of many styles of fabrics, to separate the fleece into lots containing similar specimens.

Difficulty is, at times, experienced in coloring effectively pulled or skin wools, which are removed from the pelts of sheep after death, frequently by means of a lime solution, since the lime permeates the cells of the fibre and prevents the uniform distribution of the dye. Besides, following a disease such as scab, or through insufficent nourishment, the wool fibre may be imperfectly developed and will not take the coloring solution in a satisfactory fashion.

Kemps, which are hair-like fibres, found mostly on the thighs or britch of coarse-wooled sheep, will absorb little dye, if any at all, and, consequently, all wool of this nature must be entirely removed from the fleece before the process of manufacture commences, constituting a waste product. Black, brown or grey wool must be included in this class also, since it can only be used in dark-colored fabrics. Moreover, even with a black color it is difficult to stain it exactly the same shade as white wool. For this reason, dark wool enters mostly into the manufacture of natural underwear. Therefore, it may be readily understood from this cursory description how careful, if he hopes to obtain the highest price for his product, the wool producer should be to eliminate from his breeding flock animals possessing to any degree a defective quality of wool.

Classification of Wools in the Fleece (Grading).

Classification of wools in the fleece comprehends what is technically called grading, and should be performed by the grower or dealer before the wool reaches the mill. Grading is done without untying the fleece, and three distinct divisions are made according to the Condition, Quality, Staple or Length of the wool.

Tubwashed.—(Wool scoured by hand with soap and water frequently containing a weak solution of caustic alkali, after it has been removed from the sheep.)

Scoured.—(Wool cleansed in the mill by efficient machinery.)

Rejection or Reject.—(Wool containing an excessive quantity of seeds, burrs, straw, hay or kemp.)

Cotted Reject or Cots.—(Wool matted together. Cotting is created by ill-health and is due to lack of sufficient yolk or grease in the wool, which ordinarily keeps the fibres from sticking together.)

Black or Grey Reject.—(Wool containing numerous black, brown or grey fibres.)

Tags, Dung Locks or Stained Pieces. (Short locks generally besmirched with manure.)

Government Wool Exhibit.

Every wool-growing country has its own special methods of classification and its own nomenclature for the different grades, which, however, are more or less similar and allied. Canadians, owing to contingencies of market, should be more especially interested in understanding those of Great Britain and the United States, and in correlating them with our own. For this purpose some attention will be given to a description of these.

Little difference exists in the form of grading according to condition. Therefore, a bald quotation of it as practised in this country should be sufficient.

Unwashed or Greasy.—(Wool shorn from the sheep in its natural condition.)

Washed.—(Wool washed with soap and water upon the sheep's back.)

Unmerchantable.—(Wool poorly washed or not shorn for some time after washing.)

Pulled or Skin.—(Wool removed from the pelts of dead sheep.)

Shrinkage From Washing.

Washing removes only the foreign material or dirt and creates a shrinkage in weight from fifteen per cent to twenty-two per cent on the average. Not only the dirt, but the yolk or grease as well are taken from the wool by scouring and it is left in a thoroughly clean condition ready for making into yarn. Tubwashing is an attempt to fulfil the same purpose as scouring, but the process is not so effective. Before the wool can be used for manufacture it must be re-scoured. The loss in weight through tubwashing ranges from thirty per cent to fifty per cent.

In washing wool the sheep-raiser should carefully estimate the decrease in weight and the cost of labour against the higher price received for the washed product before undertaking the operation.

Quality.

Quality refers in this respect to fineness of the fibre or the diameter. The finest wools are arranged in the classifications at the top, each quality following being slightly coarser.

Correlation of American, British and Canadian Qualities(Grades), and Their Distinctive Terms.

United States.	*British.	Canadian. Domestic.	Rang.
Fine	64's to 66's		Fine
One-half Blood	66's	Fine	
Three-eighths Blood	56's	Fine medium	
One-quarter Blood	50's	Medium	Medium
Low one-quarter Blood	44's to 46's	Low medium	
Common	40's	Coarse	Low
Braid	36's	Luster	

American Classification.

The American classification and nomenclature are based upon the quality of Merino wool which, being the finest, was taken originally as the standard. Different crosses between the Merino and the mutton breeds were supposed to produce the intermediate grades. The first cross resulted in so-called one-half blood wool, that is, one-half Merino, and presumably twice as coarse as the Merino parent. The other grades followed similarly to show the relative and corresponding lack of fine wool blood.

Fine is frequently subdivided into three separate classes, known as XXX, XX and X. This comprises an exceptionally fine distinction for Merino wools. XXX represents the highest class obtained from the Spanish Merino, which is surpassed only by Picklock, derived from the Saxony Merino, which is generally conceded the finest type produced in the world. This breed is confined almost entirely to Germany, and is not raised at all extensively.

American wools are also divided into Territory and Domestic classes. The former refers to Western range wools; the latter, to Eastern and Middle Western, such as is produced on the small farm. Range wool is of a finer character than the other, being either Merino or a Merino cross. It therefore possesses, usually a higher shrinkage owing to the excessive greasiness of the Merino, but contains little or no straw or chaff which unfortunately are found all too frequently in Eastern wool. These conditions apply in similar fashion to Canadian wools.

British Classification.

Differences in the spinning qualities of wool on the worsted principle are taken as the basis of the British system of grading. The factor used is called a count. A slight count, which represents the standard or unit, will produce, from one pound of scoured wool, a fixed number of yards of spun yarn. Wool twice as fine as the established standard will spin as far again, since the weight being the same, there must be double the number of fibres, and would thus represent two counts or, as commonly abbreviated, s. Therefore, the finer the wool, the higher will be the counts. A comparison of the range of fineness in the various classes can readily be obtained from the foregoing table.

Canadian Classification.

No organized method of grading Canadian wools has been pursued on a national scale. This is being overcome, however, now that the sheep industry is in a state of rapid development and is fast becoming a permanent asset in the agricultural system of the country.

The following comprehends a complete classification, in respect to quality and staple, of Canadian wools in the grease, with the exception of tubwashed, which, as previously stated, cannot be satisfactorily arranged:—

Western / Eastern — Domestic fine medium combing.

Western / Eastern — Domestic medium combing.

Western / Eastern — Domestic low medium combing.

Western / Eastern — Domestic coarse combing.

Western / Eastern — Domestic lustre combing.

Western / Eastern — Domestic fine medium clothing.

Western / Eastern — Domestic medium clothing.

Western / Eastern — Domestic low medium clothing.

Western range fine staple.
Western range medium staple.
Western range low staple.
Western range fine clothing.
Western range medium clothing.
Western range low clothing.
Rejections.
Grey and black.
Loocks and pieces.
Tags.

Fort William acts as the dividing line for Eastern and Western wools. Domestic refers to wool produced in small lots upon the farm; while range applies to wool raised under ranching conditions. Domestic grades are also offered upon the market in the washed state.

It is difficult to correlate the types of wool produced by the different breeds with the foregoing grades, for the reason that within each breed there is always a wide range and great variety of qualities. Grading is performed entirely irrespective of breed type, and Shropshire or Hampshire wool may be included in the same grade with Oxford or Suffolk. Fleeces of several hundred sheep of one of the Down breeds, which are the most variable, may fill every category except fine and braid. The wool of the Cotswold, Lincoln and Leicester is the most constant in quality, and seldom is classed as other than braid.

Staple or Length.

Fleeces are separated very generally, according to staple, into two lengths, combing and clothing. Three inches is ordinarily the dividing point. Combing is the long wool, intended for worsted purposes. Clothing is too short for the combs and must be carded, entering mostly into woollen gods. Delaine, a wrd frequently used in connection with Western wools, signifies a combing fine or Merino fleece.

In Great Britain further divisions are made into what are technically termed Hogg and Wether classes. Hogg represents the first fleece shorn from a sheep; and Wether, all subsequent ones. For Down breeds, as Oxford, Suffolk, Hampshire, Shropshire and Southdown, the titles, Teg and Ewe, are sometimes substituted for Hogg and Wether, respectively. This classification may well be adopted in this country with some types of wools, since lamb's wool, in most instances, is not only longer than other fleeces, but, owing to its finer texture and tapered end, possesses better spinning qualities.

TRANSMISSION OF POWER BY ROPES

By **EDWIN KENYON**, of William Kenyon and Sons, Ltd., Dukinfield, Eng.

(Concluded from last issue).

Ropes are now applied to a rolling mill drive on which spur gear, belts, and chains had been successively tried but failed to accomplish the task. The rope pulleys are each 4 ft. 3 in. diameter, and the centres being 6 ft. apart, only allow a rim clearance of 1 ft. 9 in.

The adaptability of ropes to short drives was so little understood by one firm that, in order to drive a line shaft from a motor it was deemed necessary to fix an intermediate pulley, 5 ft. 2 in. diameter, about 16 ft. away, which was driven by 10 ropes 1½ in. diameter, from which again 10 ropes transmitted the power to a 10 ft. driven pulley. The centres between this and the motor pulley 3 ft. diameter, afforded ample space for a direct-drive, and six ropes would be quite equal to the load of 150 H. P. at 4,866 ft., after allowing for any losses due to proximity and speed ratios between 500 and 150 revolutions per minute, besides gaining considerably in efficiency by replacing the 20 ropes. This drive offered an opportunity for replacement—at much greater cost—with two 8 in. chains.

Long centres with ropes are, however, very much a matter of pulley diameters and direction of rotation, particularly on horizontal drives. The ultimate sag seldom exceeds 7½ per cent. of the distance between centres, but 10 per cent. is generally considered ample for estimating the depth of a race or for clearing obstructions. Thus, presuming upon the use of pulleys each 10 ft. diameter, the centres might be extended 100 ft. before the trailing and working spans touched each other, i. e., with slack uppermost.

Reversing the direction of rotation as per dotted lines, obviously permits longer ranges, reaching in several instances from 150 to 200 ft. This direction is recommended when erratic loads or irregular impulses set up oscillations in the ropes.

The geometrical formulae under Fig. 9 will serve to approximate the sweep of the curve, either above or below the pulleys.

Vertical driving is carried out with equal success. The drive sketched in Fig. 3 was originally arranged for oblique transmission, by introducing an intermediate pulley a little above midway on the left. Proving a purposeless absorber of power, this was removed and the ropes run direct. Under a steady load, the slack side incurves upon the driving pulley and so gains the fullest possible contact with the driven.

At a mill near Belfast the pulling side of the ropes, not the centres, takes the vertical direction and was set out on the American system, having a continuous rope wound round primary and secondary pulleys.

The tightening jockey was fixed in the centre with the object of establishing equality of tension throughout, a result never attained, for the first lap was pulled up too tight, while the others gradually slackened until the one on the far side hung below the pulleys when at rest. Rearranged on the multiple system the ropes most satisfactorily transmitted the power to the fourth storey of the mill.

The sketch, Fig. 4, of scutching room fan drive, illustrates the best method of dealing with shafts at right angles, whether one or more ropes are used. It will be noticed that the tight side of the rope is deflected by the guide fixed at a suitable angle, while the slack is directed by the one having the horizontal axis in line with the driven pulley. This arrangement also offers the most favourable guidance, either from above or below when both shafts are on the same plane. Long

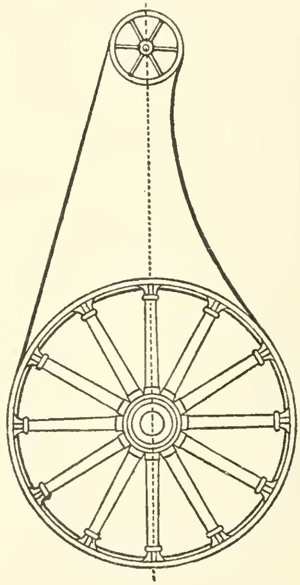


Fig 3.

keyways are a decided advantage in fixing up angular drives, so that the pulley may be moved to what may prove to be the best position in actual practice. Seeing that they have no power to transmit, guide pulley grooves should always take the form of Fig. 5, and be worked out to the same pitch as the grooves to which they are tributaries. They should also be very smooth. Considerable easement of unavoidable friction may be secured by the use of ball bearings.

The difficulty of transmitting power to a room 9 deg. out of line with main building, was successfully overcome by introducing an improved form of universal coupling, which has now been doing satisfactory service for five or six years with very little attention beyond regular lubrication.

Cross driving with ropes is undoubtedly the best method of conveying power from and to shafts revolving in opposite directions. Although some curtailment of life may be expected from unavoidable friction, many ropes so placed have lasted from seven to ten years.

Much, however, depends upon the method of attachment. Fig. 6 illustrates one method. A single rope is so folded as to occupy two out of a set of three grooves, the empty one providing space for over-lapping in the centre. But as movement is in one direction friction is also reduced to a minimum. We are indebted to Messrs. Croft and Perkins, of Bradford, Yorks., for the woodcut, which describes itself. As each

the motor house are at once regulated to the required speeds, by ropes running upon comparatively large pulleys, from which again the various line shafts obtain their movement inside the shed.

A disconcerting problem in connection with rope driving is that of fixing upon a basis of agreement, as to the proportionate size of pulleys in relation to ropes. Flexibility must naturally be the determining factor in the proposition, although an all-round minimum of 30 diameters has hitherto ruled the reckoning. But the experience gained in connection with ring frame driving, the advent of the high-speed turbine and electro-motor has led to a gradual slackening of the somewhat arbitrary rule.

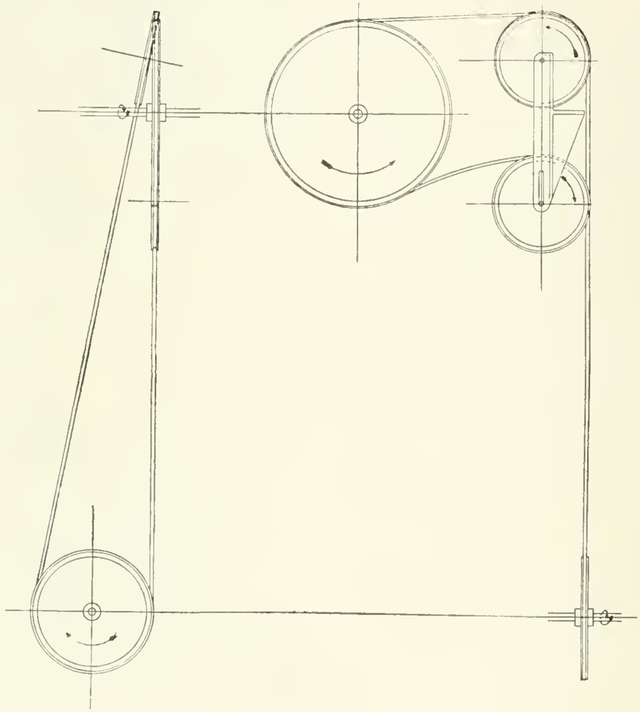


Fig. 4.

has its most favourable conditions the choice of methods is best left with the expert splicer.

Since rope driving has become so closely associated with the use of electricity as a secondary motive power, due in a large measure to the acknowledged advantages of group driving over direct electrical transmission, the two systems may be considered as allies rather than rivals. Therefore, without entering into the question of installation, upkeep, and running charges, or comparing them with the cost of distributing the power direct from the prime mover, it may not be out of place to present a few amongst a large number of instances, where both methods are working in combination.

The plan of millwright arrangements in connection with a new weaving shed, as carried out by Messrs. John Musgrave and Sons Ltd. (see Fig. 7), gives some idea of how the two main shafts projected through to

The size of ropes employed on ring frames has been extended from ¾ in. to 13-16 in., and ultimately to ⅞ in., the latter being now the most popular diameter, because of its greater tenacity and lasting properties; while driven pulley diameters are generally about 16 in., say, 18 times the rope.

Two 1 in. ropes running on a 20 in. motor pulley were recently removed after ten years' good service, not because they were worn out, but because of altered condition; while ropes are regularly run on steam turbine pulleys of 22 diameters.

These and other obtainable data lead to the conclusion that driving force does not decrease pro rata with diminishing sizes. In the absence of better adjustment we therefore take refuge in the safe if empirical suggestion of fixing upon 1½ in. diameter as the theoretical dividing line, at and beyond which the old standard of 30 diameters may be observed, and below which a gradual lessening may take place, down to, say, 18 diameters for $\frac{3}{4}$ in. rope, leaving the absolute minimum yet to be decided, always on the understanding that larger pulleys mean greater advantages, particularly beyond a velocity of 5,000 ft. These figures appear under rope diameters in the power table on page ???

Still another much-debated item on the purely mechanical side of rope transmission awaits our careful consideration, i. e., the construction of rope pulley

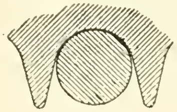


Fig. 5.

grooves. Fig. 8 presents a group of four leading types. The curved sided form A though not so much in evidence as the rest, is still insisted upon in some quarters from a desire to afford easy withdrawal by conforming in some measure to the contour of the rope.

This curvature militates so much against efficiency that it is generally necessary to increase the diameter until the groove is completely packed with material, in order to ensure the required transmission.

Flanged grooves like B are the most commonly used because of this narrow pitch, and because of the belief that they give direction to the ropes. This supposition does not appear to hold good, for when ropes are inclined to oscillate they rebound from side to side as shown in dotted circle, much to their detriment. Then again, the flanges offer a barrier to any extension upon the designed size. The weakness of these flanges is manifested by the breakages which too frequently occur during transit.

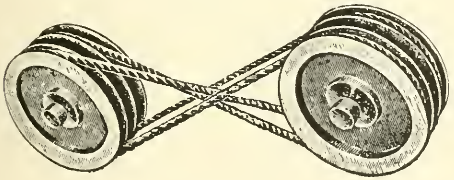


Fig. 6.

For all-round good service there is nothing to beat the flangeless groove with the driving angle carried through to the terminals, as in C. An angle of 45 deg., however, whilst permitting an extension of $\frac{3}{8}$ in. in rope diameter, produces a wider pitch than most engineers care to adopt.

No other groove appears to conform so well to general conditions as the D type, although more acute impact and delivery are accomplished without the slightest additional friction, while the estimated power may be increased by one-third. This type also retards any tendency to revolve, which wide angles and curved sides appear to encourage unless well filled and not too lightly loaded. These useless gyrations are not always constant for the ropes may fix themselves for a period then roll over until their section assumes an irregular polygon, instead of the more serviceable wedge.

In order that the simplified method of setting out a 40 deg. groove may be better understood an enlarged diagram is submitted in Fig. 9. A circle representing the required rope diameter is drawn, through which the vertical and horizontal centre lines are projected. The chord of the arc A B then becomes the standard of further measurement, decides the centre for the rounded base and doubled, points the inverted apex of the angle, carried through the points B B and the upper horizontal lines, where the pitch is indicated. Another line projected from half A B or its opposite decides the length of the terminals.

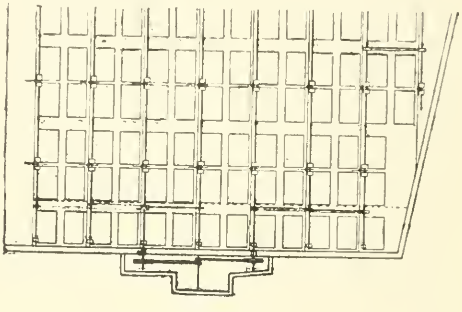


Fig. 7.

It has been urged that every size of rope has its best driving angle. Whether this be so or not, there is no appreciable advantage in providing a multitude of templates to cover the whole range. Therefore as the 40 deg. groove gives such excellent results it may well stand for all sizes above 1 in. diameter, while 30 deg. may be just as usefully engaged upon this, and the smaller sizes in general use, not, however, including the thin bands used on cotton mules, for which more acute angles are provided.

Good splicing is of so much importance to the general well-being of rope transmission that expert splicers are sent to all parts of the manufacturing world. They also instruct others in the craft, so that the necessity for long foreign journeys grows less every year.

At our suggestion demonstrations in rope splicing have been held in connection with quite a number of cotton classes throughout the Lancashire district dur-

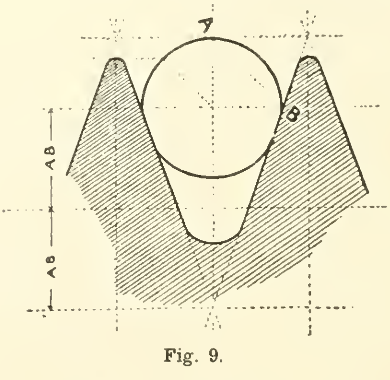


Fig. 9.

ing the winter session, through which the students have largely benefited, not only in acquiring a knowledge of driving rope manipulation but by improving their methods of mule band splicing and—what is more remarkable in tying scroll knots. This may serve as a recommendation to those interested in technical school curriculum.

The foregoing then may be said to fairly present the case for rope driving, according to the findings of actual practice, and as supported by a mass of irrefutable evidence—the accumulation of long years of experience, dating back to the inception of the method—after following the work of many engineers, both at home and abroad.

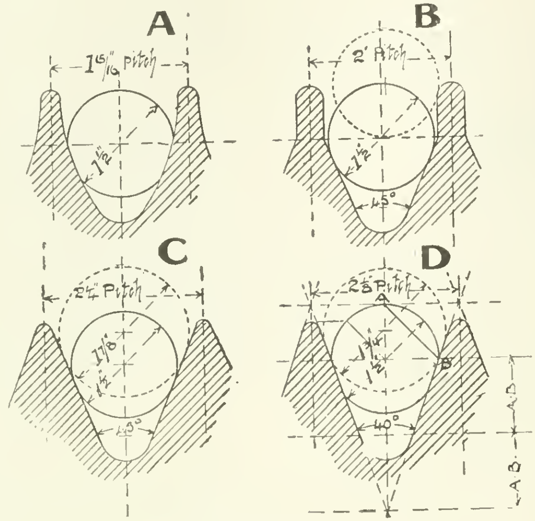


Fig. 8.

Transmission of Power by Rope.

Sizing and Weighting Fabrics

Methods Used to Cheapen Textile Materials.

Wool goods cannot be sophisticated to anything like the same extent as cottons and silks, chiefly because their characteristic softness of handle is soon impaired by the addition of foreign bodies. Fillings may be divided into two classes, the first being exclusively for the purpose of imparting body and stiffness, while the second is used for increasing the weight only. Many cheap woollen cloths, particularly dress material, owe their appearance and finish entirely to the backbone put into them by mixtures of sizes and gums. Cheap woollens, as a rule, do not need the addition of weight-giving bodies, which are usually added to pure worsted cloths only. The addition of starches and other stiffening agents to woollens cannot be regarded in the light of adulteration pure and simple, as the fabric is improved by their use. Many low cloths made from loosely spun shoddy are dependent for their strength upon the accompanying cotton, and for their body upon the sizing matters. On the other hand, the use of weighting agents is solely adulteration, as they serve no purpose but that of taking the place of wool. The agents used for stiffening woollens are principally confined to starch, flour, dextrine, gelatine, farina, Irish moss, and glucose. Such bodies as China clay, barium sulphate, etc., although freely used for cottons, are rarely employed for woollen goods, as they show their presence too plainly. The sulphates of soda and magnesia are sometimes used, but must be restricted to small quantities or the handle soon suffers.

As a general rule non-crystallisable bodies combine with wool far better than those of a crystalline nature. The fault of the latter is that they impart harshness of touch, and "candy," or show a white streak, wherever the surface of the cloth is rubbed. Thick cloths carry stiffening agents better than thin ones, as the bulk enables the substance to lodge in the interior, while the outer surfaces show no sign of it. Stiffening is carried to the highest degree in the cheapest class of dress goods. These, after passing through the stiffening trough, are mostly run straight on to a range of hot cylinders, which gives an extra stiffness to them. Worsted goods are only stiffened in very rare cases, as the material is a worse carrier of foreign matter than woollens. Wheaten flour forms, with the addition of glue or gelatine if extra body is desired, one of the most generally used and economical of stiffeners for woollens. Farina and dextrine do not give the leathery handle which wheat flour does, and a stronger solution is required to obtain the same amount of stiffness. The most reasonable cause to which to attribute the superiority of wheat flour appears to be the amount of gluten it contains, and it is probable that the whole meal flour would yield a stronger stiffening liquor than the purified white. The presence of this gluten may be easily seen, and the body isolated by enclosing some flour in a fine cotton cloth, and kneading it for some time in running water. After a time the starchy matters will be entirely washed away, leaving a sticky glutinous body behind. This gluten is a dirty grey colour, very elastic and insoluble in water. The elastic properties appear to account for its value as a stiffener.

Flour Stiffenings.

To prepare a stiffening liquor from wheat flour it should first be well mixed to a thick paste with a little warm water. Boiling water should then be added to swell and burst the starch granules, and when this is effected the liquor takes on the well-known semi-transparent appearance of flour paste. No fixed proportion of flour to water can be given, as the material and requirements differ so greatly, but the proper strength is soon found after one or two trials. Flour stiffening has the advantage of the stiffening not dusting out after finishing, like some other bodies are apt to do, nor does it dry as white as starch does, which renders it safe to use for blues and other dark colours. Many sizers consider a solution of wheat flour is improved by its turning sour, particularly when used for very heavy woollens; but, if carried too far, fermentation destroys all the adhesive properties exactly as it does that of glue.

Irish moss is much used as a stiffener for some cloths. This is the dried fronds of a seaweed, "chrondus crispus," and is known also by other names, such as Iceland moss and Carragheen moss. It is a grey, crisp weed, tasteless and nearly free from odour. By boiling in water a mucilaginous solution is produced, which on cooling sets into a jelly. On account of the large amount of saline matter in this moss its solution when evaporated down leaves a tough body which does not dust out of cloths as the starches do. This renders it very useful for treating low woollens in which a fully clothy handle is required. Like most organic bodies its solution soon ferments and loses its gelatinous properties, so that stock solutions of it cannot be kept. Liquors made up with glucose possess both stiffening and weighting properties, but have the drawback of forming a hotbed for mildew growths, and are apt to candy and show a grey streak wherever the fabric is rubbed. Tragasol, which is a gummy product from the kernels of the locust bean, forms a capital filling for woollen cloths, as it sets to a pliable india-rubber-like film, which may be formed in the heart of the fabric, and does not interfere with the natural woolly handle. It is extensively used in the cotton trade, and finishers of woollens will find it answers many purposes for which animal size is often used.

Fillings for Cotton Goods.

Altering and improving the appearance of cloths by means of fillings of various nature is of much greater importance in the cotton trade than in that of woollens or worsteds, and special fabrics, such as book-back cloths, glazed calicoes, and cretonnes, are converted into leather-like tissues impervious to both air and dust. Book cloths are got up to imitate leather, and with these the fillings can hardly be termed sophistications, as they are indispensable for embossing purposes, and also for rendering the material impervious to paste and glue. On the other hand the stiffening of shirting cloths and other fabrics of a like nature which are intended to be washed is nothing but adulteration, as a fictitious substance is given which disappears in the wash. Agents used for stiffening and binding consist of flours, starches, gums, dextrine, and animal size. Those for weighting and filling of China clay, mineral white, blanc fixe, Epsom and Glauter salts, etc. Among the softening agents used with the foregoing are tallow, oils, soluble oils, soaps, glycerine, and the chlorides of calcium and magnesia.

Weighing of Worsteds.

Weighting only, where stiffening is unnecessary and often undesirable, comes under quite another branch of filling. It serves merely to replace wool, and makes a light cloth heavy. Worsteds are the chief fabrics treated in this way, and when it is considered that a 16 oz. cloth can be converted at a small cost into one weighing 18 oz., or even 20 oz. per yard, the profitable side of it will be obvious. The substances used for this purpose are all highly deliquescent salts, and the weight is obtained simply by the amount of moisture the fabric is able to retain by their use. Worsted cloths in the natural state easily carry 8 or 10 per cent. of moisture without either feeling damp or carrying any risk of mildew; in fact, moisture up to this amount is necessary to impart softness to the handle. Anyone handling a fabric straight from a drying machine will easily appreciate the difference between the handle then and after the goods have been finished. With the use of water-holding salts another 10 to 20 per cent. can be added to the weight of the material, which will still not betray any signs of dampness. The favourite agents used are the chlorides of zinc, calcium, magnesia, and alumina. All these possess a powerful attraction for moisture, and will abstract it from the atmosphere if the salts are concentrated sufficiently. Under ordinary conditions none of these bodies crystallise when their solutions are evaporated, but form shapeless masses from which it is very difficult to drive the last traces of moisture. Glycerine is also highly deliquescent, and was formerly much used for weights, but owing to its sticky nature it is objectionable unless present in very small quantities.

Probably the first weighting agent to be used extensively was chloride of magnesia, either alone or along with glycerine. Now zinc chloride is mostly used, which, besides being highly deliquescent, is a strong antiseptic, and has a high specific gravity. Chloride of zinc has been used for many years in the cotton trade together with other fillings, but it is only comparatively of late years that it has been used as a weighting agent for woollens and worsteds. It is recommended for this purpose in a very old book on dyeing, but, like mercerising, it appears to have had no extensive application until years after the discovery of its properties. The chlorides of magnesia and alumina are both strongly deliquescent, but their light weight renders them inferior to the zinc salt. The chloride of lime is heavier and cheaply obtained, but is liable to form white cloudy places unless used in small quantities. It is a peculiar fact that among salts only the chloride exhibit this deliquescent quality. The corresponding sulphates, nitrates, etc., form hard dry crystalline bodies, and the chlorides of soda and potash also form hard crystals. The first users of weighting agents undoubtedly made a good thing out of the practice, but as it became known it was carried to extremes by the desire of one man to go one better than another. The effect weighing agents have upon the weaver of the garment cannot be beneficial, as their tendency is to keep the cloth damp, even in the driest of weather.

A fabric artificially weighted with any of the agents named may be distinguished from one with a pure finish by allowing a drop of water to fall upon it; under normal conditions the cloth would be difficult to wet, and the drop would be repelled, and form a tiny globule on the surface. When weighted the fabric quickly absorbs moisture, and very much more quickly after it has been worn for a time. Heavily-weighted cloths are difficult to finish, and, besides taking longer to dry, they are apt to mark during the pressing. The filling has such a strong affinity for moisture that glazed marks at both ends of the cloth are a common fault; these are caused by the pressing acting upon the overweighted fabric, and this is more often the case when the pressing has been hurried and time stinted. The use of deliquescent salts also causes the pressed finish to fall very quickly if the cloth is left about opened out, so that instead of keeping their handle and appearance, the pieces soon get limp and appear like old rags. Weighting materials are usually sold in the form of liquors, but the best and cheapest way is to buy the ingredients in the solid form and make up your own liquor. Zinc and magnesium chlorides of good make can now be bought in the solid state. They are both highly caustic when solid and cannot be handled with impunity, but they both dissolve very readily in water and lose their causticity to such an extent that neither the wool fibres nor the dye is affected. Usually, zinc chloride is sold in the fluid form with a specific gravity of 1.48 to 1.5, and contains 54 to 60 per cent. of zinc chloride. It should be tested to see if it is free from iron, which it sometimes contains; this impurity is liable to affect very delicate colours by saddening them.

Cotton Warp Cloths.

Cloths with cotton warps are sometimes liable to be tendered by weighting unless rather weak liquors are used. Magnesia chloride has a stronger action than zinc, owing to the drying process partly decomposing the salt into hydro-chloric acid and magnesia. Chloride of zinc is a preventer of mildew, and the weighting bath may with advantage be made very slightly acid with a trace of hydrochloric acid. This helps to keep the liquor clear and prevents oxy-salts forming, while it also aids the antiseptic properties of the zinc. Fancy worsteds that have been soap-scoured must be quite free from all soap residues when weighting is done. Any soap left in the cloth splits up the zinc or magnesium salt into a white curd, which will show on the fabric as a white cloudy stain. The same applies to alkalies, such as soda-ash or other similar bodies, all of which decompose the weighting liquors.

The amount of filling in a cloth may be estimated roughly as follows: Cut off exactly one yard of the material and weigh this carefully, then boil it for ten minutes in distilled water in a large basin. In case alumina is present in the filling, the water may be acidulated with a little hydrochloric acid to aid in the extraction. After boiling, the cloth should be well rinsed in warm water, squeezed, and dried, but should be allowed to lie for three days in a well-ventilated room before being weighed. The loss of weight represents the filling, but an additional 5 per cent. should be added to the weight of the dried cloth to represent the water added during the finishing to improve the finish.

Alfred Sykes, of Georgetown, Ont., has been engaged as manager of the Redcliffe Knitting Co., Redcliffe, Alta. Dr. Bonnar, the president of the concern, stated recently that he expected the plant would be operating this fall.

Davidson's Textile Bluebook

The Twenty-Seventh Annual Edition of this well-known publication has just been issued, and the following statistics covering the volume will be of interest to the textile trade.

The new volume contains mills as follows: Cotton Mills 2,231; Woolen Mills 1,256; Silk Mills 1,087; Knitting Mills 1,667; Jute, Linen and Flax Mills 166; Dyers, Bleachers and Finishers 454; Canadian Mills 413, a total of 7,274 Mills.

Mills have been added to the volume as follows: Cotton Mills 188; Woolen Mills 92; Silk Mills 165; Jute, Linen and Flax Mills 10; Knitting Mills 301; Dyers, Bleachers and Finishers 52; Canadian Mills 40; a total of 848 plants added.

There has been removed from the volume 449 mills as follows: Cotton Mills 87; Woolen Mills 66; Silk Mills 83; Jute, Linen and Flax Mills 8; Knitting Mills 164; Dyers, Bleachers and Finishers 20; Canadian Mills 27.

The number of changes made in the mill reports were: Cotton Mills 1,374; Woolen Mills 496; Silk Mills 554; Jute, Linen and Flax Mills 89; Knitting Mills 1,950; Dyers, Bleachers and Finishers 144; Canadian Mills 451, a total of 5,058 changes.

Besides the regular reports, a separate list of the new mills is shown and this should be useful in soliciting trade from the new concerns. The Textile Maps, showing all towns where there are textile plants or dye works, have been carefully revised to date.

The Blue Book is really twenty-one directories in one volume as follows:

Directory of Cotton Mills; Woolen Mills; Worsted Mills; Silk Mills; Knitting Mills; Jute, Linen and Flax Mills; Canadian Mills; Dyers and Finishers; Mills with Dye Houses; Commission Merchants; Cotton Dealers; Wool Dealers; Hair Dealers; Waste Dealers and Manufacturers; Mattress Makers; Textile Supplies; New Textile Maps, and is the only textile directory issued with thumb indexes for quick references.

Two editions are issued as formerly; the office size, 1,100 pages, with heavy cloth binding, is printed on fine plate paper with a large page and contains all the above features, while the pocket edition, 1,000 pages printed on thin paper with flexible cloth covers, has all the features given in the office size except the Classified Directory of Mills and Textile Supply Directory.

The Salesmen's Directory, elegantly bound in flexible leather, size 3½ x 5¾ x ½ inch thick, is much smaller than the pocket edition, but has a full report of every mill, dyer, etc., these being arranged alphabetically, all mills under each town, different from the Blue Book, which subdivides into Cotton, Woolen, Silk, etc.

The volumes can be obtained from the publishers, Davison Publishing Co., 407 Broadway, New York. Prices delivered, Office Edition $4.00, Pocket Edition $3.00, Salesmen's Directory $3.00.

"CORRECTION."

In giving credit for the article appearing on page 207 of the July number, entitled, "Preventing Bad Waste in Cotton Mills," we stated that it had been read before the Alumni Association of the Philadelphia Textile School. We regret this, as the article was written specially for publication in the Textile Manufacturers' Journal, New York, and our thanks are therefore due to the publishers of that journal.

PRACTICAL TUNING AND CONSTRUCTION OF POWER LOOMS--V.

THE DRIVING OF POWER LOOMS

By BEAUMONT METTRICK.

*This instalment is continued from the June issue. That appearing in the July issue was delayed for unavoidable reasons and should have preceeded the June installment.—Ed.

Fig. 23 illustrates two views of the Hattersley indirect eccentric driving motion, fitted on their dobby looms, and working in conjunction with a brake motion, which is also connected to the warp stop motion, and weft stop motion. It is claimed to be a useful drive for a heavy wide coating loom, as it allows a pause, when the going part is at the back centre, to give more time for the shuttle to cross the shed, and a strong quick beat up of the weft at the front centre.

The fast and loose pulleys F P and L P are fitted over a tube or sleeve S, the fast pulley being keyed and bolted to the sleeve. This pulley is usually made larger than the loose pulley, to allow for a better grip being obtained, by the belt, when starting the loom, and to prevent slipping of belt, by reason of the extra tightness. The loose pulley revolves freely upon the sleeve, to which is also fastened the spur driver S D and the brake wheel B W, the sleeve in turn being held in position over the crank shaft C S by the collar C. The spur driver then gears with the spur follower S F, which is keyed fast to the picking shaft P. S., so that the regular speed imparted to the circular gear wheel S. F. by S. D., and the speed of S. F., will be the speed at which the picking shaft travels. Next to the spur follower is placed the eccentric driver E. D. which gears with its companion wheel the eccentric follower E. F., keyed to the crank shaft C. S. These two wheels, being ellipse shaped, impart an irregular motion to the crank shaft C. S., this motion being in turn given to the going part of the loom by the two crank arms on the crank shaft.

The chief fault about this style of drive is that, if looms are run at fairly high speeds, when weaving heavy goods, special care should be taken in setting the picking and also the warp stop motion, as excessive knocking off of loom and hard picking is apt to cause stripping of spur teeth, this being assisted by the increase of speed that takes place, when the crank arms are moving between the top centre and front centre, this being the time, when the dagger D of the warp stop motion knocks against the frog F; this may also cause breakage of sword arm S. A. The motion imparted is eccentric, and the irregularity of speed imparted to the going part will be dealt with in a later article.

The Brake Motion.

To this drive is fitted a brake motion. B shows the brake wheel, which is lined with leather L, and pivoted to frame at P. Special care should be taken to keep this leather free from oil and dirt, so as to allow it to grip the surface of the brake wheel B. W. To the bottom of the brake is attached the brake rod B. R., and this is the regulating point for the brake. Near the other end of rod is cast a small stud S, to which is connected by a loose bracket, the brake lever B. L. which is bell crank lever pivoted at P, to the framework and tensioned by the weight W, this lever being also connected to the humbler lever T, by the rod R, which passes through B. L. and around which is fixed a loose spiral spring R, held in place by the collar C. This spring and collar regulate the distance dropped by the brake lever B. L. and the amount of brake put on to the wheel B. W. by the brake B, when the tumbler is allowed to drop. This taking place when the loom handle L. H. is pulled back to transfer the strap from fast to loose pulley, the rod R. drops, which allows weight W. to pull down B. L., which, being pivoted at P., will pull on the rod B. R. in the direction of the arrow, and place the brake B. in contact with the brake wheel. The brake rod is also connected to the frog F. at S_2. This causes the brake to be applied at once, if any knocking off of loom takes place. The action is as follows: If the shuttle fails to enter the box B, a small spiral spring will hold the top of stop rod finger S. F. in contact with the box swell B. S., which, not being pressed out of the box by the shuttle, will allow the dagger D. (which is connected to S. F. by the stop rod S. R.) to be exactly opposite to the notch at the top of the frog F. As the going part of loom is coming forward to front centre, this will bring about a collision of the dagger and frog as the crank is about the top centre, and as the frog is free to slide upon the rail of frame, when the tension of the spring S. is overcome, it will pull the brake rod and brake into action and by means of a small projection P_2, cast on to frog F. will knock back the rod R_2, which is connected to loom handle. Therefore, this will knock back the handle, and cause the strap to be transferred from the fast to the loose pulley, and the loom to be stopped, without much vibration, owing to the action of the brake. This motion needs careful adjustment, for all the motions to work in co-operation with each other, and comparatively few breakages of teeth and sword arms need take place, if all the rods and levers are regulated to the correct length, etc., and all the springs kept at the correct tension. Springs too tight means unnecessary waste of power used to overcome this tightness, and springs too slack allow vibration of levers, therefore sureness of action is not ensured.

Gearing Calculations.

The up-to-date tuner requires to know these calculations, in order to obtain the required speed of looms, etc., and should not need to rely upon the knowledge of the engineer for these particulars.

To find the surface speed of pulleys divide the speed travelled by the face of the pulleys, when they are running at a certain definite revolutions per minute or other unit of time. (The surface speeds are usually expressed by feet per minute).

Rule: $\dfrac{\text{Diameter of pulleys in ins.} \times 3.1416 \times \text{revolu'ns min.}}{12}$

e. g. A 24 in. pulley makes 120 R. P. M. Give surface speed allowing 2 per cent loss for friction.

$\dfrac{24'' \times 3.1416 \times 120}{12} \times \dfrac{98}{100} = 739$ ft. per minute.

(2) Relative Speeds of Pulleys, etc.—These are usually expressed in revolutions per minute.

Two pulleys driven by the same belt must make the same surface speed (ignoring loss), therefore the relative speeds or revolutions per minute will be in inverse ratio to their diameters.

Rule—Diameter of drivers : diameter of followers : : R. P. M. of followers : R. P. M. of drivers; e. g. A 24 in. pulley makes 120 R. P. M., this drives a 36 '' pulley. What is the speed of last pulley?

24 : 36 : : x : 120. $X = \dfrac{120 \times 24}{36} = 80$ R. P. M.

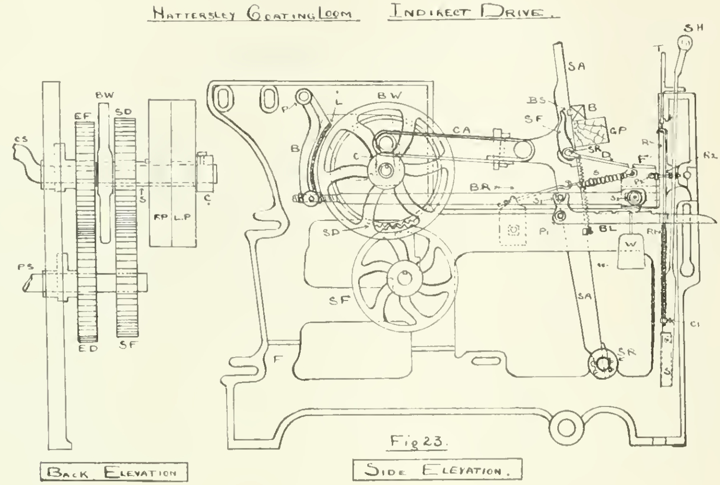


Fig 23.

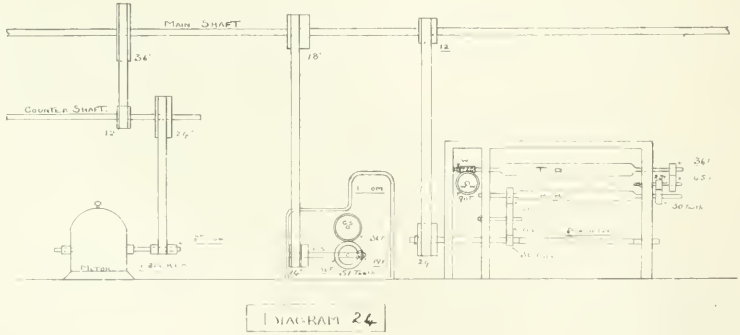


Diagram 24

It has now been shown how the speed of wheels vary in inverse ratio to their diameters, or the number of their teeth, therefore from this fact we may fix a formula, which will be found useful for all speed or gearing calculations, viz.:—D. S. = F. S.

D = Diameter or number of teeth of the first driver or the product of all the drivers.

S = Revolutions per minute of first driver or the revolutions for any unit of time of same.

F = Diameter or number of teeth of last follower or the product of all the followers.

S_1 = The speed or revolutions per minute of last follower or revolutions for any unit of time of same.

The chief difficulty in applying the above rule will be found in determining which are drivers and which followers on the looms. This can easily be found for gear wheels, by noticing which side of the teeth are worn most, as, the teeth of drivers always rubbing against teeth of followers, are worn at the point of contact.

In determining this factor for pulleys note the difference in tension of the belting on each side of pulleys. As the driving pulleys move the load, the tight side of belt or rope always follows in the direction taken by the revolutions of driver. The following points may also serve as a guide, when determining these features:

Wheels may be divided into 4 distinct classes for purposes of calculation:

(1) Driving wheels are those which impart motion direct.

(2) Driven wheels are those which receive motion direct.

(3) Intermediate or carrier wheels are those which give and receive motion direct, and they are used only for carrying the power, or changing the direction of the motion, and therefore they may be ignored so far as calculations are concerned.

(4) Double stud wheels are so made that there are two wheels on one stud, one to receive the motion and the other to impart it. This type of wheel is used to reduce or increase the speed of the wheels following them.

The Worm Wheel.

The ordinary single worm can be reckoned as a wheel with one tooth, as the gear wheel running with it, turns one tooth for one revolution of worm shaft.

A Double Worm may be reckoned as a wheel with two teeth, as two teeth of its companion gear wheel are moved for one revolution of worm.

Diagram 24 will illustrate various arrangements of driving and gearing, and from it can be calculated out:

(1) Speed of counter shaft.
(2) Speed of main shaft.
(3) Speed of counter shaft on loom.
(4) Speed of crank shaft on loom or picks per min.
(5) Speed of machine.
(6) Speed of bottom roller B. R.
(7) Speed of top roller T. R.
(8) Speed of worm wheel W. W.

Allow 2 per cent. loss off speed for slipping up to counter shaft of loom, and 5 per cent. for main shaft of machine.

(1) $\dfrac{1800 \times 8}{24} = 600$ Rev. per min. of counter shaft. (R. P. M.)

(2) $\dfrac{600 \times 12}{36} = 200$ R. P. M. of main shaft.

(3) $\dfrac{200 \times 18}{14} \times \dfrac{98}{100}$ 252 R. P. M. of counter shaft C. S.

(4) $\dfrac{252 \times 19}{51} = 94$ picks per min. (approx.)

(5) $\dfrac{200 \times 12}{24} \times \dfrac{95}{100} = 95$ R. P. M. of machine.

(6) $\dfrac{95 \times 30}{50} = 57$ R. P. M. of bottom roller B. R.

(7) $\dfrac{57 \times 30}{25} \times \dfrac{45}{36} = 85\frac{1}{2}$ R. P. M. of top roller T. R.

(8) $\dfrac{171 \times 1}{2 \times 90}$ .95 R. P. M. of worm wheel.

It is also necessary that calculations of the following order can be worked out by the tuner.

How many picks will a Dobcross indirect driven loom run at, if sizes of wheels and care as follows: Speed of main shaft 162 R. P. M., driving drum on main shaft 22 in. diameter, fast and loose pulleys on loom 14 in. diameter, change bevel speed wheel 19 teeth, bevel on picking shaft 51 teeth, spur wheels on picking and crank shaft 57 teeth, using formula:

$$\overline{\text{D} \qquad \text{S}} \qquad \text{F} \qquad \text{S}$$

$$22 \times 19 \times 57 \times 162 = 14 \times 51 \times 57 \times X$$

$$X = \frac{22 \times 19 \times 57 \times 162}{14 \times 51 \times 57} = 95 \text{ picks per min.}$$

(2) How long would it take to weave 62 yds. of cloth with 60 picks per inch, the main shaft running at 162 R. P. M., drum on main shaft 18", on a loom geared

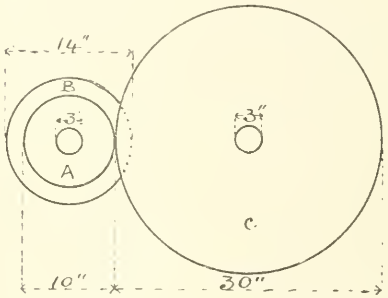


DIAGRAM 25.

up as above. Allow 20 per cent. for stoppages of loom, etc.

$$\overline{\text{D} \qquad \text{S}} = \overline{\text{F} \qquad \text{S}}$$

$$18 \times 19 \times 57 \times 162 = 14 \times 51 \times 57 \times X.$$

$$X = \frac{18 \times 19 \times 57 \times 162}{14 \times 51 \times 57} = 77.6 \text{ Rev. per min. of loom.}$$

Allows 20 per cent. loss $\dfrac{77.6 \times 80}{100} = 62$ picks per min.

$\dfrac{62 \text{ yds.} \times 36'' \times 60 \text{ picks per inch.}}{62 \text{ picks per min.} \times 60 \text{ min.}}$ 36 hrs. taken to weave 62 yds.

(3) Find size of pulley required on main shaft running at 150 R. P. M. to drive a loom at 95 picks per minute, the loom driving motion being geared up as follows: Loom pulley 14" diameter—this turns a counter shaft with an 18 bevel wheel on it, this bevel gearing into another bevel on the main shaft of loom,

with 51 teeth. Allow 2 per cent. loss for gearing and slip of belt.

$$\underline{X \times 18} \times \underline{150} = \underline{14 \times 51} \times 95$$

D S F S_1

$$X = \frac{14 \times 51 \times 95}{18 \times 150} = 25.3\text{'' size of pulley.}$$

$$\text{Allowing for the loss } \frac{25.3 \times 100}{98} = 26.2 \text{ in. actual size required.}$$

Any missing factor in the formula may be found in the manner shown above.

For calculation purposes, where gear wheels are concerned the ratio of the number of teeth in a pair of gear wheels equals that of their diameters e. g. Find speed of follower wheel when the teeth of driver are 50 and speed 100 R. P. M., and teeth of follower 25.

$$\frac{\text{Teeth in driver} \times \text{R. P. M. of driver}}{\text{Teeth in follower.}} =$$

$$\frac{50 \times 100}{25} = 200 \text{ R. P. M. of follower.}$$

When it is required to find the pitch of a gear wheel, the following formula can be used:

$D P \times P_1 = T \times P$

D P = Diameter of wheel at pitch circle.

$P = 3.1416 \text{ or } \frac{22}{7}$

T = Teeth in wheel.

P = Pitch of wheel.

e. g.--Find pitch of gear wheel, when diameter at pitch circle is 40'', wheel having 80 teeth.

$$\frac{40 \times 3.1416}{80} = 1.5708\text{'' pitch.}$$

The pitch of teeth = the distance between the edge of one tooth and the corresponding edge of the next tooth, or from centre of one to centre of the next when measured on the pitch line or centre line of wheel (that is, the line that exactly divides the mesh of the teeth when in gear or the rolling circumferential line of gear wheels). Any missing factor can be found by using the formula, as per example 2 and 3.

2——Find the number of teeth in gear wheel 30'' diam. on pitch circle, the pitch being .5''

$D P \times P_1 = T \times P$ therefore $\frac{D P \quad P_1}{P} = T$

$$\frac{3.1416 \times 30}{.5} = 188 \text{ Teeth.}$$

3—Find diameter of wheel at the pitch circle when the pitch is .25 and number of teeth in wheel 50.

$D P \times P_1 = T \times P$ therefore $\frac{T \times P}{P_1} = D P$

$$\frac{50 \times .25}{3.1416} = 4\text{'' approximately.}$$

Spur Wheels and Pinions.—It is not advisable for safe working to have pinion wheels in gear with spur wheels below the proportion of 6 to 1. If possible, use large pinions, as small pinions, when in gear with large wheels, are apt to wear rapidly, and teeth are often broken. Between 18 and 24 is quite small enough for pinion wheels, working on power looms. This varies of course according to pitch of teeth. It is better to use a double stud wheel, instead of a larger driver, and a small pinion, when high speeds are required, as the working is much smoother and safer, and no appreciable loss, owing to extra gearing is obtained when ordering spur wheels it is advisable to send a small sketch of the particular set of gearing with as many accompanying particulars as possible, as follows. (See sketch Fig. 25).

Particulars Required.	A.	B.	C.
Pitch diameter	10''	14''	30''
Number of teeth	21	35	63
Pitch of teeth	1½''	1.26''	1½''
Width of face.	2¼''	2''	2¼''
Bore of hub	3''	3''	3''
Projection of hub	½''	½''	½''
Length of hub	5''	4½''	5''
Number of arms	6	Plain	6

Material of wheels—Cast iron, steel, or wrought iron. When odd wheels are required, in place of one of an old pair, always give particulars of teeth of the companion wheel, and if possible, an impression taken from teeth of same. Exact measurements should be given of both wheels when their centres are fixed.

A CHEAP YARN.

An Austrian manufacturer has recently patented in England a process for manufacturing cheap coarse yarns from a mixture of crude wood wool and jute or similar coarse textile fibres. The wood wool and other fibre are both separately treated to a preliminary softening with water and suitable oils, and are then passed through the spinning process, which comprises carding, doubling and drawing, roving, and the final spinning. In preparing coarse yarns up to 1's, the wood wool, which may consist of fibres of about 500mm. (20in.) long, 1mm. (1-21 in.) wide, and 0.04mm. (1-635 in.) thick, is treated with a mixture of 25kilogs. of water and 6kilogs. of mineral oil to each 100kilogs. of wood fibre, and in order that this liquid shall be uniformly absorbed by the wood wool, it is allowed to stand for one or two days. The wood wool so treated is then passed through a softener or softening machine (such as is used for jute), in which the wood wool becomes still more supple.

The wood wool is then placed on the receiving table of a jute breaker card, together with jute which has received a similar preliminary treatment. An advantageous proportion is about 7kilogs. of jute to 12kilogs. of wood wool. The toothed rollers of the carding machine, in addition to stretching and laying parallel the curly wood wool fibres, divide the fibres. The carding machine delivers the material so treated in the form of a band or sliver which can be worked in a finisher card, provided with finer card clothing. This machine also delivers the material in the form of a band or sliver which is then passed through one or else two drawing frames, according to the degree of fineness required. In order to impart additional strength to the sliver, which has become somewhat weak by reason of the stretching, it is passed through the second drawing frame together with one or two suitable jute slivers. Finally, the sliver receives a further stretching and the necessary twisting on a slubbing frame or gill spinning machine.

CONDITIONING OF COTTON YARNS.

By ARTHUR T. BRADLEE.

Address Delivered at the 10th Annual Convention and Exhibition of the National Association of Hosiery and Underwear Manufacturers.

The subject of moisture in cotton yarns is but one small item in the general subject which the committee, of which I have been chairman, have endeavoured to take up. The question of moisture, however, in yarns of all kinds, especially worsted and silk yarns, worsted products and silk products, has been discussed for a long time. In 1895 the Arlington Mills started in this country a new business, the sale of worsted tops, that is, combed wool ready for the spinner. I want to read from an article published at that time by the Arlington Mills in regard to moisture in worsted yarn. An experiment that was made during the year, from the first of May, 1895, to the following first of May, 1896—"the superintendent of the worsted department of the Arlington Mills had accurate weighings taken ten times a day at approximately the same hours for every day except Sundays and holidays of a certain skein of worsted yarn, the same skein throughout the entire year. This yarn was left exposed in an open shed where no artificial heat ever came, and from which wind, sun and rain were excluded, but which was otherwise exposed to the outside influence of the atmosphere. The great variations observed in the weight of this skein of yarn were remarkable. The moisture it contained ranged from a little over 7 per cent. to as high as 35 per cent. of its total weight, often with a variation of from 15 to 20 per cent. in 24 hours."

That shows you the necessity in wool products, in some cases, anyway, of considering the question of moisture. Now, in worsted tops from that time the Arlington Mills adopted a standard of regain in this country of 15 per cent; that is, that 100 pounds of dry worsted tops will be 115 pounds in its natural condition, that is, the natural condition in this country. In England I think it is 18½ per cent., but England is a moister climate, as you know, than the United States. The adoption of that standard by the Arlington Mills at that time has led to its adoption by the entire United States. I do not think there is a pound of worsted tops sold to-day except on that basis.

In 1910, five years ago, the New England National Association of Cotton Manufacturers appointed a committee to co-operate with a committee from the South, from the New York brokers and the general trade, to get up a standard sale note for cotton cloth. I was asked to attend some of these meetings and I found an absolute lack of knowledge on the subject as to what variations ought to be expected in cotton. There was no basis on which to work and it led me to make an address to the Association, from which I will quote a few words. Referring to the question of the standardizing of the sale note, I said:—"We cannot have a standard sale note until we have a standard on which to make that sale note. That standard must not be the standard of the seller nor the standard of the buyer, nor can it be a standard of compromise. It must be a standard of fact and we do not to-day know the fact."

Later on in this speech, telling what had been done abroad and the facilities that have been given them to adopt the standards which they have, I said—"I am aware that there are many who do not believe in such innovations. The methods of the past have been good enough for our fathers, they should be good enough for us; but scientific methods in all forms of business are pushing to the front with rapid strides; we cannot know too much about our business and for the honest manufacturer it is well that the buyer of his goods should be equally posted. I believe that there was never greater honesty in business as a whole than there is to-day and that most of the differences in the textile business arise through ignorance of the real conditions and the real troubles in dispute. We can each form our own individual standards, but neither you nor I nor any committee of us can form standards for others to abide by until we have recognized public facilities for establishing what those standards shall be and open up for easy access to the buyer and the seller alike the same facilities for their own conviction as to the justice of the standards so adopted."

As a result, perhaps, of that, another committee was formed and started with the idea of possibly arriving at some uniform method of testing. The United States Government at that time was just about to put out specifications for the purchase of cloth, khaki, duck and various other things, and they had adopted at the Bureau of Standards, or were about to adopt, specifications under which these cloths should be bought. I went to Washington and communicated with the Government and asked for their co-operation to the end that the standards adopted by the U. S. Government should also be standards adopted by the manufacturers, thinking it would be a very bad thing if the U. S. Government should adopt standards which could not be lived up to by the manufacturers and that they ought to work in co-operation with the manufacturers so that the standards adopted should be fair standards and standards that were truthful and right. I received the most cordial support of the U. S. Government and they have worked from that time in the greatest harmony. They have given us every possible support and co-operation. Wishing also that we should have this more than local, I communicated with the great testing houses of England and have received from them the most cordial support. We have given to them the benefit of what we have done; they have given to us the benefit of what they are doing. After we had progressed some little ways, the U. S. Government sent a representative to England to confer with the English testing houses and, on behalf of our association, we arranged with that representative to get at the business end of the work of the foreign testing houses and find out how they were run, what it cost to run them, what use they were, how they were used in the trade and all matters pertaining to the business end, which the U. S. Government was not so much interested in as we were. The two great testing houses abroad—that is, in England—are the Bradford Conditioning House and the Manchester Testing House—the Bradford Conditioning House being a conditioning house more in the woolen district, the Manchester Testing House being a testing house directly in the cotton district. Now, the Bradford Conditioning House was only founded in 1888 and the Manchester Testing House started in 1895. In Bradford last year they made 250,000 tests on 103,000,000 lbs. of material. As I said before, the influence of moisture on wool is, of course, a great deal more than it is on cotton, as regards differences in weight. The Manchester Testing House last year made 80,000 tests. These testing houses were first started by individuals in the trade representing manufacturers who were interested. To-day they are both of them self-supporting; in fact, they are running ahead. From these tests of these foreign houses they have formed a basis for a sale note and there is a regular standard sale note in Manchester adopted by all the cotton associations working together. There is a standard sale note in Bradford, and all that the sale note really says on it is—"Subject to the rules of the Bradford Conditioning House or the Manchester Testing House," and those rules are very short and simple. In case of any dispute between a buyer or a seller, they have there a tribunal. The tribunal consists of a body of men, not the same men for all the time, but in each case the governing boards of the testing houses select certain men for that particular tribunal. The parties in dispute are not even known to the people who try them. I say try them. They are really hearings before a tribunal of men picked as experts in their line and who use the testing houses as a basis for whatever tests they want to make on yarns or fabrics in dispute. Now, the adoption of that tribunal has done away practically with its use. I mean by that that very little is brought to the tribunal. No man would bring to a tribunal of manufacturers anything he was not pretty sure he was right upon. In the first place, the buyer of goods must be pretty sure that he is right in his contention; also the manufacturer must be pretty sure he is right to carry it to that tribunal and I think the result has been possibly greater perfection of manufacture at one end of the line and greater care in the examination of stuff by the buyer at the other. Of course, a man might bring to a tribunal a bad case, but no man would want to bring cases there a great number of times and be turned down, because the rulings of the tribunal would be made public.

As a result, therefore, the tribunal is rarely used; but, on the other hand, there are practically no disputes settled in England in any other way and they have very little dispute compared to what there is in this country.

The testing houses over there test not only the products themselves, but other things that go into textile manufacturing, like dye stuffs and chemicals, sizings, the question of mildew and all problems of that sort that are of interest to the textile trade. I would say that a report on what those conditioning houses do, of how they are run, the charges that they make and all the various uses of the tribunal, how it is formed, etc., is in a most complete report to the United States and to ourselves and has been published in the transactions of the National Association of Cotton Manufacturers of last April.

The National Association of Cotton Manufacturers, feeling that they would like to have some place here which would be common authorized ground for the testing of fabrics similar to those conditioning houses, have adopted, with the consent and approval of the U. S. Government, the United States Conditioning and Testing House of New York City, which was an organization started by the large silk manufacturers and which is now extending its operations very largely to cotton and is willing to extend them to any reasonable degree. I hope that the different associations of the country will adopt the same place, for the time being, at any rate, as being the recognized headquarters so that we can all work along the same lines. Mr. Doty, who has charge of the U. S. Conditioning House in New York City, was with the U. S. Government and is working right in line with the U. S. Government now and has their hearty approval. The U. S. Government itself will make tests for you, and if any of you have never seen the reports of the U. S. Government, I advise you to get this pamphlet of the Bureau of Standards. It gives you the results of all the various tests that have been made, gives you information as regards what they will do for you and the prices at which they will make those tests. However, they did not intend to go into this thing except as a help to the manufacturer; they do not mean to make this a regular business of the Government, so that it will be necessary to adopt some outside testing house for the regular work, and that has been done by the National Association of Cotton Manufacturers.

The following extracts are from the U. S. Government pamphlet to which I refer:

"With small changes in the relative humidity of the atmosphere, such as from 45 per cent. to 85 per cent., the size of a 36.1 yarn may vary as much as two counts, and an 80.1 yarn over four counts; or, in other words, 5.5 per cent. in each case. The two-ply yarns are not as susceptible to changes due to humidity in the atmosphere, although they vary from one-half a count on 10.2 yarn to almost five counts on 96.2 yarn, with an average of 4.5 per cent. on all sizes. Greater differences in relative humidity are common in this country than those used in this work, and if the extremes were employed, much greater variation in yarn count would have been obtained."

"The tensile strength of cotton yarns increases with an increase of moisture up to 85 per cent. relative humidity (the highest point reached in this investigation). The one-ply yarns (singles) are influenced more than the two-ply yarns. Calculating from 55 per cent. to 85 per cent. relative humidities, the singles increase 17 per cent. and the two-ply yarns increase 11 per cent. in tensile strength."

I give you that merely to show you that the sizing of yarns and the strength of yarns is dependent on the condition of the yarns. The English Government, four or five years ago, or the Manchester Testing House, said they disregarded entirely the atmospheric conditions, but I have since had a very interesting report by the head of this Manchester Testing House, in which he tested cotton cloth, linen cloth and worsted cloth certain different days in the year. I would like to give you some of the breaking strengths of those pieces of cloth. At 44 per cent. relative humidity, the cotton cloth broke at 521 pounds, the linen cloth at 599 pounds and a piece of wool serge broke at 186 pounds. Now, at 82 per cent. relative humidity the piece of cloth which broke at 521 pounds broke at 592 pounds, the piece of linen which broke at 599 pounds broke at 729 pounds, the piece of wool serge which broke at 186 pounds broke at 160 pounds, and this very interesting curve here shows the relative humidity going up and down and with that the varying breaking strength of the cotton and linen cloths corresponding exactly, while the curve of the wool serge goes in an absolutely opposite direction. In other words, adding moisture made the wool weaker and the cotton and linen stronger. He goes on here and, after saying undoubtedly a great many goods which ought to have been accepted have been rejected because of the varying conditions under which they were tested, says—"if the amount of moisture present in the air can influence the count of yarn to such an extent as to show an actual 40 yarn as 39 one day, 41 on another day, and can influence the strength of the cloth 12 per cent. to 18 per cent., and possibly more, it would seem unreasonable that exception should be taken to goods which fall short of a contract specification by these amounts, unless reliable tests had been carried out under stated and agreed conditions of humidity." That is quite a change from the position taken five years ago.

Also, I would like to read here the statement of an Englishman some time back in regard to manufactures in America. He said—"I do not think the Americans will ever be able to make yarn as good as we can in this country. The climate of the United States is very unfavourable for the spinning of yarn; the very great changes that take place, the intense heat in summer and the intense cold in winter are very unfavourable to the spinning of worsted yarns. A moist climate is more suitable for them." That accounts very largely for the cotton spinning industry being centered near Manchester in England, and also for the original building of the cotton mills in Fall River and New Bedford in this country. That condition, of course, is entirely changed to-day, because we keep, by humidifiers, etc., the condition of our mills much more uniform than is possible in any climate and that is borne out by the fact that the English mills, right in their own climate, now spin under regular moisture conditions artificially made. This better working condition realized then and realized to-day, in which cotton must be spun, and in which it must be worked, possibly can be carried further in your own business. That I do not know about, but in regard to knitting, I know from my own experience in examining into trouble of one kind and another, that in the wintertime, when the air is very dry, yarns that would knit in August and September are sometimes very hard to knit. They twist and are more liable to kink. You take the summertime, open these windows and let the ordinary air come in here with its moisture; in the wintertime take this air at zero degrees, with comparatively little moisture in it compared with the higher temperature, and heat that to 70 degrees and drive in into this room—you will immediately affect all vegetable fibre in this room. You men who smoke know that in the summertime a cigar may get so full of moisture that you can wring water out of it if it is near the seashore, and in the wintertime the same cigar will peel and go to pieces. Now, that's the same cigar, the only change is in the condition in which the cigar is at the time, and so in the knitting of yarn; it is merely a thought in my mind which you gentleman know a great deal more about than do I, as to whether in knitting better results cannot be obtained by keeping conditions in what might be called the best working conditions for the yarn.

Now, this whole business of conditioning and the work of our committee has not been, as a great many people seem to think, to stop fraud, the watering of yarn or anything in the way of fraud. I do not believe there is anything in the way of fraud to be considered. Our object was to get certain knowledge before the trade so that they might benefit from it and also to find, as it were, some uniform method of testing and some uniform method, perhaps, of specifications as to breaking strength, etc., when required, so that we would not have troubles which arise to-day from really inadequate knowledge of the subject. That is why we have had this one testing house appointed by the National Association, why we have worked with the National Government and with the English Government with the object of all getting together and having some basis open to everybody for the getting of this information. I think it would be well for anyone who is interested in the subject to get these two circulars from the U. S. Government, which they would be very glad to send you, and anything that I can do for you I will be very glad to do. I hope that this Association, if they take any action toward a conditioning house or any action in any way, will co-operate with us and with the U. S. Government, so that we won't be working at counter purposes, because it is of the utmost importance that we should be all on a common basis and that the information should be open to the buyer and to the seller, so that all shall know just how we are doing it. If we form standards of any kind later we should do it with your co-operation and with the co-operation of all interested parties, as well as of the Government, and thus try to adopt a universal common standard.

A MANUAL OF DYEING.

We are in receipt of a copy of the second edition of the third volume of the Cassella series of dyeing manuals which have been issued from time to time covering various phases of the work of the dyer.

The volume before us deals particularly with the work of the garment dyer and certain other branches of novelty coloring. The little volume includes 265 pages of which 140 relate to garment dyeing in particular, including special processes for coloring and stripping, water-proofing, dry dyeing, the re-dyeing of used leather goods, furs and rugs, bleaching, fire-proofing of textiles, etc. This section also includes important practical information on the dyeing of hosiery, artificial silk goods, china, grass, the new Salidonia fibre, jute, etc., and this section of the volume alone will no doubt prove of very great value to garment dyers generally.

Part II comprises 42 pages of technical matter including processes for the dyeing of feathers, straw, chip and tagal, human hair, natural and artificial flowers, leaves, grass, wood staining, celluloid, mother of pearl, horn and other similar products.

Part III includes 25 pages of technical matter devoted to the manufacture of pigment colors, colored varnishes, inks, typewriter ribbons, soap, wax, candle and fat coloring; besides including a valuable collection of recipes for the manufacturing of finishes for leather goods. The usual collection for the information of the working dyer.

This little volume, the size of which is convenient for the pocket, is bound in a very durable waterproof cover and is a very great improvement over the well-known first edition of this little work.

A copy of this volume may possibly be obtained from the Cassella Color Company by addressing a request to any of its branches.

FIFTH SERIES COLONIAL WOOL SALES.

The fifth series of Colonial Wool Sales at London is scheduled to commence on September 29. The arrivals to date are: New South Wales, 4,800 bales; Queensland, 5,650 bales; Victoria, 10,400 bales; South Australia, 250 bales; West Australia, 450 bales; Tasmania, 150 bales; New Zealand, 24,450 bales; Cape, 8,550 bales, a total of 54,700 bales. Of this 20,000 bales were forwarded direct to the continent on arrival, leaving a total available to date for the next series of 30,700 bales, new arrivals and 7,200 bales held over from last sales.

The Stretch of Knitted Fabric

We hear a great deal about the properties of stretch and elasticity possessed by the knitted fabric, and how these properties make it suitable for the special purpose for which it is intended. It will, however, be interesting to examine those qualities a little more fully with a view to obtaining more accurate ideas regarding the fabric as a whole. If we take, for instance, the normal type of woven cloth, where there is an equal number of ends with picks per inch and where the size of the yarn is alike, then we will have approximately equal strength and stretch in the length and the width way of the cloth. On examining the structure of the plain knitted stitch or normal type, however, we find very considerable differences in the width and length directions as regards those properties.

With a view to arriving at definite results on the subject, the writer recently undertook a series of tests on a standard machine used for testing Government cloths, and the figures obtained were most interesting and instructive. The usual machine is not adapted for giving the full stretch, but a part was marked off in the centre of the piece of fabric to be tested, and the proportion of the stretch noted on that portion. An extract of the figure is given in the accompanying table, which is drawn out so as to show the results obtained in testing for strength and stretch in both the length and width. The fibres chosen were standard cloths such as are in everyday use, and they were taken in a series of gauges and stitches. The chief point of interest in the table is to note the relation which exists between the width and length dimensions, and the peculiarities of the rib varieties given.

Taking a general analysis of the figures given, we see that the relation between the length and width particulars in each case is fairly constant. For the four examples of plain stitch, the 3in. original length stretches in two cases to a further $2\frac{1}{4}$in., in one case to $2\frac{3}{4}$in., and in another case to $3\frac{1}{4}$in., so taking an approximate, one might say that in general the knitted fabric plain stitch will stretch from two-thirds to double the original in the direction of the length.

In the width, the stretch, as is to be expected, is much greater, and the figures show even a more uniform result. In two cases the fabric stretches from 3 to $8\frac{3}{4}$in., in another case to $9\frac{1}{4}$in., and in still another to 9in. in width. We may thus say with considerable accuracy that the stretch is such that the fabric will stretch three times its original width before breaking. For the plain stitch, therefore, we would say that the fabric under conditions will stretch to twice the original in the length and three times the original in the width before giving way.

If the figures for stretch or breaking strain be examined they will be found to bear an interesting relation to each other in the first four examples of plain fabric. In each case the strength in the length is much greater than that of the width. In other words, what is gained in elasticity is lost in strength. A piece of fabric about 7in. square was placed in the machine and regular strain applied until the cloth gave way. In each case the strength is about one-half more in the length than the width, and the examples give are from entirely different fabrics.

These facts can be borne out by considering the structure of the knitted stitch in its elementary form. The loops in the direction of the length hang on each other in small portions, the lower one being firmly twined to the one above. As strain is applied these loops elongate and the loop portions strengthen each other. You may be said to have the added strength of each separate loop. In the width, however, you have the direction in which the rows of loops have been made, and each course may be regarded as a single thread which has been formed over the needles in a zigzag curved fashion, and when stretch is applied you have excessive elasticity, because the added strain is merely pulling the separate threads straight, and, when this has been done, you have for the most part the strength of the separate threads, and these are not in very intimate connection with each other. If an unroved thread of knitted cloth be examined, it will be noticed that the length when straightened out is just about three times that which it occupied in the fabric; the "take-up," as it is termed, will be found to be that on one side the courses are knocked over double instead of single. You thus can put a greater quantity of yarn in the same space, and so increase the bulk and weight of the fabric. In the full cardigan we have a 1-and-1 rig again, but the doubling device is adopted on both sides of the cloth, so that the bulk of the fabric can be still further increased.

	Length.			Width.		
Fabric.	3in. Stretch to	Lb. Strain.	Permanent Stretch of 3in. Piece.	3in. Stretch to	Lb. Strain.	Permanent Stretch of 3in. Piece.
	In.		In.	In.		In.
Plain stitch.. ..	$6\frac{1}{4}$	174	4	$9\frac{1}{4}$	144	6
" "	$5\frac{1}{4}$	170	$3\frac{1}{2}$	$8\frac{3}{4}$	100	6
" "	$5\frac{1}{4}$	85	$3\frac{1}{2}$	$8\frac{3}{4}$	62	$5\frac{1}{4}$
" "	$5\frac{3}{8}$	150	4	9	108	$6\frac{1}{4}$
16. 1 rib.	$5\frac{3}{4}$	450	$4\frac{1}{2}$	$16\frac{1}{2}$	180	7
Half cardigan ..	6	350	4	12	225	7
Full cardigan ..	$7\frac{1}{2}$	420	$3\frac{3}{4}$	$14\frac{1}{2}$	375	$6\frac{1}{2}$

The table shows several examples of the tests made on the three chief types of ribbed fabrics. The first was the plain 1-and-1 rib, which, as is well known, has greatly increased elasticity in width. The next was the half cardigan or Royal rib, which is the same as the 1-and-1, except in the last three examples it is interesting to note that as regards strength of the width it is much augmented by putting in double courses on one side, and still further increased by making the courses double on both sides. In fact, it would seem that the full cardigan or double rib is in point of physical qualities the nearest to the woven cloth. It is the most stable, and this, no doubt, accounts for its extensive use for sweater garments and other articles for outer wear requiring a full bulky handle in the cloth.

An examination of those figures will show further the percentage of elasticity which is present in the knitted fabric. The difference between elasticity and stretch is familiar to most readers, the stretch being the amount which the article will yield in a certain condition, and the elasticity the extent to which it will resume its former dimensions after the stretching force has been removed. The figures of the table show that the elasticity is considerable, because the fabric assumes its former shape quite readily and shows very little permanent elongation.

In the direction of the length the average elongation may be taken as one third, but in the width it is considerably more, the fabric being permanently stretched to double its width. The one direction, however, depends on the other, and the apparent stretch in the width will be at once considerably reduced if the cloth be pulled somewhat in length. The natural elasticity of the material employed should be taken into account when making an estimate of those qualities which will hold good for all knitted fabrics. The tests given have, for the most part, been performed on woollen, worsted, or mixed cotton and wool yarns. The stretching in a wood-pulp fabric would be relatively less than that of a woollen, and also a cotton fabric would not have as much stretch, which would be attributed to the material.—"Cotton."

Cotton Situation in United States

(Special Correspondence).

New York, Aug. 8.—Cotton growers of the South are facing a crisis on account of Europe's inability to take our surplus cotton of from 6,000,000 to 9,000,000 bales. If the European war had broken out in the spring the acreage would probably have been much reduced automatically. But for the present they have a product on their hands worth from $300,000,000 to $400,000,000 to carry, and they are in dire need of help. Various expedients have been suggested as a means of meeting this situation. The first problem is to take care of about 300,000 bales of cotton up to September 1, probably 500,000 bales during September and 1,500,000 bales during October. The handling of another 1,750,000, making 4,000,000 in all, by the end of November, would go far towards preventing prices from slumping. The holding of 4,000,000 bales of cotton at $55 a bale would require $220,000,000 capital. On this the owners or trustees could probably borrow $180,000,000.

A second suggestion is to develop the consuming capacity of domestic mills, which are now capable of taking 6,000,000 bales. By the special promotion of foreign markets under the suspension of the European supply of cotton goods our mills might easily enlarge their cloth and yarn production for Latin American as well as African and Asiatic wares. An expansion of 50 per cent. in consumption would enable the home mills with over 31,000,000 spindles to take 9,000,000 bales. That would in itself be a substantial relief provided they could sell the goods.

There are no large stocks of cotton goods in this country, and the European war is likely to prevent imports. The whole demand for cotton textiles would then fall on the home mills.

The war has intercepted jute imports, the staple material on which southern mills have depended regularly for this class of manufacture. The large mills at Memphis are already considering the necessity of having to manufacture cotton bagging out of cotton instead of jute for wrapping bales. At five yards a bale, 15,000,000 bales of cotton would make 75,000,000 of cloth for this single new item of demand alone.

The policy of southern growers, if Europe fails to take its share of raw cotton, would be immediately to address themselves to diversification to such an extent as to cut the cotton crop down to less than 10,000,000 bales; that is one third below the absolutely necessary requirements to keep the world's spindles going. Europe has about 100,000,000 spindles out of 143,000,000 in the world's spinning equipment. There could be no greater calamity to isolate Europe from a manufacturing standpoint than a radical reduction of the American cotton supply. That would bankrupt a major portion of their manufacturing industry. Nor is this all, the loss of the markets in various parts of the world for cotton goods is a possibility involved in the present crisis.

The practicability of financing a loan of $180,000,000 to carry cotton is probably no more difficult than the valorization of Brazilian coffee in 1908. Various proposals have been made among which is that of issuing cotton bonds of one hundred dollars in denomination and higher, to which general subscription throughout the south might be invited. It is generally regarded that this would have to be done privately, as there would be much opposition to any governmental underwriting unless it were fathered by the States as such. Unless something effective is undertaken a revolution in the cotton growing industry is inevitable before next spring.

Position of United States Wool Manufacturers

(Special Correspondence).

New York, Aug. 8.—The European war has been the big factor in the wool market, as it has been and will be the overshadowing influence in all commodity markets of the world. With foreign exchange completely deranged, if not paralyzed, and with shipping facilities withdrawn, it has been of course impossible to do much business.

Importers are sitting back and doing nothing. The prevailing opinion is that the war will be of fairly long duration and that it will be impossible to transact any foreign business for weeks to come. The United States, to state the situation succinctly, is in about the same boat as regards wool as is Europe with grain.

It consumes twice as much wool as it grows itself. Normally it uses up some 600,000,000 pounds a year, of which the domestic clip has of late years contributed only 320,000,000 pounds.

It is inevitable that the prices will rise on this side of the water and as a matter of fact the advance in wool already has been a full cent a pound. This is equivalent to a 5 per cent. rise and has developed within several days of the formal announcement of hostilities between Germany and Russia. There is every indication that the advance will go still further.

The stock of wool in the United States is well below normal. On account of the tariff readjustments and later as a result of high prices the mills chose to travel close to the wind on raw material supplies. Consequently there is a smaller reserve supply available than for many years, the mills all waiting for the coming clip. The supply of foreign wool in the country does not represent a month's consumption.

The outlook is that American mills will benefit considerably, certainly for a six months' period at least. Importations are being cancelled and there is no doubt that foreign textile organizations and properties will be badly disrupted or destroyed. The menace of foreign competition has at last been removed by the great war.

COTTON CARDING POINTS

First of a Series of Articles on Cotton Carding.

By WILLIAM SHAW

I would like to have every young carder and second hands of carding follow these articles, as it is my intention to give the readers my twenty-five years of experience as a carder, and give every practical and valuable point that I can recall to my mind.

A young man just promoted to the position of carder, journed 120 miles to have a personal interview with the writer, very recently. It was his first position, and what seemed to trouble him most was, what he should do and how he should act the first day. The first day is what he dreaded. For the benefit of many that may have the same feeling, I give below the lines of procedure I mapped out for the young man in question.

In taking charge of a card room, get in early in the morning and take the number of every hank clock.

As a rule, your predecessor will favor himself by taking the clocks a little ahead. Be sure of the point. Next, remember and convince yourself that you are the king pin of the room, and so be careful to ask no questions; let them come to you. The greatest mistake made by many new men in taking charge of a room is in asking the help questions.

After the help are properly placed, begin at the picker room and get every name in the room, and make a note of what machine each name attends.

Then, get acquainted with the spinner, and ask him to give you immediately a sizing from pick ups around the room. Next, obtain two bobbins from each fine frame and size them, and have the spinner put them in size and compare this sizing with that of the pick ups in the spinning room.

If a big variation is found, inquire from the second hand if any gears were changed a day or two before your coming. If so, go slow, and look up the carding report for the previous week, and if the fine hank is lighter or heavier than reported, change to the hank roving reported. On the other hand, if very little difference is found in the sizeing, size every process immediately and make a record of same for every process.

Then size your drawing twice daily and change the finish drawing when the roving varies from the first day's records.

A great many experienced carders may not agree with me on these points, but let me say that if the precautions pointed out were followed by every new man taking charge of a room, the section beams in most cases would not jump 20 to 30 pounds from the standard.

In the management of a card-room the carder's aim should be to produce good work, with as large a production as is consistent with the quality of the work required, and to avoid unnecessary waste, keeping down the expenses of wages and power, and keeping the machinery in good condition.

Every carder should understand the construction and peculiarities of the cotton fibre. Hold firmly in mind, if you can, that the cotton fibre is of hollow spiral or collapsed tubular form, with delicate waxy walls, and has wonderful adaptitude for drafting and twisting and manipulating under proper atmospheric conditions. What does this mean to a carder? (1) Beaters, too sharp or too dull, speeded too highly, or of the wrong design, will injure the waxy walls. Too close a setting on the cards will injure the waxy walls. Running the stock a second time will injure the waxy walls, and when you injure the waxy walls of the fibre it is made fluffy and will make weak yarn. (2) The atmospheric condition of the room goes a great way in keeping down the percentage of waste, and when you keep down the percentage of waste, you prevent the stock being run a second time. There are many carders who sit down with the morning paper in hand when they should be watching the thermometer. When the proper atmospheric running conditions get away from you, it means much bad work, a loss of production, poor quality and waste.

Give the picker room your attention when making your rounds, and when mixing be sure to sample every bale that is put in the bin, and have the cotton pulled in small pieces, and as each lot of cotton varies, bale from bale, have the mixing built in layers, so no two bales of the same mark will come together, and have each mixing large enough to last at least four or five days.

As a rule, you will find very few second hands good samplers of cotton, and there are many books on the market dealing with the subject, but you cannot learn to sample cotton from books. There is only one way to learn, and that is to sample it yourself. Sample every chance you get and notice how each mixing runs. That is, try to remember the nature of the stock in process, and notice whether it gains or loses twist.

Then, when you get the same kind of mixing, you know what to do. That is, what makes a man a good carder. Every mixing he puts in the bin he knows whether the stock will gain or lose twist, and this means less gear changing, and less gear changing means uniform work.

The carder able to judge how a mixing will run by sampling is worth his weight in gold to the concern for which he works.

The picker-room is a department considered too unimportant by many carders. That is where a great mistake is made, because cotton wrongly blended cannot be separated afterwards. No two mixings are alike, and almost every time that a mixing is changed with no attention given, changes have to be made in the card or spinning room, and the result is uneven yarn.

As I have stated in my previous articles, I have visited most mills in the North and Southern States, and in almost every large concern equipped with a bale breaker and automatic conveyors I found the cotton fed to the breaker one bale at a time. What a mistake! The strange part of it is, that the men at the helm of these mills wonder what makes the work uneven. What else can be expected? The system is all right, but it is abused. The bale breaker is intended to perform what is done by the human hand, but every manufacturer will find his work much evener if he will insist upon having the mixing broken in small pieces and built in layers, as described, and afterwards fed to the bale breaker. Try it. Even work means a better and larger production, because when the work in the card and spinning room is even, the front rolls can be driven faster and the work at the same time will run better than with a slow-speeded front roll in case of uneven work. Remember, the production of good quality and good quantity is what makes dividends.

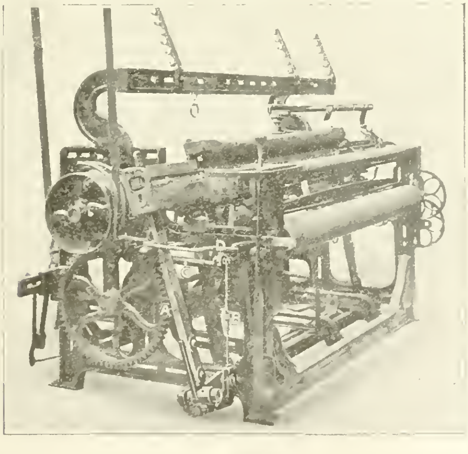
I once visited a large concern in the State of New Hampshire, and the agent of the concern had the best ideas on running a cotton mill of any man I ever met in charge of a cotton mill. He showed me a store house situated across a river. I saw how the different lots of bales were separated, and how they were conveyed to the mill by cable across the river. At mixing time one bale of each lot was taken, so that the cotton would be well blended.

It struck me that although this man was at a disadvantage in having the store house a great way from the picker-room, he had enough ingenuity to invent a system that would insure the blending of the different bales. Still, you will find large concerns that have the cotton shed door facing that of the picker-room that will allow one bale at a time to be fed at the bale breaker, which, I think, is one of the greatest mistakes in cotton carding.

New Strapless Picking Motion

A new form of strapless picking motion has recently been patented in Great Britain, by James Wade, 157 Upper Wortley-Road, Mortley, Leeds, England. The device as applied to a loom is shown in the accompanying illustration.

The long picking arm A is of the usual formation, and is compounded with a short horizontally disposed arm. This short arm carries a pivoted block, the arms of



which are engaged by a fork mounted on the lower end of the round upright rod B shown just to the left of the setting-on handle. This rod is pivoted to a short crank D mounted on one end of the horizontal rocking shaft C. On the other end of the rocking shaft C is a projection which comes into the path of the usual picking bill or nose of the picking tappet mounted in the ordinary manner on the second-motion or lower shaft of the loom. In operation the picking nose strikes the projection on the rear end of the horizontal shaft C, and thus rocks the latter, and lowers the arm D and the rod B. The lowering of this rod gives an impetus to the shaft arm of the picking lever, causing the long arm A to pick the shuttle. It is obvious that by adjusting the length of the operating rod B the moment in the cycle of operations of the going part of the loom at which the impulse is transmitted to the short arm of the picking lever will be advanced or retarded so that the power transmitted can be varied as may be desirable.

There is a positive connection from the picking bill up to the lever arm A and there is no mechanism or part which can be stretched or otherwise influenced to affect the timing of the picking lever or the strength of the blow given thereto. After the stroke of the picking nose the shaft C is returned to its normal position under the influence of a spring acting on the projection formed on the rearward end of the shaft C. Another spring secured at one end to the lower loom framing, and at the other end to a projection on the bottom end of the picking arm A, serves to return the top end of the latter to the outer end of the shuttlebox. The great features of the motion are the rigidity and certainty of its action. The motion can be timed and adjusted to give just the strength of pick required, and then requires no further attention. It thus effects a distinct saving in power and supervision.

Hosiery Wools

A well-known Bradford wool man writing during the time when the English wool fairs were in progress remarked on the strength of the Down wools and the Crossbreds which contain a mixture of the Down blood. The writer says:

The reader may well ask why this is so, and the reason is not far to seek. It will be remembered that the clip of 1913 was bought for glory and not profit, and all country dealers and Bradford merchants did badly out of it. The fact is significant that they did worse out of the stronger stapled wools, all the finer classes being saleable at a slight profit, or at least if an advance was not obtainable, holders lost no money. This shows distinctly the course of fashions and what has taken place during the past few months, it being increasingly manifest since the passing of the free wool tariff in the United States that medium and fine wools were most in demand. The bulk of the Down wools of England can only be called medium quality, say 46's to 48's, but for all that the raw material possesses special features which make them favourites with hosiery spinners and manufacturers the wide world over. This is the reason why all the Down wools are selling so well, and we believe will continue to hold their own for many months to come.

Why Downs Are so Popular.

We have already hinted as to the purposes and uses to which Down wools are put, and it is the great hosiery trade which is the prime reason for them being wanted. It is rather remarkable that the Down breeds of English sheep have never been kept in any great numbers in the other sheep breeding countries of the world. The Midland counties and certain southern counties of England are the principal place where such useful breeds as the Southdown, Shropshire, Hampshire and Suffolk Down sheep are kept, and outside the counties represented, the sheep are very little kept indeed. It is quite true that a few Downs have been exported to Australia and New Zealand, but they have never taken root like the Lincoln, Leicester or Romney Marsh, and it is as well that they have not. It is quite correct that the Down sheep are quick maturing, coming to full growth even faster than the Lincoln, Leicester or Romney Marsh. For fat lamb purposes possibly the Down cross is the quickest maturing animal, but what it gains in flesh it looses in fleece, and it is remarkable that wool buyers have never as yet taken very kindly to the half-bred Down-merino sheep as they have to the half-bred wool produced by mating the Lincoln, Leicester or Romney Marsh with the merino ewe. The halfbreed Down fleece is of a very short fuzzy nature, and while there is certainly manifest in the fleece the Down characteristics, the wool does not appeal to hosiery spinners as a rule like the pure Down wools from the English mutton breeds of sheep. We have seen Down half-bred wool from New Zealand that has sold from 14d to 15d per lb., but when we find other half-bred wool from New Zealand selling from 15d to 16½ d as is the case to-day, and the latter shearing a heavier fleece of wool, it is hardly likely that the Down sire will be largely used. Still there is a popularity about the pure Down wools which will always make them acceptable for hosiery trade purposes.

Hosiery Wools.

What are the leading characteristics of hosiery wools? It must be said that they are essentially wools showing medium growth, these remarks applying both to the quality and length of staple, and they are used for the production of those fabrics which are quite distinct in their composition from cloths made from combing or even clothing wools. It seems to us that hosiery wools are really a go between, occupying an intermediate state between clothing and combing wools and are better adapted for the production of hosiery than for woolen or worsted cloths. These wools are seldom above three inches long, and some are even shorter, though they are of medium texture. But then even combing wools are of similar length, but where the merino blood predominates, there is not the "blobbiness" of staple which is so essentially a characteristic connected with hosiery wools. The reader has only to take a staple each of say, Southdown, Shropshire, Hampshire, and merino, place them alongside each other, and a distinct difference will be seen at once in every staple. There will be more compactness about the staple of the merino and the Southern than there is about the Shropshire and the Hampshire grown wool, the latter being more open, more spongy, and more disposed to be mushy and noily. These are all very good characteristics where a full handling yarn and fabric is desired, it really being the spongy full handling nature of the wool which makes them such favourites for hosiery spinning purposes. The reader must have observed that hosiery fabrics as a rule are light, open, and fleecy, and it follows that wool that is given to felting quickly like the merino is hardly suitable for the full handling hosiery yarns which are to-day so largely in vogue in every country alike.

The Growth of Hosiery Wools.

There is no doubt that climate and pasturage play a very important part in determining the character of the wool grown. We were recently called in to give an expert opinion on five Southdown fleeces grown in Victoria, and there were at least two distinct types of wool. Two of the rams' fleeces showed real typical Southdown characteristics, and three were really of a Shropshire order. We are confident that climate and pasturage were here very much written upon the staple and general features of the fleece, and the same to a very large extent predominates in the wools grown in the Midland and Southern counties of England. The question is well worth asking, What has helped to make the Down wools of Great Britain? We have said for 25 years that in the evolution of the Southdown, Shropshire and other Down breeds of English the merino has at one time played an important part, for a critical examination of the Down wools of England to-day shows distinctly that there is merino blood in them. We are more convinced of this fact than ever, for even the general contour of the staple, if such a term can be used, proclaims the fact most eloquently. In a book published in 1809 giving a record of the introduction of the merino into England there is also a full account of the letting of the merino rams of King George III importation, to the leading sheep breeders of Suffolk, Hampshire, Dorset, and other neighbouring countries, and we maintain that the use of the merino of that day influenced the sheep for good, and to this very day, merino blood is in evidence. No doubt climate and pasturage have also contributed a leading part to the evolution of the Down breeds of England, but all the same in the make up of both sheep and fleece, the merino has played a leading part. These Down breeds are here to stay, and as long as the hosiery trade lasts, Down wool will be popular favourites, because they possess the features which we have outlined.

SCROOP IN SILK.

Neutral soap, even at the boil, does not injure unweighted silk, and may be used with impunity in white fabrics; it must, however, be borne in mind that silk is particularly sensitive to iron stains, which are frequently very difficult (sometimes impossible) to remove. Caustic alkalies in cold dilute solutions have little action upon silk, but if boiling or highly concentrated will destroy the fibre. Dilute solutions of mineral and organic acids, even at the boil, do not injure silk if the treatment is not prolonged. Acid imparts to the silk fibre a peculiar handle or crackle known technically as "scroop." Silk fabrics which have been washed in soap should be rinsed quite free from it and then im- as a last rinse. A teaspoonful of acetic acid in 10 gallons as a last rinse. A teaspoonful of acetic in 10 gallons of water is sufficient for the purpose (just enough to make the water taste acid). The acid which the fibre retains gives it an added lustre, brightens the shades of coloured fabrics, and removes the dead feel of a washed silk by imparting the scroop of a new silk article.

CANADIAN CONNECTICUT COTTON.

McCuaig Bros. & Co., of Montreal, in a recent bulletin regarding the affairs of the Canadian Connecticut Cotton Company, of Sherbrooke, Me., say, in part:

"In spite of the delays inseparable from the commencement of operations by a new plant, the Canadian Connecticut Cotton Mills Limited has made excellent progress.

"The factory at Sherbrooke is now producing at the rate of 12,000 pounds tire fabric per week, which is at the rate of 600,000 pounds per annum. In other words, it is now operating at 60 per cent. capacity.

"All the machinery is in place and the greater part is set up. In fact, practically the only thing that is holding back operations is the breaking in of labor, as some difficulty has been experienced in obtaining a sufficient supply of skilled help, which is essential in the production of tire fabric.

"However, the company expects to be operating at full capacity inside of six weeks."

THE AUSTRIAN TEXTILE INDUSTRY

By H. C. BEATTY.

In face of the great war in which Austria-Hungary is involved it will be interesting to know the state of textile industry after the Balkan conflict and the position the industry holds in the commerce of the country. The Balkan war had a very grave effect upon countries which surrounded them and Austria-Hungary appears to have been more seriously affected by the war conditions than any other power not actually engaged. Industrial development caused a demand for capital, and there was an extreme scarcity of money, the rates of discount reached 7 per cent., the highest rate that has been reached in Austria-Hungary for the previous four decades, and higher than any other country in Europe. Savings were withdrawn from the banks for daily support, on account of the huge number of unemployed. The cessation of the home demand, coupled with the closing of the usual Balkan outlets for trade, checked commerce in general.

The Textile industry of Austria-Hungary was the most seriously affected of all the branches of commerce. This industry is the most important in the country, employing, during normal conditions, over 300,000 workmen in scores of mills. For 5 years prior to 1913 there seems to have been gradually developed a state of stagnation in this industry, which culminated in the unfortunate season of 1913. The root of the trouble lay in the over development of spinning and weaving in the country. Instead of keeping within a modest scale of production, increasing as the market demanded, there was an unhealthy haste in advancing money to extend uncertain ventures in the hope that previous advances would be realized.

In 1913 home consumption reached its lowest ebb, home production its highest price. The mills were kept running to reduce the inevitable loss; the output, however, was limited by an agreement among the spinners but notwithstanding this limitation, there was not a demand for the output. As a result large amounts of goods were sold at unremunerative prices to Germany, Netherlands, Egypt and Asia. These forced exports had the effect of reducing the unfavorable balance of the Austria-Hungary trade for the year, but at a tremendous cost and great discomfort to the textile industries.

Austria-Hungary imported 240,000 tons of raw cotton, cotton yarn, cotton waste and cotton goods in 1912, worth by customs figures nearly $80,000,000. Of this the value of raw cotton was about $65,400,000, yarn and wadding $6,400,000, waste $2,200,000 and manufactured goods $7,200,000. The raw cotton came from different countries, in the following quantity: United States, 147,000 tons; British India, 31,000 tons; Egypt, 12,500 tons; Germany, 22,000 tons; Asiatic Turkey, 6,500 tons. The imports of cotton yarn and wadding in 1912 came chiefly from Great Britain, Germany and Switzerland, with smaller quantities from Italy and France, while the United States contributed none.

Wool, woolen yarn and woolen goods were imported to the value of $54,300,000. Austria-Hungary exported in the same year $21,000,000 worth, showing an unfavorable balance of $33,300,000 in the woolen industry. The imports included raw wool valued at $7,600,000; washed wool, value estimated at $7,100,000, and combed wool valued at $12,600,000. The raw wool was imported from the following countries: Argentina, 7,920 tons; Australia, 3,538 tons; Roumania, 754 tons; Great Britain, 581 tons; Russia, 437 tons; the United States, 261 tons, and other ports of America 919 tons. Of the washed wool 1,354 tons came from Germany, 3,504 tons from Belgium, 586 tons from France, 389 tons from Turkey, 281 tons from Russia, 171 tons from Greece, and 53 tons from the United States.

In 1912 Austria-Hungary imported 8,909 tons of woolen yarns worth $11,000,000, as compared with an export trade in the same year of 2,137 tons, worth $2,594,000. Great Britain and Germany obtained the most of this import trade, while the exports went chiefly to the Balkans, Russia and Turkey.

Woolen wares consisting chiefly of woolen goods, laces, hosiery, knit goods, shawls, felt, etc., were imported to the value of $10,350,000, as against an export in the same year of goods worth $14,400,000. The greater part of the woolen exports of Austria-Hungary consists of knit jerseys of fancy pattern, and heavy underclothing suitable for winter sports. The Austrian manufacturer makes a specialty of articles made from camel's hair. These are worked up into a great variety of attractive and expensive articles.

Austria-Hungary affords a splendid market for countries that grow cotton. There is not, however, a good market for cotton cloth to a foreign competitor, owing to certain economic factors and her geographical situation. She is accessible by sea to all the great cotton growing countries, and to the great consuming countries of Turkey, The Balkans, and her neighbor, Russia. She is an exporter rather than an importer of manufactured woolen goods. Austria-Hungary derives her raw material chiefly from distant countries. Low-priced labor and abundant water power, with a favorable manufacturing environment, and the proximity of the large markets of Turkey, Russia and The Balkans are factors which favor the industry, while the good taste of the country people and the widespread custom of manufacturing in the home enables a grade of product that appeals to the cultivated taste, to be sold at prices with which it would be hard to compete.

UNDERWEAR IN SOUTH AFRICA.

Information received from the Department of Trade & Commerce at Ottawa regarding the possibilities of extending our underwear and knit goods trade with South Africa advises the trade here as follows:—

"The garment most in demand in South Africa is similar to the lines which the Canadian jobbing houses have sold in the last eight years for a 50c. retail line. This line in the plain colors was quoted and sold last season by the United States manufacturers at $3.25 in 50 dozen case lots, assorted sizes, f.o.b. New York, and the fancy line, that has an Ombre effect, is quoted and sold in New York at $3.42. The prices, of course, vary a few cents, according to the placing of orders.

There are other lines such as the 75c. retail line in Canada and the dollar line. These are sold to a certain extent, but not in the large quantity that the cheaper line is sold in. These goods are sold in South Africa to miners particularly.

"If the dumping clause, which is actually in force now, is finally adopted by the South African Parliament, this should have the effect of allowing Canadian manufacturers to quote at higher prices than the Americans have been dumping at."

Our Old Country Letter

(From our Special Correspondent).

The failure of Neill Brothers, of London, was received with regret and some consternation in the Lancashire cotton trade. Since 1890 there has not been a Neill in the firm, and it appears that for some time past the amount of cotton business transacted by the firm has not been large. But Neill's estimate of the American cotton crop, which has been for many years one of the events of the cotton season, and though there are scores of estimates now, there is not another with such a tradition. The estimate for the present season was made at the end of October last and it has not turned out a success, but for some years Messrs. Neill—or the directing intelligence behind that title—have made valuable contributions to the information of the cotton trade, both by their estimates and by their general handling of statistics. Mr. G. T. Edington, who traded alone as Neill Brothers, is said to have lost heavily in 1906 on dealings in cotton futures in Liverpool. His liabilities are returned at $48,000. The petition against him was brought in the London Bankruptcy Court by Messrs. Frank Albrecht & Co., cotton brokers, of Liverpool, who are creditors for $1,248. Proofs to the amount of over $14,400 were put in by Liverpool cotton firms.

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In some of my past letters I have referred to the depression that prevails in the English cotton trade. Sir Charles Macara, the president of the Employers' Parliamentary Association, says that the depression is the result of a combination of circumstances over which no one has any control. It is practically affecting all countries in the world, and, so far as England is concerned, it is clear that it can only be dealt with by the industry as a whole. A general stoppage will come faster than some people have any idea of, for the reason that under existing conditions it is cheaper for the mills to stand idle than to work. If we succeed in getting the short time movement into operation I am hopeful that in the interests of the workers as well as of the employers, a uniform method of reduction in the working hours will, as far as practicable, be adopted. Looking at the matter from the position of the employer, if things are allowed to drift, no one can escape the consequences. "This is not the time for taking a selfish view," he added, "for sooner or later disaster is bound to come unless we act unitedly with employees and employers. To go on working at a heavy loss until firms be brought into liquidation simply means that the whole of machinery and buildings in the industry become depreciated. And one has to remember, too, that the seller at the lowest price regulates the market." Sir Charles Macara is doing all he can to promote the short-time movement and there is no reason whatever why it should not be adopted. The cotton trade at present is in very low water and thousands of looms are already idle.

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The King and Queen of England have been visiting the lace factories of Nottingham. At Messrs. J. & R. Morley's hosiery factory the Queen was brought into touch with an operative who was making hose for Her Majesty and who had also made it for the late Queen Victoria, in addition to Queen Alexandra. Here, too, was an employee, Mrs. Burton, who seamed the Queen's wedding stockings, and when Queen Mary learnt that Mrs. Burton had been for many years engaged on orders for the royal family she asked if the operative had ever seamed stockings for Queen Victoria. The woman replied that she had—some tartan and varicolored hosiery. The Queen before leaving the mill accepted a gift of hosiery and the King received a gold medal of the original knitting frame for stockings which was invented in 1587 by the Rev. William Lee, of Calverton. At Messrs. T. I. Birkin & Co.'s mill the King and Queen saw the making of lace and they were highly interested in the work of rectifying the mistakes of the machines. The royal visitors also saw lace curtains being made at Messrs. Thomas Adams & Co.'s mill. The Queen was particularly interested in the fine mess-room provided for the workers to take their food in and rest. Her Majesty said the arrangements were perfect.

* * * *

The King and Queen have also been visiting the jute workers in Dundee. They walked, along with the Princess Mary and their suite, through miles of factory alleyways. They beheld in warehouses bales of jute as received from Dundee's great rival in the industry, Calcutta. They saw the fibre being damped and oiled for spinning and softened between great spiral rollers. In the spinning shed, with its whirring machinery, the combing and twisting processes were observed until the thread is packed into the cones to fill the shuttles with weft. In the weaving shed warp threads, eight miles long, were being wound into spools, and looms were at work threading warp into heddles and into reeds. Looms also were weaving canvas for linoleum foundations. And all this and much more was the deeply interesting experience of the King and Queen in one of the great textile factories of Dundee. The Ashton Works, of which Sir James Caird is the head, is typical of many more in Dundee. The programme which served as a guide through these works contained the quotation:—"True love's the warp o' life, but its whiles filled frae a sorrowful shuttle." Sir James, who is one of the best kown Dundee jute manufacturers, is a great philanthropist. On the occasion of the King's visit he gave $480,000 for a new hospital. Sometime ago he gave $48,000 to the British Association for the Advancement of Scientific Work, and $72,000 to help on the Imperial Trans-Antarctic Expedition. He has also given Dundee beautiful parks and $48,000 to Mr. Winston Churchill to help England in the Free Trade movement. Sir James is a widower and over 70 years of age. He is a man that never advertises himself and he will not allow anyone else to do it for him. That is one of the reasons the world hears so little about him—except in jute.

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A self-threading shuttle has been patented by Mr. James Yates, loom jobber, 12 Egerton street, Wallgate. Wigan. The patent has been submitted to experts and it carries out the full requirements which are needed, as it can be threaded without touching it by the mouth. A slot in the shuttle at the end of the peg comes down into the hole where the thread passes through. Then the thread is wound round a metal disc and emerges on the outside just over the shuttle eye, and all that the weaver needs to do is to put the thread round the disc and pull it through the eye. It does not weaken the shuttle, nor is there any chance of the ends of the warp being broken.

* * * *

John Hetherington & Sons, Ltd., cotton machine makers, have handed over to the Textile School at New Bedford, Mass., U.S.A., the camless winding machine they exhibited at the recent Boston Exhibition.

Mr. H. Dodgson, an overlooker at Foulds & Sons, Burnley, has left for Canada to take up a new appointment. He received numerous presents from the weavers of his friends in Burnley.

In Lancashire the use of electricity for driving purposes in mills is becoming more general and numerous changes are to-day being made.

Our Bradford Letter

(Special to The Canadian Textile Journal)).

Bradford, July 29.—It is many years since there was such inactivity in the textile industries of Dewsbury, and the heavy woollen district. Night work has been reduced considerably, and for day workers there is very little overtime in any part of the district, while many hundreds of operatives are unable to earn a full week's wages. Cloth manufacturers appear to be a little better employed than rug or blanket makers, for there is still a fair amount of home trade, and the exports of heavy woollens of superior grades to the States are increasing to an appreciable extent. Quiet as business is, it is much worse in the Colne Valley, where the amount of unemployment is becoming serious. In normal periods the Colne Valley manufacturers are heavy buyers, not only of unpulled rags, but of shoddy, and there has been a great falling off in their purchases of all classes of raw materials. Carpet makers and carpet yarn spinners are only doing a small amount of trade. Most of the manufacturers are lessening the production by running machinery for fewer hours per day. With Canada trade shows very little improvement, and anything worth talking about is done in winter fabrics. Naturally the dyeing trade in the heavy woollen district is feeling the depression keenly, and help is being reduced all round.

All Branches Are Quiet.

Quietness also prevails in practically every branch of the textile industries of the Huddersfield district. Fine worsted makers are suffering most from the depressed conditions. There is also a decreased demand for tweeds, and the reduced output decided upon is accompanied by firm rates, which is most unusual, especially as at the same time competition to obtain orders has become keener. Opinion is divided as to the probable duration of the depression which has set in, but it is agreed that prospects, as regards the immediate future are not at all good. Reports are forecasting a decline in values before a marked revival in trade can set in. The United States is the only booming market. Canadian business is dull, particularly in tweeds, which has not yet even grown to an average of past years. The Canadian request for thin worsteds is also very small, and the same may be said in regard to other woollens in the Huddersfield district.

At Leeds trade is sluggish. With a few exceptions of mills making lower class goods, all could do with more work. The Canadian demand is not improving in bulk, but there is a better tone, and a feeling amongst the Leeds manufacturers that the Dominion will give them better prospects in the course of the next couple of months. The States demand is slow.

Flannels Dull—Some Mills Active.

At Rochdale there is a lull in the flannel trade, but of course this is to be expected, as the manufacturers are between the seasons. Trade, however, has been quiet since Whitsuntide, and quieter than usual at this time of the year. The advanced prices of flannel, of which I wrote about some time ago, are no doubt also causing the general public to delay their orders. Owing to the fact that there are not so many orders being received, many of the merchants are delaying their deliveries of flannel from the manufacturers. There are now fewer flannel manufacturers in Rochdale and district than there were a few years ago, and consequently a small production of flannel is taking place. As the manufacturers have a large supply of merchants' orders there is every prospect of no undue accumulation of stock. The demand from Canadian merchants is slow, and very little flannel orders are on the books at present.

At Hawick some of the mills are doing better than others, and there are a good many looms standing idle throughout the district. This is likely to continue until next season is entered upon, as orders for winter goods are now pretty well exhausted. Confirmation of spring orders are now coming in, but these will not be put into the looms for a few weeks. Spinners and dyers are moderately employed. The hosiery branch of the trade is in a healthy state. Hosiery manufacturers in Leicester and Nottingham are also well employed, but the Canadian demand for hosiery at all the centres is reported to be on a very small scale just at present.

Eastern States Letter

(Special Correspondence).

Providence, Aug. 8, 1914.—The past month has been the most chaotic for the textile mills that they have passed through in some years. Samples for Spring 1913 have been opened, cotton has gone high and is now breaking to new low levels, and the war, with its threatened stoppage of all supplies, more especially the dyestuffs, has made many a manufacturer wish that he were retired and in a place where he could not be bothered by business.

Mills have closed for lack of orders during the month, several have failed, and many have planned additions and are working overtime even now. Never in the history of the industry have such things happened for the manufacturer as are happening now, and it is believed that it will be many years before the present record is broken.

The cotton end of the industry is more chaotic than the woolen end, and at present many of the manufacturers are wondering what will be their next move. Cotton has broken many points since the war began, and curtailment is the order of the day. The mills of Fall River and New Bedford are curtailing by closing one or two days a week, while the Rhode Island mills are stopping machines throughout the plants and are trying to keep up appearances by working full time each week. The mills of the South are also curtailed, and many of them have closed for the whole of this month.

The opening of the woolen and worsted lines about the middle of the month was the big event for the manufacturers, and since that time they have been hearing from the selling agents in New York in a very satisfactory fashion. Many of the mills which have never before opened lines of men's wear opened lines of serges this year and have secured some business.

The tailors to the trade and the large book houses have bought sparingly, compared with other years, but the mills have all reported a very fair business, and, until the war broke loose all over Europe, the millmen were expecting a very large business for the season.

Prices on the lines that have been opened compare very favorable with those which were quoted a year ago, and in some cases that price is about the same. It was noticed in the opening of the lines that those which are made from the better qualities of wools have been raised in price to meet the prices which have been paid on the wool, but the goods made from the poorer and medium grades of wool are at same levels as last year.

The largest factor in the market is reported to have sold out practically all of the serges offered of the better grades, and several of the Fulton styles have been withdrawn from the market. Other serge offerigs have not been taken quite so well, and the mills are still looking for business.

The mills that opened lines of serges for the first time report a very satisfactory response from the trade in general, and the lines will probably be made permanent with the companies. The Lorraine Manufacturing Company of Pawtucket opened a line of fine woven men's wear serge, 54 inches wide, at 96 cents a yard, and they report a very good sale of this style. This was the company's first venture into the field for men's wear.

With the breaking of the wars in Europe came the realization that the country depended upon Germany for its dyestuffs and that there is not in the whole country more than enough dyes to last four or five months. During the past three or four days the buyers for the mills have been scouring the trade for dyestuffs, but without success. It is believed that Oxfords and other shades of greys will be quite stylish next year, if the wars last that long.

The Whitin Machine Works of Whitinsville, Mass., are to open a Boston office about the first of October, and the company has engaged Stephen C. Lowe, for many years the American representative of John Hetherington & Sons, Ltd., of Manchester, England, to take charge of it. Mr. Lowe is probably the best known machinery salesman in the United States, he having been instrumental in introducing to this country and Canada the Naismith comber, of which he has sold several thousands.

The Whitin Company has recently perfected the new Whitin comber, and it is expected that Mr. Lowe will devote his time to pushing this machine. The new machine has been in operation in two New Bedford mills for the past two months, and while the results of the tests have not been published as yet it is said that they have been exceedingly successful.

The plans of the Naumkeag Steam Cotton Company, which had its plant burned in the Salem fire of June, are of interest to all textile men. The company plans to rebuild at once, and to have the most up-to-date plant in the country when it is finished. In the meantime 400 Northrup automatic looms have been ordered from the Draper Company at Hopedale, Mass., and these are to be set up in a concrete warehouse which was not razed by the conflagration. The Draper Company will equip the new plant when it is erected.

The erection of two buildings for the Appalachian Mills at Knoxville, Tenn. will double the production of that company. The buildings have cost $50,000, and the machinery to equip them will cost about $100,000.

Plans have been completed and the contract has been let to a Providence firm for the erection of the plant, which will be occupied by the Hopedale Manufacturing Company at Milford Mass. The contract calls for the completion of the plant before the first of September, and it is expected that it will be in operation within a short time. The building is to be of brick 303 x 62 feet. It will be of standard mill construction with the maximum of light and air for the operatives.

The foundation work for additional construction work at the plant of the Hamilton Manufacturing Company of Lowell, Mass., is well under way, and it is believed that the second section of the immense weave shed for the company will be finished as soon as the textile situation clears up a little.

The second section is the one which is now under process of preparation, and it will be erected along the Bigelow canal in Lowell. When the plans of the company are completed it will have a three section weaving mill 800 feet in length and from four to five stories in height. With the completion of this three part unit, the Hamilton Manufacturing Company will be the largest single unit for the manufacture of cotton goods in the United States.

WABASSO COTTON CO. ANNUAL.

The annual statement of the Wabasso Cotton Co., submitted at the annual meeting, held the 31st July at Three Rivers, shows profits of $115,662, which compares with $123,374 the previous year.

The profit and loss account for the year, in comparison with the previous year, is as follows:—

	1914.	1913.
Balance forward..	$147,726	$ 82,841
Trade profits..	115,662	123,374
Bond interests	57,010	58,070
Doubtful debts	250	121

In the general statement of assets and liabilities, property, plant and machinery stand at $1,412,484, compared with $1,398,511. Inventories, raw cotton and goods on hand were $615,902, compared with $386,709 last year. Cash and accounts receivable $71,804, against $98,222 last year. Among the liabilities, accounts payable amount to $30,809, as compared with $33,875 last year.

AN INTERNATIONAL CRISIS.

The Cassella Color Company has issued a statement relating to the effect of the present crisis on the dyestuff trade in America and that company in particular, as follows:

"Almost without warning the civilized nations are facing a crisis deemed by most men impossible. The strongest and best armed of the world's nations are at war. Commercially, there is an unprecedented breakdown. In the dyestuff trade the source of supply—Germany—has for the time, been wholly severed from the American consuming trade. Dependence must be placed upon stocks on hand or undelivered on the water. The Cassella Color Company has always followed the principle of keeping in America supplies for all reasonable emergencies and it believes that with a little patience on the part of its friends, every reasonable need can be cared for. Close observers have held that the contest which seems imminent cannot be of long duration—the forces are too great—the power at the command of each too tremendous. Assuming this to be so, textile interests which are stocked with colors, reasonably may expect to weather the difficulty and if all will limit their demands to actual needs, no hardship should immediately come to any. No advance will be made in price to customers for deliveries from stocks on hand. The goods themselves are but part of the service which the company renders to the textile trade, and a crisis such as the present only accentuates the fact that we are here to protect those whose interests have been placed in our care."

MILL AND GENERAL TEXTILE NEWS

A report from Sorel, Que., states that R. J. Reeves, of Providence, R.I., has been granted land by the municipality of Massueville for the establishment of a felt factory in that district.

Charles Bradford, an employee of Ayer's Limited, Lachute, Que., was killed on July 13 at Centreville, Que. He was performing some acrobatics when he fell breaking his neck in the fall.

Charles Sumner Barton, president and treasurer of the Rice, Borton & Fales Machine and Iron Company of Worcester, Mass., died at his home in that city on July 11, last. The late Mr. Barton was born September 21, 1857.

Mr. William Mitchell,of Kincardine, Ont., has about completed plans to establish a small knitting business in that town next spring. He proposes to manufacture wool half hose.

The Arnprior Felt Co., Ltd., Arnprior, Ont., has been incorporated with a capitalization of $50,000. This company is now operating at Galetta, Ont., but has purchased the shirt factory property at Arnprior, which they expect to occupy this fall. The company has asked the Town for a fixed assessment of $5,000 for school taxes, exemption from general tax, and free water for a term of ten years. On motion, the Corporation will grant the Felt Company free water for the balance of the year, and will submit a by-law to the ratepayers at the January elections for exemption from taxation for a term of ten years, excepting school taxes and free water. J. T. Griffith is manager of the Arnprior Felt Co.

Harold Krohn, formerly in charge of the sweater department with Hewson's, at Amherst, N.S., is now with R. G. Long & Co., Toronto, in a similar capacity, succeeding J. A. Blundell.

The Monarch Knitting Company, Limited, has surrendered their Ontario charter under date of July 20. The company is, of course, incorporated under a Dominion charter.

The Cobourg Felt Company, Limited, Cobourg, Ont., has recently taken out an Ontario charter, the caiptal to be $200,000. The company purposes to manufacture felt for footwear purposes. The directors are: G. W. Charles, Henry Fullerton, John Dick and W. M. Hilliard, all of Cobourg.

Ferguson & Swanson, brokers, Continental Life Bldg., Toronto, were the purchasers of the buildings, real estate and equipment of the Dominion Linen Manufacturing Co. of Guelph. A new organization, called the Dominion Linens, Ltd., is being promoted, which will probably include the Oxford Linen Mills at Tilsonburg, Ont., now idle. The Guelph plant is now being operated.

As announced in last month's issue, the Oxford Worsted Linen Mills, Ltd., of Dorchester, N.B., is being reorganized under the name, Eastern Linen Mills, Ltd. An agreement has been made with the Eastern Securities, Ltd., whereby the new company will be supplied with capital to make certain necessary improvements to the plant and to carry on operations on a more efficient basis than formerly. The company manufactures towels, lap robes, hammocks, etc., the plant being started about a year ago.

Albert Roby, formerly with the Hewson Pure Wool Textiles at Amherst, N.S., is considering the starting of a small plant in Truro, N.S., for the manufacture of cashmere hosiery.

Mrs. James Orr, wife of the secretary-treasurer of the Boehmer-Orr Textile Co. of Woodstock, Ont., was killed in a motor accident in Jersey City, on July 20, when the machine in which she and her husband were motoring turned turtle. We wish to express the sincere sympathy of the textile industry with Mr. Orr in his sorrow.

R. R. Dodds, president of the Guelph Carpet Co., Guelph, Ont., is now in the Old Country in the interests of his firm.

The Mercury Mills, Limited, Hamilton, Ont., are installing two sets cards and complete spinning equipment in the old woolen mills at Dundas, Ont. that has been idle for some time. The Mercury Mills are going into the manufacture of men's underwear on an extensive scale, this being the first step in the extension of their equipment. Mr. John Penman is again taking an active part in the management of the affairs of the concern.

Sam Carter, manager of the Renfrew Textile Co., Ltd., Renfrew, Ont., who has been ill for several weeks, is back at work again, much improved in health.

The total takings of wool by America up to the end of the July series this year, including transit wools and direct imports, are 151,000 bales, compared with 45,000 bales during last year.

A special cable, dated Aug. 7, from Bradford, says that market is practically at a standstill. Prices are nominally firm with little business passing to test them. A few Government orders have been placed for khaki, blankets and rugs, which trade is expected to be the principal source of immediate business. Short time is general and many mills in the Huddersfield district are running only three days a week. American buying distinctly quiet, while Continental business is completely stopped. Bradford expects wool to remain about steady in price, especially for crossbreds.

The Moncton mill of the Dominion Textile Co. has been closed this past week or so. It is expected that work will be resumed about Sept. 1st.

Colonial Wool Sales

Fourth Series, July 7 to 21.

(Special Correspondence).

Bradford, July 22.—The series just closed has run its course with remarkable firmness of values and unflagging competition from beginning to end. Crossbreds have greatly preponderated, and the daily offerings of large quantities of medium and low grade wools, which had been looked forward to with some misgivings before the sales, have been absorbed without difficulty at prices which opened fully up to previous sales' parity, and have rather hardened than otherwise towards the close. Fine crossbred qualities have also been very well represented, both greasy and scoured, and have met with strong demand at an advance of from 5 per cent. to 7½ per cent. American and German buyers have shown keenness for the halfbred greasies, and the home trade has taken the bulk of the scoureds: up to 16½d. being frequently paid for the best of the former, and from 1s. 8d. to 1s. 10d. for the best halfbred scoureds, exceptional lots of the latter making up to 2s. America has also been a constant buyer of the better style of medium and low greasy crossbreds, and with assistance from home trade spinners these wools have shown in most cases ½d. advance on May rates.

Slipe cross bred has been in abundant supply, and the finer lambs have sold fully up to previous rates at 15½d. to 16½d. for the best lots. The medium grades of lambs and cardings have been a little irregular, but have tended to increase firmness during the latter part of the series, and close without much change. Slipe crossbred of clothing length, which opened at about ½d. decline, has partly regained this towards the close. Scoured crossbreds of medium and low grades have sold somewhat irregularly, but with a hardening tendency during the latter part of the series. Greasy crossbred lambs were slightly easier at the outset, especially the more faulty and seedy lots, but sold better during the later days, and close without quotable change.

Merinos have been in comparatively limited supply, especially good combing descriptions. These have included a few lines of new clip Sydneys and Queenslands, supplemented by offerings of a considerable number of speculators' lots. Wools of specially high class and fineness have been scarcely represented, but exceptionally high prices have been obtained for all wools of fairly good quality and condition, the reoffered wools showing in some cases 3d. to 5d. advance on Australian first cost. Home trade and German spinners have competed strongly, with some assistance at times from the United States. New Zealand and merinos have been a welcome addition to the limited supply from Australia, and have commanded very full rates, the good scoureds selling at up to 2s. 4½d., and greasies in only moderate condition at 13d. to 14d. The few merino lambs have sold without change.

Cape greasies have been largely of short clothing length, and difficult of sale, but the combings have sold well up to or rather above previous rates. Scoured Capes have sold a little irregularly, but close without quotable alteration from May level.

Competition has been well distributed, excepting that France has not operated quite as freely as the rest. America has given good support, especially on the fine and medium greasy crossbreds, for which Germany has also shown much interest.

The close of the series finds prices of all descriptions well up to or slightly beyond opening rates, and competition well maintained.

The Cotton Market

A most serious situation in the cotton markets of the world developed with an appalling swiftness on the general outbreak of hostilities in Europe, and both the United States and English markets were so demoralized that the closing of all exchanges was inevitable. War news overshadowed crop and condition reports which for a few days became practically neglected. Many in the cotton trade were committed to the expectation of an inadequate crop and but for the prompt action of the Boards of Managers in closing the New York, New Orleans and Liverpool exchanges the demoralization might have been even more serious. The closing of the exchanges checked the panic and the rapid progress since made in closing out old committments, combined with the smooth working of the Clearing House has relieved the apprehension there may have been as to the financial position of the trade.

The demoralized condition on the New York Cotton Exchange on the outbreak of war was unprecedented. Prices of futures suffered a staggering break ranging from \$7 to \$13 a bale, compared with a week before, causing holders in England, the continent and in America to dump their contracts on the markets. Crop and trade factors that otherwise might have exercised bullish effect were absolutely ignored. The government report of the condition of the crop which for the last several weeks was regarded as the coming development of prime importance was announced just one hour after the Exchange suspended trading yesterday, but in the general confusion incident to the financial demoralization, it attracted scarcely any attention in the trade.

The government report made the condition of the crops as of July 25th, 76.4 per cent., against 79.6 per cent. last month, and a ten-year average of 80 per cent., pointing to a crop of only 13,800,000 bales exclusive of linters. However, with average climatic conditions from now on the yield this year should compare very favorably with last, when the second largest crop in the history of the world was harvested.

While the war has disrupted all gauges by which intrinsic values are determined, there is a strong belief that cotton values will be well maintained. The increased activity of the machinery of the neutral countries is expected to keep consumption moving at a healthy pace, and with trade routes cleared of all hostile ships, as will undoubtedly be the case very shortly, the machinery of international banking will be put into operation, making the financing of cotton shipments a matter of course. The indications now are that, except possibly for a limited interest in straddles and hedges, all accounts will be thoroughly liquidated before the New York Exchange re-opens for business—of which there will be a 24-hour notice. The American spot cotton business resumed in Liverpool on August 7. Prices were 16 points lower with American middlings at 6.50 d.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

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Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, SEPTEMBER, 1914 No. 9

The Situation Among the Mills

The situation in the textile industry in Canada at the beginning of the month is far from being unsatisfactory. The large government contracts for khaki cloth, serges, hosiery, underwear, tunics, canvass, ducks, blankets, etc., which have been distributed, have kept the mills very well engaged during the past month. For several months previous to the outbreak of hostilities, business had been very slack in practically all textile lines, and there was hardly a mill in the country that worked to anything like full capacity. The season for fall and winter goods had shown a marked falling off in placing orders, owing to the general business depression, and prospects were none too bright for the spring goods season. The extra business afforded by the government contracts has, therefore, given manufacturers an excellent opportunity to conserving their orders for later on. There was also fair late placing business during the month from clothiers, cutters-up and jobbers, who had expected delivery from the continental countries, but as most of the British deliveries of fall and winter goods had been received, only a slight business on these lines has been received. Few of the mills, however, are now complaining of a shortness of orders, so that the prospects for the next few months are fairly satisfactory. What the approaching season will bring forth is difficult to foretell. Undoubtedly British manufacturers will be able to maintain most of their Canadian business, except in so far as freight rates, insurance rates and exchange work in favor of the Canadian mills. Manufacturers are also making a determined effort to capture the German business in this country, but a considerable portion of it will likely go to the United Kingdom. A good deal depends on the repeat order business this fall, which to date does not look encouraging.

The most serious difficulty confronting the domestic manufacturers is the difficulty of procuring supplies of dyestuffs and chemicals. The supply on hand is estimated to be sufficient for about two months to come, and by that time importers expect that they will be able to procure further supplies from the German mills through neutral ports and in neutral vessels. Prices, so far, have been kept fairly steady as importers have made a determined effort to distribute the supply on hand in a fair manner as long as it lasts. The situation, however, is very serious, and unless we are able to secure supplies from English and United States manufacturers, our mills will be seriously handicapped. United States textile manufacturers are attacking the situation very seriously, and hope to find a solution for the difficulty. The situation in Canada depends on the success of their efforts.

No difficulty is anticipated in the matter of securing supplies of raw materials. Of course, the cotton mills will be able to get all they require, and although the wool sales in both London and Australia have been postponed indefinitely, no serious difficulty is anticipated in procuring all the necessary supplies of raw wool, so that the dyestuff difficulty appears to be the only one confronting manufacturers in so far as the procuring of supplies is concerned. The matter of securing accommodation from the banks is bothering not a few of the mills, as also the difficulty in collecting accounts, but it is hoped that the banks will make every effort to grant accommodation. The industry generally, is in a very sound position, and should emerge from the present crisis satisfactorily. No boom is expected, but prospects for the next few months afford satisfaction.

German Goods in Canada

That German manufacturers are making every effort to retain their Canadian business is evidenced by a letter received recently from a firm of hosiery manufacturers in Chemnitz, Germany, by their representative in Montreal. The agent, who is a Canadian, has represented this firm of hosiery manufacturers for some years, but on the outbreak of hostilities was compelled to cancel all contracts he had received this season on which delivery had not been made. The letter which was without signature, was written by the representative of the company from Rotterdam asking that the Canadian customers make payment to a first class bank in Canada, and that these payments be remitted to a bank in a neutral country with the request that the money be turned over from there to the firm in Chemnitz under advice of the Rotterdam agent. The letter stated also that the factories were running part time, and expected to be running full in a few weeks. It also requested that the Canadian agent should accept orders for goods to be delivered after the war or at a time when forwarding will be possible. The prices asked were at an advance of 5 per cent, and any communications with the firm were to be through agents in Rotterdam, Bucharest, Milano or Stockholm, with the request that the contents be forwarded to the Chemnitz firm.

Similar leters have been received by other agents in Montreal, all requesting that business be continued through agents in Rotterdam, but in practically all cases, the Canadian agents have looked upon the proposition as presumptions on the part of the senders and they are making an effort to accept orders during the war. There are many lines imported from Germany which can be made in this country and local agents say they are making every effort to obtain connections with such firms. Those goods which cannot be manufactured in this country will be off the market as soon as the present stocks are cleaned up, although attempts are being made to replace such stocks with somewhat similar goods made either in Great Britain or in this country. British manufacturers are already after this trade, and it is safe to say that once she gets it, Germany will have a hard time winning it back after the war. Domestic mills are also in the field and wherever possible have accepted contracts for goods similar to those formerly imported. In the meantime, prices on many import lines have been advanced, but undoubtedly styles will be adjusted to suit the market whatever situation might arise so that it is likely that prices will hold fairly steady.

To Capture German Trade

The Department of Trade and Commerce is now collecting and distributing information regarding the trade of Germany in Canada, South America, Australia and South Africa, so as to keep Canadian manufacturers informed in regard to openings for trade, and orders which are now available owing to German commerce being swept from the seas. According to figures prepared by the department, Germany's annual trade with South America totals over $160,000,000, while Argentine imported last year goods to the value of $60,000,000, Brazil goods to the value of nearly $50,000,000, and Chile goods to the value of $28,000,000 from Germany.

This trade is being carefully solicited by British and American manufacturers and undoubtedly there are many lines in which Canadian manufacturers will be able to extend their foreign business. So far as the textile industry is concerned, however, the possibilities for an export business are very slight. The larger proportion of the consumption of textile materials in Canada is imported and although there may be a few lines on which our mills would be able to compete in the foreign markets at the present time such a trade in any volume is a dream of the future.

Germany's trade in textile materials with Canada is very small when compared with that of the United Kingdom. Our imports of cotton goods from Germany in 1913 amounted to $1,020,516, compared with $16,736,255 from Great Britain. Flax, hemp and jute materials $51,885, compared with $5,374,396. Silks $274,655, compared with $3,828,121. Wool and woollens $1,079,952, compared with $28,173,086. These are the principal imports of textile materials so that the comparative smallness of the German trade with Canada in that regard is clear. The trade is mostly of a dumping nature, the goods showing no superiority over domestic or British goods. Of course, there are a few lines, such as lisle gloves and others, of which German manufacturers have made a specialty, but it is not likely that any Canadian manufacturer will instal equipment specially to cater to such trade. On other lines domestic mills will be able to look after most of the business formerly held by German firms.

Freight Rates Higher

The cancellation of existing through freight rates between Canada and Great Britain by Canadian railways and the increase, owing to the heavy insurance charges now prevailing, if continued, will have a serious effect on the importation of British goods this fall and during the winter. Freight rates between Old Country ports and internal Canadian cities have been very low, lower in fact, than between Eastern and Western cities, and this low rate has worked in favor of the British manufacturer and Canadian importers. The higher rate in effect after September 10 will, therefore be in favor of the mills here, if extended. Practically all deliveries have been received on fall and winter goods, but the shipment of goods for spring and summer from the Old Country centres usually takes place in December and January so that the increase will not be felt to any extent until that time. It is not likely, however, that the advance will be sufficient to have any material effect on the trade, so that domestic manufacturers are not banking on much assistance in that connection.

Patents Open to Canadians

It has been announced from Ottawa that the Government will pass an Order-in-Council cancelling all German and Austrian patents and trade marks in Canada. This has already been done in Great Britain, so that hundreds of patents are now available to British and Canadian manufacturers which heretofore have been held the sole property of firms in Germany and Austria-Hungary. The effect of such a move can well be imagined. Germany has worked up a wonderful industrial system and a good deal of the success is due to the excellence and quality as well as the cheapness of her products, mostly manufactured on the most modern machinery of German design, which has been well protected by patents in every country in the world. Our annual imports of textile machinery of German make and of dyestuffs and chemicals from that country are considerable. Specifications for these will now be available to Canadian manufacturers, applications for the patents from Canadians being accepted as soon as the order goes into effect.

Trading With Belligerent Countries

The following official announcement issued by the British Government explains any doubts that may have arisen as to the meaning and application of the proclamation against trading with the enemy.

(1) For the purpose of deciding what transactions with foreign traders are permitted, the important thing is to consider where the foreign trader resides and carries on business, and not the nationality of the foreign trader.

(2) Consequently there is, as a rule, no objection to British firms trading with German or Austrian firms established in neutral or British territory. What is prohibited is trade with any firms establisehd in hostile territory.

(3) If a firm with headquarters in hostile territory has a branch in neutral or British territory, trade with the branch is (apart from prohibitions in special cases) permissible, as long as the trade is bona fide with the branch, and no transaction with the head office is involved.

(4) Commercial contracts entered into before war broke out with firms established in hostile territory cannot be performed during the war, and payments under them ought not to be made to such firms during the war. Where, however, nothing remains to be done save to pay for goods already delivered or for services already rendered, there is no objection to making the payment. Whether contracts entered into before war are suspended or terminated is a question of law which may depend on circumstances, and in cases of doubt British firms must consult their own legal advisers.

This explanation is issued in order to promote confidence and certainty in British commercial transactions; but it must be understood that, in case of need, the Government will still be free to impose stricter regulations or special prohibitions in the national interest.

TEN GERMAN COMMANDMENTS TO FOSTER TRADE.

The following ten commandments contained in an instructive circular which has been distributed throughout Germany by the various Chambers of Commerce, were read recently by Sir George Pragnall at a meeting of British manufacturers:—

1—In all expenses keep in mind the interests of your own compatriots.

2—Never forget that when you buy foreign articles your own country is poorer.

3—Your money should profit no one but the Germans.

4—Never profane German factories by using foreign machinery.

5—Never allow foreign eatables to be served at your table.

6—Write on German paper with a German pen, and use German blotting paper.

7—Use German flour, eat German fruit, and drink German beer. These alone give your body the true German energy.

8—If you do not like German malt coffee, drink coffee from the German colonies.

9—Use only German clothes for your dress and German hats for your head.

10—Let no foreign flattery distract you from these precepts, and be firmly convinced that whatever others may say, German produc ts are the only ones worthy of the citizens of the German Fatherland.

NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

Semi-Annual Meeting—September 29 and 30.

The semi-annual meeting of the National Association of Cotton Manufacturers will be held at Hotel Aspinwall, Lenox, Mass., on September 29th and 30th.

The following preliminary programme has been arranged, but owing to unavoidable circumstance a few modifications will likely be made.

"Beam Dyeing," "Commerce in Cotton Goods With South America," "Cost of the Permanent Fireproofing of Cotton Goods," "Effect of Structure on the Strength and Wearing Qualities of Rabries," "Health of the Employe," "Lever Cotton Law," "Pink Boll Worm in Egyptian Cotton," "Production and Preparation of Raw Cotton for the Spinner," "Systematic Purchase and Care of Mill Supplies," "Time Temperature Distributions in a Bale of Cotton," "Trademarks in Cotton Textiles," "Visits to Cotton Mills in the Far East," "Weft Yarn Inspection," "World's Demand for Cotton and India's Part in Meeting It."

BUSINESS ECONOMICS

THE FACTORS OF PRODUCTION AND THE DIVISION OF LABOR.

By PROFESSOR W. W. SWANSON.

Economists have usually included in the factors of production land, labor and capital, and these three alone. This classification has obtained from the days of Adam Smith down to our own time.

There are signs of a revolt, however, against this time-honored classification. And when one examines the matter closely there is good reason for believing that the old arrangement of productive factors must go by the board.

The change in attitude is significant. Adam Smith's great work was entitled "The Wealth of Nations." He approached the economic problem from the national viewpoint. Although not always consistent, he was more concerned with the progress of the nation than with that of the individual. And from the national standpoint there is a good deal to be said in behalf of the old division of the productive factors into land, labor and capital.

The Individual Viewpoint.

But the modern economist realizes that the individual, competitive point of view is the only one that offers any key to the solution of the market-value problem. He knows that, however psychologists may write, society is not an organism that thinks, wills and acts independently of the individuals that compose it. It is, therefore, only through a study of the activities of business men in the market that we can discover how values are determined—the value of labor, the value of capital and the value of land.

Bearing these facts in mind, we may ask, what would the business man consider as his factors of production? land, labor and capital—yes; but these would by no means exhaust the list.

Let us say that an entrepreneur—a business man, a promoter—wishes to start an autobus line in a large city, to supplement the tramway service. After provisionally organizing his company, he proceeds to get a franchise. He may have to pay for that franchise, directly or indirectly.

His next step is to raise capital through a bond issue or otherwise, employ executive heads, organize his labor force, purchase cars and so forth. When the service is in operation he will have taxes to meet, water rates to pay, lighting bills and a hundred and one other expenses incident to the successful functioning of the enterprise. Everything for which he must pay must be considered a factor in the carrying through of his business.

Will he consider land, labor and capital the only operative factors in his business? Certainly not. Every expenditure that must be undertaken, every outlay that he must make, will be considered a cost of production; and every means to the end he has in view will function as a factor of production.

Thus he will include in his cost of production: Payment for the franchise—whether secured by corrupt or clean methods—taxes, depreciation, up-keep, a sum for bad debts, wages, interest, rent and a thousand and one other outlays. Every expenditure that must be met to put his product—transportation—on the market will be considered a cost of production—and every object upon which such expenditures are made will be counted as a factor of production.

Therefore, from the individual point of view—the only point of view that will lead us anywhere — these are innumerable factors of production, and not merely land, labor and capital alone.

The Meaning of Labor.

It must be admitted, however, that land, labor and capital are the three main factors in production.

Labor, of course, is differentiated for the other two factors inasmuch as it is the active agent in the productive field. Some economists, indeed, for that very reason insist upon calling labor an "agent" rather than a "factor" of production.

Labor has been defined by the American economist, J. B. Clarke, as "a wealth-creating effort." Henry George, in Progress and Poverty, says: "The term labor includes all human exertion." F. A. Fetter defines it as "any human effort having an aim or purpose outside of itself." A. S. Johnson says: "Labor is the application of human faculties to the production of wealth." Alfred Marshall writes: "We may define labor as any exertion of mind or body undertaken wholly or partly with a view to some good other than the pleasure derived directly from the work."

The older view—one not now accepted—is well expressed by J. R. McCulloch: "Labor may be properly defined as any sort of action or operation, whether performed by man, the lower animals; machinery or natural agents, that tends to bring about any desirable result." But it is only confusing the issue to speak of machines or animals as labor in the true meaning of the term. Labor is an active agent, machines and animals are passive, and subject to man's will. The latter must be considered as capital, and not labor. Marshall's definition, given above, is complete and comprehensive and defines clearly what is involved in the term.

Land and Capital.

Capital has been defined as "wealth which is used to produce more wealth." But this again takes the national or social point of view. Much modern capitalistic enterprise is concerned with the limiting of the supply of economic goods, and not with making them abundant.

The Dutch East Indian traders of the seventeenth century were accustomed at times to throw into the sea whole cargoes of spices, whenever the supply outran the demand on the markets of Rotterdam, Amsterdam and Antwerp. Their object of course was to maintain the prevailing level of prices or even to increase it. They were not concerned with furnishing a great and abundant supply of the products of the East; their attention was fixed upon the money value of the goods in hand. This is typical of a great deal of our modern business activities. Hence, it cannot be said that capital consists of all wealth used to produce more wealth; but rather, that capital con-

Second of a Series of Articles Dealing With the Economics of Modern Business and Commercial Enterprise.

sists of all wealth held for gain, or used for acquisitive purposes.

The term "land" as used in economics, has a wider significance than is ordinarily attached to that word. Land, in the economic sense, includes the land surface down to the deepest possible mine or artesian well or geological stratum; all the aqueous mass—that is, every drop of water out of the seas or in them, for there is no telling when any drop may enter the circle of human agencies and ownerships; the circumambient air, every gallon of that aerial ocean that swathes the world and vitalizes all living beings, the common carrier of clouds and birds, of health and disease, of music and perfumes, of industry and commerce. As modifying economic life, not only must we include as land all that has been mentioned, but gravity, mechanical powers, physical force, chemical activities, and the vital phenomena of plants.

In the narrower economic sense, however, land consists of the right which may be bought or sold in the market, to have or to hold, or to use or enjoy, any of the resources of nature which have been described above.

The Division of Labor.

The division of labor is one of the chief characteristics of modern society. Some of the most difficult economic problems arise from a failure to understand what is involved in the division of labor, and how much it means for the progress and prosperity of mankind.

There are two broad classifications that may be made in the division of labor. We have first the various trades—plumbing, tailoring and so forth. On the other hand there is the more complex division of work, under which there is a splitting up of several operations, all belonging to the one field of production. In more primitive times the shoemaker might be a tanner, and the whole process of converting the raw hide into a shoe might be undertaken by one man. To-day, the making of a shoe involves the co-operation of many workers—one cuts the leather, another stitches it, others put on the soles, still others the heels, and so on through the many processes of producing the finished product.

No hard-and-fast line can be drawn between these two aspects of the division of labor. No craftsman today carries through all the operations involved in a piece of work himself. The furniture factory gets its lumber from the jobber; the jobber from the sawmill; and the owner of the mill gets the logs from the lumberman. Within the furniture factory itself there will be turners, polishers, upholsterers and a great number of other mechanics, each engaged in one process. The difference, however, between the simpler and the more complex division of labor is essentially one of degree. Notwithstanding this, the difference of degree is important. The extent of the division of labor alters the face of economics life and brings about far-reaching changes in social conditions.

Limitations of the Division of Labor.

As Adam Smith, John Stuart Mill and other great economists have pointed out, the division of labor is limited by the extent of the market. It can be advantageously carried out only to the extent that will produce the quantity of goods demanded. The size of the market may be limited by several causes: Too small a population; a population too scattered and distant to be easily accessible; deficiency of means of transportation; or finally a population too poor to admit of its being a large consumer of goods.

In the early stages of civilization, when the demand of any particular locality was small, industry flourished only among those who, by their command of the sea coast or of a navigable river could have the whole world, or that part of it which lay on coasts or navigable rivers, as a market for their productiveness. The great increase in the wealth of the world, and the increase in commercial freedom as well as of improvements in methods of transportation has resulted in giving increased productiveness to the labor of every nation, by enabling each locality to supply with its special products so much larger a market. As a necessary result the division of labor has been further extended to take care of the growing trade of the world.

Limited by Nature of Employment.

The division of labor is also limited by the nature of the employment. Agriculture, for example, is not susceptible of so great a division of labor into various occupations as many branches of manufactures. Sowing of grain must take place in the spring, the reaping of the harvest in the autumn—these different operations cannot possibly be simultaneously performed. It is true that even agriculture tends to become specialized in our day; nevertheless, as a rule, the men on a farm are generally employed in performing the same kind of work.

Limits of space will not permit of a complete classification of all the industries of Canada; but the following list will prove interesting, as showing the amazing extent to which division of labor may be carried in a single industry:

Division of Labor Within a Typical Industry—Cotton Manufacturing.

Manufacturers, officials, managers and superintendents, foremen, clerks.

A.—Apprentices.

B.—Back boys, ballers, banders, beaders, beamers, bobbin boys, breaker hands.

C.—Card clothiers, card fixers, card grinders, card strippers, carders, carpenters, chainers, cleavers, cloth balers, cloth cutters, cloth menders, cloth steamers, combers, cotton shakers, curlers.

D.—Designers, doffers, doublers, drawers-in, dressers, drillers, dyers, dryers.

1.—Engineers.

F.—Filling carriers, finishers, folders.

H.—Harness brushers, harness makers, helpers.

I.—Inspectors.

J.—Jack-frame tenders.

5.—Laborers, lappers, loom fixers.

M.—Machinists.

N.—Nappers.

O.—Oilers.

P.—Packers, pickers, pressmen, printers.

Q.—Quillers.

R.—Rulers, ribbers, rolll coverers, ropers, rovers, roving-frame tenders.

S.—Scrubbers, section hands, sewers and seamers, shearers, sizers, slasher tenders, slubber tenders, sorters, speeders, spinners, spoolers, spool fixers, stampers, sweepers.

T.—Trimmers, twisters.

W.—Warpers, washers, weavers, winders, wrappers.

Y.—Yarn pourers.

This list could be greatly amplified. It shows the wonderful change that has come over modern industry since our grandmothers, with their spinning wheels, and the masters with their men at the hand looms, controlled the cloth business.

Great Mechanical Invention.

As division of labor was extended, the number of occupations increased. But the range of each occupation was diminished; and gradually the mechanical movements involved in the process became simplified. These facts gave rise to the epoch-making applications of machinery and power to the work in hand. While no machine, not even the most highly complex of modern times can rival the human hand in dexterity; but whenever the same movements have to be completed over and over again the blind forces of nature can perform the work as well as the human hand, and in some cases better than by some human hands. The gain from the application of power proved so great that there was a reaction on the division of labor. There was an inducement to split up the steps in production still further, to reduce more and more of them to identical movements, and so to make possible to a still greater degree the use of natural forces.

Necessity the Mother of Invention.

There has been nothing heroic in the way inventions have come into the world. The old proverb still remains true: "Necessity is the mother of invention." The American cotton spinner who imported Scotch and Irish girls to thread his spools found Cupid too strong a competitor, and gave up the struggle. He was forced to invent a machine that would do the work.

And so it was during the "heroic age" of invention. Hargreave's spinning jenny (1764); Arkwright's rival spinning machine (1769); and Crompton's invention (1779) of a machine that combined all the features of both of the former merely mark a time when sheer necessity compelled the discovery of a method of placing immense quantities of goods on the market at one time, to meet the demand.

The opening up of new markets in India, Java and China; the markets of the New World; surplus capital secured from East Indian trade; a labor force already trained in the industrial arts—all these combined to demand a method for a rapid and large production of goods. New roads, new canals, the discovery of steam as a motive power hastened the whole process. And so it has been from the time of the Industrial Revolution (1765-1825) new inventions have of necessity followed each other with bewildering rapidity—because of the sheer necessity of the situation. The English have found rivals in the Americans, and the latter in the Germans; so that as country after country becomes highly industrialized it may be expected that mechanical inventions will be increased, or simplified or extended. And no limits can be set to this marvellous march forward of modern trade and industry.

THE GREAT EUROPEAN WAR AND CANADA'S CHANCES

Serious Dislocation of Textile Industry and Markets in Great Britain.

(From Our London Representative.)

We are in the throes of war! The peace of more than half of a century has been broken and we find ourselves at war with hitherto friendly nations, to which we were bound not only by the ties of kinship, but also by the bonds of an immense reciprocal trade, and by the pursuit of common aims and aspirations. Unfortunately the present state of affairs has been brought about by Germany disregarding the Treaty guaranteeing Belgian neutrality, because it bore the signature as well as that of Great Britain. The breach of good faith entered into in the past was, of course, engineered for an attack on France and Great Britain, and the Continent of Europe is now shaking to its foundations in a war unprecedented in extent—and, I fear, in horror—between the world's greatest nations. Actuated by lust for power, the Teutonic War Lord of Germany has wilfully and recklessly precipitated a conflict, the end of which no man may yet faintly see, and upon him and his advisers alone must fall the blame for this grave and terrible disaster.

But war is not an affair for arms alone. Modern nations fight no less thoroughly in the market than on the battlefield, and far more extensively. Britain to-day is waging a serious war on German and Austrian trade, and Canada must not in this great crisis allow the ground to slip from under her feet, but insist on having a share of what is likely to be recaptured in British possessions from our German rivals. Now is the time for the Canadian manufacturers to get moving, and all the powers that be should without delay be concentrated in the direction of preserving the home industries, and opening up, if possible, new markets which are bound to arise through the present bottling up of European textile trades. With this object in view, the Foreign and Colonial Secretaries in London are securing samples of and reports on what Germany has in the past been supplying to the markets and Canadian manufacturers will have an opportunity of seeing these samples and reports if the proper authorities are at once approached. It is manifestly impossible to estimate at present the results of the war upon British industry and commerce. Employers and the huge industrial army have already suffered enormously through the dislocation of trade, because the conquest of foreign markets cannot be achieved in a day or a month; but from the moment that the trade routes are cleared by the British fleets, with the help of the French, that conquest has begun. It will take Germany and Austria another generation to recover what has now been lost, and it may be safe to conjecture that the economic conditions which industrial Germany will eventually adopt to recover her lost trade will tend to price-cutting, as well as other degraded forms of pushing business. Up to now the Teutons had just completed a world-wide expansion of trade—that trade, contracts and orders alike, has failed for want of completion, and mistrust has stepped in, where once a feeling of confidence prevailed. This new state of things makes British manufacturers feel encouraged and in that encouragement they are having the hearty support of the Government. It rests now with the Government of the Dominion to do its share.

Ray of Hope in the Cotton Trade.

Before the war broke out, the reports from German cotton centres were of an unsatisfactory nature. Spinners order books were becoming depleted, and very little was sold in July. In England, the position was not quite so bad. The war, however, soon dislocated trade in the industrial centres as well as on the various sea routes. Oldham and Bolton (and the districts around) are two great cotton spinning centres—the one spinning American and the other Egyptian cotton. But the effect of the war soon became apparent, particularly as stocks of the raw material were not great. Some of the mills closed down, others went on short time. The same may be said about mills in other centres. The Government moratorium was next introduced, which freed persons for one month of all obligation to pay for supplies of cotton, etc., due for payment on or before the 8th August, but in many instances arrangements were come to so that a complete stoppage should be avoided of many of the mills. A scheme of State insurance of war risks at sea was also put forward by the government, but the rates fixed will be liable to adjustment, as the course of the war may show to be necessary, but at all events the premiums do not cover the losses that might be insurred. In this state of affairs trade went slowly on until it was reported that shipping on most routes could be resumed with safety from United Kingdom ports. After this notification merchants took deliveries from the mills, and a better feeling was noticeable in Liverpool and Manchester, as well as in London. War risks rates then fell a couple of points, and new cotton was selling at 6.12 per lb. for future delivery contracts of January-February. The financial position, however, is keeping business checked. It has been a matter of wonder in Liverpool why the price of cotton should be fixed at 13 cents per lb. as most people were of the opinion that with decreased consumption for some time to come, the price must inevitably fall to 8 cents or even 6 cents per pound. In some quarters it was alleged that the price was fixed to prevent the failure of a ring of bull speculators who were committed to large purchases of 14 cents and over. The cotton trade at all events is now improved since the outbreak of war, but there is still a great stoppage, and I am hearing of firms who are already picking up German trade. Lancashire's cotton exports in 1913 were: Yarn £15,007,017, compared with £16,222,150 in 1912; exports of cloth £97,820,623 compared with £91,624,257 in 1912. Of these totals, Canada imported £289,193 worth of yarn goods as against £249,802 in 1912 and £1,981,218 worth of cloth compared with £1,711,039 in 1912.

Banks Stringent at Bradford Wool Centre.

At Bradford the tone of the market is good, and the feeling greatly improved since the war started. Important sales of wool have been made, all for khaki, in fact for the past two weeks ending August virtually the whole of the business doing is for this purpose. The sales have consisted principally of New Zealand sliped crossbred lambs, home pulled skin wools and also 40's and pick hog tops, but most interest centres around the sales of New Zealand slipes. All the stocks bought at the last series of sales in London have been disposed of, and now London selling brokers are receiving important enquiries, and sales effected show an advance in some cases of one cent on last series prices. A very pleasing feature also announced is that some good sales of merino wool have taken place in London. Prices for merino tops are firm, but good 64's are worth no more than 52 cents. Of course, if there is a better demand prices may harden slightly, but this is most unlikely for the next few weeks to come. The export yarn trade is at a standstill, so is the home trade. Home grown wools remain firm. Mohairs are a dull trade. The greatest trouble at Bradford is the financial question, and firms are crippled from doing business because of the stringent policy of the banks.

Wool Affected, But Prices Unchanged.

The war has also caused a limited amount of dealing in wool, but prices are practically unchanged since the last London sales. There is, of course, a serious falling off in the home trade and on export account for woollen goods, but notwithstanding the many difficulties in the way of manufacturers there is an optimistic feeling prevailing. Wools for army cloths and blankets are in demand generally. The Army council has placed contracts for 1,000,000 yards of khaki, the orders being distributed between Scottish and Yorkshire makers in view of the need of speedy delivery. Other orders are expected to follow soon. This demand for khaki causes a good deal of stir in crossbred tops around 40's quality, so that considerable sales have taken place, and I would not be surprised if prices would not harden in this sphere of the wool market. Indeed, crossbreds from 40's to 50's should benefit considerably by the European war, but then there is a great danger of a shortage of raw material. Foreign trade is cut off altogether in Europe and this factor may facilitate the market in recovering itself as regards prices being on a lower basis.

On September 29 the fifth series of colonial wool sales will be opened in London. A fortnight after the war broke a total of 86,286 bales of wool had arrived from Australia and New Zealand, so that supplies are not expected to experience a severe check. Every week is bringing in supplies and the fact of the sea routes now being cleared of the enemy's ships and guarded by the British and French fleets has caused a certain amount of confidence amongst buyers and allayed all apprehensions as to what the near future may bring. "Business as usual," said a buyer to me the other day. Can one realize that we and all Europe are in the throes of war?

Woollens and Worsteds—Canada's Opportunity.

The dislocation of the woollen and worsted industries in Europe and in Great Britain should give manufacturers in Canada a great opportunity for opening up new ground and now is their time to move quickly and strongly. They have the greatest chance of their lives. Around Dewsbury in the heavy woollen district there is a serious falling off of trade, owing to the cessation of business with many countries and were it not for the government orders many of the mills would be in a bad way. The district is well equipped for dealing with Army orders, but the chief difficulty presented is that of obtaining the raw materials ordinarily used in the making, rugs and blankets. Pure wool is the basis of English Army cloths, but the extracted wool from rags plays an important part in the rug and blanket trades. For years there has been a consistent run on light soft rags and stockings, these having been required for the fashion of light, bright colors for ladies garments and the demand for quiet shades in men's wear. The consequence has bee nthat while dark rags, and particularly those of hand texture, have been neglected, the supply of all the lighter and softer materials has been barely sufficient for immediate requirements. Business being dull, merchants in all parts of the world have refused to send consignments of a speculative nature, and while the best lines have been consumed as they came to hand, the arrivals of second grade rags have constituted a negligible quantity. Stocks accumulated at foreign ports cannot be released for a considerable period and, therefore, a great deal depends on the English collections. In the meantime rags which are not ordinarily used for conversion into rugs and blankets will have to be utilized. The cost of production will consequently be increased. Raw materials have now advanced in prices and complaints are being heard of the small amount of business that is being done with Canada. Bradford and Leeds have also felt the pinch of the war. The competition of Germany has been keenly felt in America and Bradford also lost a good deal of work last year owing to the prolonged dyers' strike, most of it going to Germany and France. It is fully expected now that owing to the inability of the continental firms to complete their contracts there is now an opportunity for Bradford manufacturers to regain the business. In Leeds the mills are running on an average three and four days in the week, and the same applies to the West Riding district. This state of things may only be for a short time to come. Business with Canada is reported to be dull, and a scarcity in new orders. At Halifax spinners are quiet and so are the manufacturers, except those who are engaged on Army orders. In Kidderminster there is a collapse in the carpet trade. Orders have been countermanded and mills are running only two and three days a week to keep down unemployment. At Rochdale old stocks of flannels have been cleared out and merchants are giving out small repeat orders. There is also a disposition to examine winter flannels, but most of the orders are delayed. The tweed mills at Haddington belonging to Messrs. Adam Paterson and Sons have closed down for a short period owing to the dislocation of trade caused by the war and firm is treating all workers very handsomely in regard to wages. Other mills in England are on half time.

In the present crisis the government is giving manufacturers every facilities in the way of securing new trade, and there is inclined to be a rush of travellers to Canada and other colonies. Therefore, mill owners in Canada must be on the alert. This cannot be preached to them too often. The feeling in Great Britain [illegible] the war is "Business as usual," notwithstanding the shortage of orders, and the Dominion must be prepared to meet competition from England, and in that competition the Dominion should know how to act in regard to prices for the purpose of regaining trade, bearing in mind the fact that German and French economies will play a great part in trade when things settle down after the European upheaval.

Dundee and London Jute Slow.

The war has substantially closed trading in all our London fibre markets, both transport and payments being more or less supended or postponed and Continental business impossible. Admiralty and War Office requirements are giving some relief to manufacturers and spinners of jute, flax and hemp, consequently quotations are nominal.

In London, trading in future positions has been suspended. Steps are being taken by the London Jute Association to deal with complicated questions arising out of contracts already negotiated under c.i.f. conditions. There was an active demand for visible supplies from the Continent in the earlier part of August the turnover being considerable. During the later stages, the sole centre of activity has been Dundee where a brisk demand for spot lots considerably enhanced values for all grades. Towards the close trading is slow, but stocks are firmly held in anticipation of an early demand. Native first marks have been sold from £35 to £36. Medium grades £32 10s to £33 10s, according to quality. SCC in heart Group Tops have realized up to £25, but so far there has been very little outlet for this grade.

The Dundee textile trades were, in common with other trades, greatly affected by the war, and business fell off for a few days. There is now a better feeling and prices may be in and around the following figures for spot parcels of raw jute:—First marks £35; red S.C.C.-B.C. £32 10s. to £33; black S.C.C.-B.C. £24 to £24 5s Jute yarns have improved, but prices vary, 8lb. cops ranging from 2s 9d to 3s. and 8 lb. on spools 3s to 3s 4d, with bundle warps slightly on a lower basis. Heavies are firmer. Jute cloth business is restricted and prices are variable and very firm. Linen yarns are all dear and sellers are few. Government orders are now being placed in Dundee for Osnaburg, Admiralty duck and various other items. The United States have also placed a large number of orders for hessians in medium and lightweights.—J. R. B.

WORLD'S PRODUCTION OF RAW SILK.

Provisional statistics covering the production of raw silk throughout the world for the year 1913 have just been made public by the union of raw silk merchants of Lyons, France.

The total output last year is estimated at 59,636,000 pounds, which is 685,000 pounds more than the provisional figures for 1912, and 188,000 pounds more than the corrected total for that year, which was the greatest ever recorded. It is assumed that the 1913 figures, when revised, will show that this has been exceede.

There was a marked falling off in production last year in France, Italy, European Turkey and in that part of China of which Shanghai is the export gateway: These decreases, however, were more than made up by the increased outputs of Japan, Asiatic Turkey, and Canton, China.

U. S. COTTON REPORTER FOR JULY.

The monthly cotton report of the United States census bureau reported cotton, exclusive of linters, consumed during July aggregated 448,269 running bales, compared with 462,242 bales in July, 1913. Cotton held in manufacturing establishments July 31 totalled 904,-414 bales, against 957,961 in 1913, and 424,216 bales independent warehouses, against 381,739 bales in 1913. Imports reported were 23,743 bales, against 9,495 in 1913 and exports were 136,173 bales against 140,710 bales in 1913. Cotton spindles reported active during July were 30,676,955 against 30,022,654 in 1913.

PRACTICAL TUNING AND CONSTRUCTION OF POWER LOOMS---VI.

THE DRIVING OF POWER LOOMS

By BEAUMONT METTRICK.

The Going Part.

This motion may be said to vary, when applied to different types of looms. It is governed by a few factors, such as driving motion, position of crank shaft, size of crank, length of connecting arm, and position of connecting pin on going part. Different types of looms vary in these details, according to the particular results desired on that special loom. Various types of mechanism have been tried to impart motion to the going part, such as springs, pneumatic cylinders, etc., but the general rule now applied by the makers is to connect the going part by a crank arm, crank and crank shaft to the driving wheels, thus giving a positive control to the beat up of the going part The width of the loom, also the size of shuttle used, have an influence upon the desired. motion .

The Style of Motion.

The motion required is an eccentric one, the reason being to allow more time for the shuttle to cross the race of going part, and more thime toovercome resistance of the warp threads in the passage of the shuttle, when the cranks are revolving around their back centres, and the going part is also at the back centre.

This eccentricity is obtained by employing a crank and a connecting arm to work the going part, and thus converting a circular motion of crank into an eccentric, reciprocating motion of the going part, which is pivoted at the bottom to the framework of the loom.

The eccentricity is also increased on some looms, by the use of eccentric wheels to drive the crank shaft, and also by the use of knuckle jointed cranks, or specially shaped cams, which impart to the going part a double beat up, this latter style being used on very broad heavy looms, for weaving carpets, felting, etc., where the weft requires a strong beat up.

Size of Crank and Connecting Arms, and Their Relation to the Eccentricity of Going Part.

The smaller the size of connecting arm, and the larger the size of crank, the more eccentric the movement will be, that is given to going part. The larger the conecting arm and the smaller the crank, the less the eccentricity of the going part. This can be shown in a simple manner by the Diagrams shown, which illustrate the eccentric variation of speed obtained by this method.

Narrow looms have usually long connecting arms, and small cranks, as only a slight "dwell" is needed at the back centre to allow time for shuttle to cross. Where more time is required, such as on broad looms, larger cranks and shorter arms are used, sometimes in combination with eccentric driving wheels.

Diagram 26 illustrates how particulars of the eccentricity given to the going part by the crank can be obtained, when the various measurements required are known, that is—

(a) Size of crank.

(b) Length of connecting arm.

(c) Distance from connecting arm pin to centre of rocking shaft. C.C. represents the circle travelled by crank C.

C.S., crank shaft on which the crank is cast.

F.C., front centre of crank. T.C. top centre. B.C. back centre. L.C. low centre or bottom centre

C.A. is connecting arm pivoted at C.P. to crank C. and at C.P., to pin on projecting arm of going part G.P.

R., the reed or sley fitted on going part (this should not move past the vertical position shown).

H.R., the top hand rail to hold reed in position.

S.R., the shuttle race, which should not pass horizontal plane shown.

R.S., rocking shaft, which conects going part to framework of loom, and is the pivot on which rocks the going part.

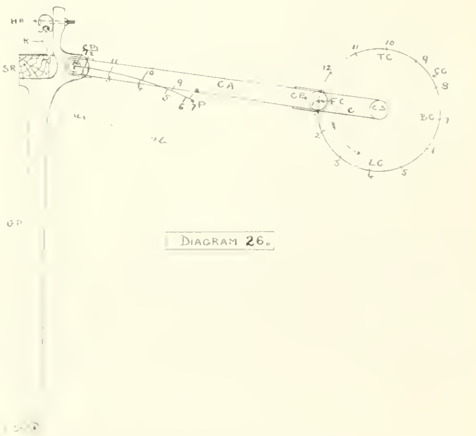


Diagram 26.

The dotted lines from A to B show the arc moved by the connecting pin C.P., of going part, that is between F.C. and B.C.

The numbers from 1 to 12 on the line P., which is the path of pin C.P., represent unequal distances travelled by the shuttle race and sley of going part, during the equal angular spaces, travelled by crank around the path of the crank pin, as shown from 1 to 12.

The amount of time allowed for the passage of the shuttle is shown by the pause of speed, just before the crank pin is passing, and just after passing the back centre, that is say from 4 to 9; here the going part is travelling at its slowest speed.

The ideal mechanical position of the pin C.P., in relation to centre of crank shaft C.S., is found by drawing a line from the centre of pin C.P., at right angles to one dropped from C.P., to centre of rocking shaft R.S., and passing through centre of crank shaft, when the going part is half-way on its traverse between front and back centres. This however, varies slightly on different looms, according to the position of connecting arm, when the beat up and knocking off takes place, and according to the length of pause required at back centre.

Care should be taken to see that the vertical line is not passed by the sley of the going part, when beating up the weft at the front centre, as this has a tendency to cause the sley to rub the weft, and if a fine sley be used, the weft will often be cut, this fault not always being detected on the cloth in the loom, especially when fine backed cloths are being woven. This, of course, means a serious waste of material, so whenever any alteration of height of going part takes places, test the action of going part carefully, to see that this fault

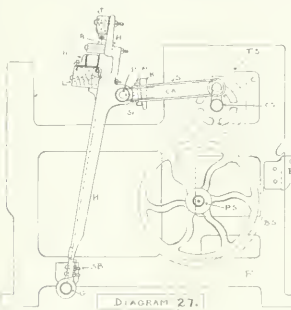


DIAGRAM 27.

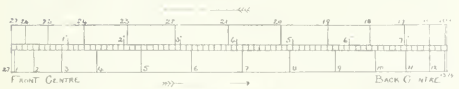


DIAGRAM 28.

does not occur. Some looms are fitted with the connecting pin $1\frac{1}{2}$ in. to 3 in. behind top centre; this allows the race board to be level at the beat up of the weft, therefore, not as much chafing of the warp threads takes place, and as the board inclines more towards the reed, when going part is at the back centre, the shuttles do not have any great tendency to fly off the race.

The reed or sley should be at right angles to the shuttle race and warp line, when the beat up of the warp takes place. This point is very important, on fast running looms, and great care should be taken to see that the shuttles fit against the angle of reed, and shuttle race. If not set level, the shuttles are apt to be picked out of the loom, as the shuttles are under no positive control, when crossing the race from one box to the other, and any diverting influence may bring about this danger.

Construction of Setting of Going Part.

Diag. 27 illustrates a simple style of going part, fitted to a Hattersley Tappet Loom. G. is the rocking shaft or pivot of the sword arm H. of the going part. At S.B. two adjusting bolts are fitted, to allow for a slight variation in height of shuttle race L. K. shows the shuttle and box. R. the reed set at right angles to the shuttle race. J. the top hand rail. P. the pivot or pin of connecting arm C.A. C. is the crank, C.S. the crank shaft. The connecting arm is connected to pin P and crank C by means of two curved steel plates S and S., and these are tensioned and fastened by a plain key K, and a fixed key K. Care should be taken to see that these plates do not bind at the pivots, and are not too slack, and also that both connecting arms are of the same length and tension. If they bind, extra friction is set up, with the corresponding waste of power and materials. If too slack, the fittings are worn unevenly, and a jerky action is given to the going part, when passing front and back centre, this being liable to cause the shuttle to be thrown off the race, when the crank is passing the back centre. If both the connecting arms are not tensioned up the same, the cloth is apt to be shady, as the weft is not beaten up by the reed in parallel lines, but in wavy lines and the warp is unevenly stretched at each side T.S. is the top spur driver, which revolves once for every pick, and is fitted with 27 teeth.

B.S., is the bottom spur follower, which revolves once for two picks.

P.S. is the picking shaft. B. is the warp beam bracket, F. the framework.

Fig. 28 gives a scale, showing the varying distances moved by the going part H. The scale is marked out in tenths of an inch, and the numbers 1 to 27 show the varying distances travelled by the going part, for equal angular spaces, or teeth travelled by the wheel T.S. during one revolution.

This illustrates how the eccentricity is transferred to the going part by the crank, but as this loom is a narrow one, and the speed rather fast, not much variation of speed is required. A small crank and long arm are therefore used, sizes being crank $2\frac{1}{2}$ in. connecting arm 14 in. long approximately.

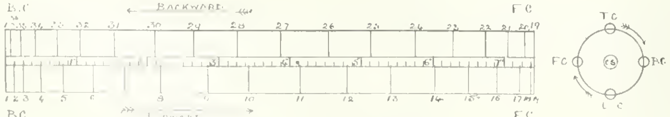


DIAGRAM 29

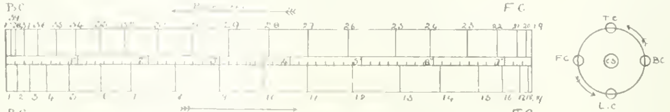


DIAGRAM 30.

Scale 29 illustrates the variable distances travelled by the going part of a Dobeross Narrow Friction Driven Loom, when the spur drivers are circular. The circle shows the direction moved by the cranks, looking from the front of the loom, therefore the cranks, starting from back centre, B.C., work underneath to low centre, L.C., and to front centre, F.C., and top centre, T.C.

The numbers shown are equal angular distances travelled by the crank, or teeth travelled by the spur driver; these as marked in diagram, give unequal distances and travelled by the going part. The scale, being marked out in 8ths of an inch, from 1 to 19, equals forward movements of going part from B.C. to F.C., and from 19 to 1 equals backward movements of going part from F.C. to B.C. An increase of speed will be noticed as the cranks are passing the top and low centres with a decrease at front and back centres, thus allowing plenty of time for the picking to take place between top, back and low centres.

The size of cranks are.......	4 in.	
The size of connecting arms .	17 in.	Narrow looms.

The size of cranks are.......	4 in.	
The size of connecting arms .	22 in.	Broad looms.

Scale 30 illustrates the variable distances travelled by the going part of a Hattersley narrow coating loom, where the crank shaft is driven eccentrically by a pair of eclipse shaped spur gear wheels. Here the crank revolves in the opposite direction from the Dobeross crank, as shown in diagrams, the crank moving from back centre to top centre, front centre and low centre.

The numbers here shown represent teeth travelled by the first pair of spur wheels, which give motion to low shaft, this in turn giving motion to eccentric wheels, therefore the eccentricity of both crank, shaft and going part are registered.

The wheels have 39 teeth. From 1 to 19 equals the movements of the going part on forward journey from back to front centre. From 19 to 1 equals movements of going part on backward journey from front to back centre.

The size of cranks are.......	3 in.	
The size of connecting arms .	14 in.	Narrow loom.

Here the size of connecting arm is less than in the Dobeross looms, as the projecting arms, behind going part, which hold the pin, are much longer, therefore pins are further away from reed; this feature helps to strengthen the sword arm, during the time the knocking off motion of the loom is brought into action: this helps to prevent breakages of sword arm.

Setting Parts.

Care should be taken to see that the height of going part is correct; if too high in relation to crank shaft more breakages of sword arm take place, this being brought about by the force of beat up that takes place, when the dagger strikes the frog, and not being directed in the line of the resistance of the frog. When the height of shuttle race or going part have been altered for any purpose, the healds will also need readjusting, or unnecessary rubbing of the warp threads upon race will take place, if the race has been lifted, and if lowered, the threads will not be level with the race; this would be liable to cause throwing out of race of the shuttles during picking. See that the shuttle race is perfectly level, if not so, pack or file between the casting at top of sword arm and wood race, till race is perfectly level.

The Shuttle Race. -On some looms this part is composed of strong seasoned wood; the chief disadvantage of this style is that they are apt to wear unevenly, and where cotton warps are woven, the constant rubbing of the cotton threads is apt to wear ridges into the wood; when this takes place, the race can be scraped or planed level again and then set.

On most of the fast dobby looms, a metal plate is screwed on to the top of the race; this being stronger, will last longer, and the increased speed of the shuttle does not effect and wear the plate, as it would in the case of the plain wood race. When weaving fine worsted or woollen cloths on this style of race, it will be found of advantage to cover the metal plate with a strip of soft worsted cloth, as this allows the fine warp threads to sink into cloth, and therefore prevents the harsh rubbing that would take place of the fine yarn between the shuttle and race.

The cloth strip should be tacked on level to front of race, and then stretched over race, and held tight underneath the bottom rail of sley. This simple expedient will be found to save the breakages of warp ends, when fine soft yarns are used. If cotton or strong twist yarns are employed in warp, the cover will not be of much service, as the strong yarn will soon rub away the softer cover, and if not watched carefully may cause a warp breakage, or the shuttle to be thrown out of shuttle race.

Cotton Carding Points

By WILLIAM SHAW.

The points of the wire on the cards can be preserved by giving the grid bars on the pickers proper attention. The grid bars should be opened for dirty stock and closed for clean stock, and to do this the carder should have on hand small pieces of either leather or wood to place between the bars when opened.

It should be the aim of every carder to have as nearly as possible the same number of fibres in the cross section of each strand. With this in mind, the question arises to what happens when the automatic feed boxes are neglected, and not fed regularly.

The principle employed in the automatic feed box is that of having an apron with projecting spikes carry away from a mass of cotton a larger quantity than is required, the excess amount being removed by suitable mechanism, such as a spiked roll or comb, and only that portion which is required being allowed to pass forward to supply the next machine or machines. When the box is filled or nearly filled, a larger number of spikes take hold of the mass of cotton, so that a larger amount escapes the action of the spiked roll or comb. Next, allow the box to run low and weight a yard of the top, and then fill the box and weigh the top again, and the difference in the weight found will prove a surprise. This is nothing new, but this sort of carelessness affects the number of fibres in the cross section of the strand. If one portion of top is heavier than another, it is impossible to have the same number of fibres in the cross section of the strands made from such a constructed sheet of lap. Do nto depend on the evener motion on the finisher pickers to remedy the trouble. The faulty part of the sheet of lap will pass the action of the evener motion, that is, if a defective part of a lap, say one yard, comes under the action of the evener motion at least one half-yard will pass before the speed of the feed roll is regulated to make the sheet the standard weight.

At the bottom of every automatic feed box there is what is known as a lattice apron. The object of this small apron is to keep the stock in contact with the spikes of the lifting apron. Therefore, if this small apron is neglected and not free to rotate, the evil is nearly as bad as not filling the boxes regularly. This is pointed out to make the young carder more careful, as very few beginners think that at the card one inch of lap will make from 80 to 100 inches of sliver, and in some cases more. Just think of it. If a card has a draft of 90, which is common, and a yard of defective lap is allowed to pass to the card, we have 90 x 36 = 3240 inches of defective sliver. To prove what I say here, weigh your card sliver and the difference found from one card to the other having the same draft will surprise you. Even the sizing of only one card at intervals of about fifteen minutes may prove a surprise. These are the things that will make you careful and make you a good carder. To make strong yarn you must have as nearly as possible the same number of fibres in the cross section of the strand, and in order to do this you must begin at the feed box.

It is a common practice to change the surface speed of the lifting apron to accommodate light or heavy stock. This is wrong. A surface speed of 72 inches per minute for the lifting apron has been found to be the best speed to suit the blows to the inch the stock is called on to undergo. When the stock comes in light or heavy, set the comb nearer, or away from the spiked apron. The blows to the inch that the cotton receives is an important consideration, and it has been proven that changing the speed of the apron has caused much fluffy work, for remember that you have no evener motion attached to the feed box and for this reason changing the surface speed of the spiked apron is liable to cause the stock to receive more blows to the inch than intended, which make the stock fluffy. Very few carders take this into consideration, as they appear to think that when the beater speed is regulated to suit the speed of the roll all is well. Let us assume that a feed roll $2\frac{1}{2}$ inches in diameter makes 9.9 revolutions per minute and that a two-bladed beater makes 1,440 revolutions per minute. We have

$$\frac{2.5 \times 9.9 \times 3.1416}{2 \times 1440} = 37$$

blows to the inch, which is about the proper number of blows the cotton should be struck. Never over 40 blows. Now let us again assume that the stock is coming in heavy and the speed of the lifting apron is forgotten. We then have a heavier breaker lap, and as the sheets are doubled, the speed of the feed roll is decreased by the action of the evener motion, and when the speed of the feed roll is decreased, the blows to the inch are increased. By giving the automatic feed boxes proper attention, you do away with two common evils (1) irregular feeding, which makes the number of fibres in the cross section of the strand vary and causes defective weak yarn; (2) the stock is prevented from receiving too severe a beating.

Whatever improvement we attempt in carding, it must be preceded by a change of methods in the picker room. The practice of having the card to the work of the picker in removing the heavy impurities is wrong, in both theory and practice. I know of a mill in Fall River, Mass., that has lately discarded its intermediate breaker. This mill makes carded yarns as fine as 80's out of $1\frac{3}{4}$-inch stock, and the quality of roving and yarn is excellent. But it must be understood that more care and attention must be given to the filling of the automatic feed boxes, in the closing of the grid bars for clean stock and to the opening of them when using dirty stock. With this system one must be on the job every minute, and not neglect the opening and closing of the grid bars, as is so often the case in many mills. Under this system constant watchfulness must be given to the cone belts in order to see that the belt is not too tight, so that the belt shipper may be allowed to move quickly with the belt tight enough so that no slippage of the driver cone will occur.

In the mill in question, the breaker beaters are of the ordinary type, while those of the finisher pickers are of the carding type. The change in system was called too wide a departure from the old system by many mill men, and in some cases was severely criticized. I suspected one reason for this was the fact that a textile school graduate had laid out the plans. However, let us examine this new system. The action of the beater is the most important part of picking, because it is desirable not only to clean the cotton, but also to do it with as little injury to the fibre as possible. This young graduate believed that the speed of the beater must be so regulated that the blades would not strike the cotton too often and thus injure the staple. He knew also that the bladed beater would open the tufts of cotton best, and that with the carding beater the pins penetrate and break up the cotton, and as the cotton tufts have been opened by the bladed beater and as the pins enter the cotton gradually, we get a combined carding and beating action, which produces a sheet of lap-free from bunches and material of a hard nature. Besides, the fibres are in a more parallel order when presented at the card.

Let the reader stop and think about this new system. Here we have bladed beaters in the breaker picker to open the stock and in the finisher picker we have the carding beater to beat and comb the stock. We receive better work with this system without giving the stock a too severe treatment by eliminating the intermediate picker.

With this system we do not have to depend upon the first flats acting first upon the cotton to disentangle the fibres, as they have received a combing in the picker room .and it will be found in this system that the fibres have retained their nature owing to less beating.

(To be Continued.)

U. S. COTTON CROP CONDITION

The condition of the United States cotton crop on August 25, was 78.0 per cent. of a normal, the United States Department of Agriculture announced at noon to-day. This compares with 76.4 per cent. on July 25 last year, and 73.4 per cent., the average for the past ten years on August 25.

A total production of 15,090,000 bales of 500 pounds gross weight is interpreted by the department experts from the condition figures. This is 1,365,000 bales more than forecast from the July condition figures, the result of excellent growing conditions throughout the cotton belt during August.

Manufacturing Goods For Africa

By RALPH M. ODELL, Commercial Agent U.S. Dept. of Commerce

Africa, which has a population of 170,000,000, or more than that of North and South America combined, is one of the most important markets for cotton goods in the world. Owing to the warm climate, cotton is the chief material for clothing, and as there is practically no manufacturing industry in the whole continent, all the goods which are used must be shipped from abroad. The natives are gradually being civilized and adopting clothing so rapidly that the consumption of cotton goods has increased enormously in the past few years. The kinds of goods which are being used in many sections of Africa to-day are grey sheetings and drills and a large part of them come from mills in North and South Carolina, Georgia and Alabama. The sheetings are 36 inches wide, 3.00 to 6.00 yards per pound, 30 yards per piece, and 25 pieces per bale; and the drills are 30 inches wide, 2.85 to 3.50 yards per pound, 40 yards per piece, and are packed 20 pieces to the bale.

The natives sometimes wrap the goods around their bodies loosely, but often they make the cloth into a long loose gown which usually bleaches owing to the action of the hot tropical sun and constant washing. I spent most of last year in Africa travelling from country to country for the purpose of finding out the exact kinds of goods which the people require and suggesting ways and means by which the American cotton manufacturers can increase their export trade. In Abyssinia and East Africa I found that we supply more than half of all the grey goods used in the country, our shipments to these markets in 1913 amounting to nearly 50,000,000 yards, valued at over $2,000,000. This is a matter which should be of particular interest to you, because most of these goods were made in southern mills. In the interior of Africa I often saw in the small shops in the native villages grey sheetings from the King and Graniteville Mills near Augusta, the Pelzer in Pelzer, the Henrietta in Henrietta, the Dwight Mill in Alabama City, and many other familiar brands of grey goods. This entire market is an important one and offers splendid possibilities to our manufacturers because the use of cotton goods among the natives is increasing rapidly.

Our supremacy in the trade in East Africa is being threatened to some extent by Austrian and Italian grey goods which are usually sized more heavily than the American and are often only 35 inches wide with 28 yards of 30 folds or laps to the piece. I also heard some complaint about the condition in which our goods reach Africa and I saw a number of bales of cloth from this country on which the binding ropes were broken and the burlap badly torn, thus exposing the goods to damage. The goods shipped to these far away markets are subjected to considerable handling and they must be substantially packed in order to reach their destination safely. European bales are usually covered with heavier burlap than ours and have a waterproof paper lining with broad iron bands for binding.

Unfortunately American manufacturers are furnishing only grey goods to the African markets and we have no share in the trade in bleached, colored, and printed fabrics. The native African, like the American negro, usually prefers gay colored garments, but he has been too poor in the past to buy them. As the country develops and the buying power of the people increases, the demand for colored goods grows and the use of grey goods tends to decline. In South Africa where $10,000,000 worth of piece goods are imported every year, American cotton cloth is practically unknown. Very few grey sheetings are imported and the chief demand is for prints, ginghams, colored flannels, and bleached goods. These are lines which we manufacture here, but because our goods are not of the proper width and have not the design or finish which the people want, we have not been able to secure much of the trade.

The average manufacturer or superintendent, as I know from my own experience, usually objects to export orders because they often necessitate changes in width, construction, stamping, packing or finishing. I want to plead with you who are practical men to view this matter from a larger point of view. It cannot be doubted that our cotton mills are producing more goods than this country can consume. Most of you I am sure have passed through periods of depression when it was necessary to curtail production by shutting down your mills or running on short time. You know very well the hardship which this policy entails. The only possible remedy for this unfortunate condition, and the demoralization of your operatives which results. The only way in which we can bring about greater prosperity in our cotton industry unquestionably lies in the extension of our export trade. The world to-day outside of the United States uses approximately one billion dollars worth of cotton goods annually, or more than we manufacture in all of the mills in this country. Of this amount England furnishes over half, while our own share is slightly more than $50,000,000, or 5 per cent.

If we will but set ourselves to the task we can increase this trade considerably, and it is only through your hearty co-operation that this can be successfully accomplished. No not accept as final the oft repeated claim that we cannot compete with other countries where labor is cheaper. There are many lines of goods, which by means of the high efficiency of our operatives and the use of improved labor-saving machinery, we can manufacture in competition with the world. The cheapness of foreign cotton goods is often due to the use of lower grades of raw cotton from India or China, which are mixed with American cotton, and to practice of adding 20 to 30 per cent sizing to the warp. These are two important matters to which the progressive manufacturer of to-day should give more serious attention.

Mr. Clark and myself have been studying the markets under the direction of the Department of Commerce in order that the manufacturers in this country may ascertain the kinds of goods which the foreign people want. We have brought samples of many of these goods back with us and they are on exhibition here to-day in order that you may examine them. But we can only supply the information; the task of securing the trade is in the hands of the cotton goods sellers and manufacturers and it is only through their cooperation that any great success can be attained.

I want to urge every one of you present at this meeting to begin to study the possibilities of the export trade, to give all the encouragement that you can to the manufacture of the classes of goods which the foreign countries require, and to endeavor in every possible way to assist the owners of the mills in their efforts to sell their goods abroad. We need a new spirit of determination, from the exporter to the operative, to place American cotton goods in the markets of the world, and if we give more serious attention to this question we can inaugurate a new era of prosperity in the large and important textile industry of the South and put an end to the constantly recurring periods of depression and curtailment which we have experienced in the past.

Cotton Combing

By P. A. GWALTNEY*

(Read before a recent convention of the Southern Textile Association)

Before cotton can be fed to the combers it must be prepared into a lap. As a general rule, this necessitates the use of two preparatory machines, known as the "Sliver" and "Ribbon" lap machines. Sixteen or twenty card slivers are fed into the sliver machine, the principal part of which consists of three or four drawing rolelrs, two pairs of calender rollers and two lap rolls. The slivers are condensed into one solid sheet or lap. Four to six of these laps are placed on two corrugated wooden rollers and fed through four pairs of drawing rolls, which have a tendency to draw the fibers into a more parallel condition. These four or six sheets of cotton are passed over a guide plate through a pair of calender rolls and condensed into a lap plate which is in a suitable condition to be presented to the comber. This lap is placed on two fluted wooden rollers at the back of the comber, and is fed to the feed rollers over a guide plate in an intermittent motion at about 3-16 to 5-16 inches per nip. While the feed rollers are passing the cotton forward the nippers are open, and the detatching rollers, with the segment, are taking the last combed portion of the cotton forward. The nippers then close and hold the cotton in the path of the needles of the half lap, which combs out the short fibres and impurities. While this operation is taking place, the feed rollers and detaching rollers are not revolving. The waste is taken out by the cylinder needles and carried to the back by the cylinder brush, doffer and comb, or by an aspirator. The use of the aspirator is a great improvement over the old system of removing the waste, as the backs of the combs are kept clean by this method, which requires much less stoppage for cleaning the backs, and enabling the comber tender to look after more machines.

After the nippers open, the segment comes under the combed fibers and carries them forward, with the assistance of the leather detaching roller, which comes in contact with the segment for this purpose, the newly combed fibers being carried forward until they meet the return ends of the last previous combed fibers.

The detaching and attaching mechanism is quite difficult to understand on account of the different operations of the detaching rollers, and more especially the top rollers. They have a rotary motion carried on simultaneously with a bodily motion through space. They have an intermittent and reciprocating motion, besides the rotary motion one way being greater than the opposite motion. In other words, the forward motion, we will say, is twice as great as the backward motion. During the time of combing the roller is lifted out of the way of the needles and lowered again to meet the segment. This is known as the "bodily motion through space." The rotary motion is caused by frictional contact with the long steel roller, and is first made in such a direction as to cause the rollers to turn backward. As soon as the backward motion is completed, the forward motion commences.

The comber requires very delicate adjustment and handling. To obtain the best results, the needles of the half lap should be gone over at least once a week; the top combs should be examined closely each day; the leather detaching rolls should be kept well varnished and the leather kept in good condition. Allow me to say here that it has been my experience that more bad work is caused by poor leather detaching ing rollers than from any other one source. The rollers are about 10 to 12 inches long and ¾ of an inch in diameter, and it is a very difficult operation to cover them so that they will be of uniform thickness throughout. These rollers should be ground perfectly true before varnishing. The roller coverer is supposed to do this, but it is well for the mill to have their own grinding machines. If this be well looked after, and all rollers are perfectly parallel, there is no reason why the comber should not give first-class results.

Combers should be stripped of as many of its parts as required to give it a complete overhauling once a year.

Proper heat and humidity plays a big part in obtaining first-class results, but, with the present system of air conditioning apparatus, we should not have any complaint from this source.

The percentage of waste ought to be taken at least once each week, and if the proper amount is not being taken out, the parts governing this should be looked into.

The reason the comber takes out the short fiber and leaves the long is because the long fibers are taken from the open nippers by the detaching rollers before they are released by the nippers. The short fibers are freed from the nippers before the detaching rollers can reach them; therefore they are carried to the waste tin.

The function of the top comb is to comb out the tail ends of the fibers delivered, and extract the short fibers and impurities. The angle and setting of this comb plays a big part in the amount of waste taken out.

In conclusion, allow me to say that great care should be used in the making of good, even laps, with fibers as parallel as possible. Short piecings up at the back of the ribbon machine will save a lot of broken needles in the cylinder and bad top combs, which is very detrimental to good work, as well as the cost of having them re-needled.

*Superintendent Holt Williamson Mfg. Co., Fayetteville, N. C.

PAR VALUE PENMAN'S SHARES $100.00.

Notice has been given that the directors of Penman's Limited have changed the par value of the shares of the company from $5.00 to $100.00. Each holder of twenty shares of the old will be entitled to one share of the new consolidated six per cent preferred stock. Fractional certificates in twentieths will be issued for any number of shares less than twenty.

There is now $1,075,000 of preferred stock outstanding. This amount is not to be changed, the only difference being that in future there will be 10,750 shares of $100 each instead of 215,000 shares of $5 each.

RAW MATERIALS OF WOOLEN CLOTH MANUFACTURE.

By WILLIAM DAVIS, M.A.,

Principle of Hawick (Scotland) Technical Institute

In studying the operations of woollen cloth manufacture, there is a strong tendency to give little attention to the raw materials and to concentrate on the mechanical operations of manufacture and the structure of fabrics. Now a little consideration will show that the quality of the fabric, whilst it is udoubtedly influenced by the method of treating in the various manufacturing operations and finishing, is to a large extent what it is made by the qualities originally found in the raw material itself. If, for instance the various criteri be examined by which all woollen fabrics be judged, then it will be seen that such qualities must to a large extent be present in the original material, if they are to show up in the resulting fabric. On the other hand it is also true that defective and wrong methods of manufacturing will annihilate many of the qualities most sought after in woollen clothing.

Requirements of the Raw Material.

Certain properties are desired more for one variety of goods than another, but there are general properties sought after in all cloths. It is because that wool has been found possessed of the most of those qualities that it has been selected as the material from which such goods are manufactured. It will be instructive to examine some of those qualities in particular, and trace their influence and value in the fabric produced from them.

Color.—The natural color of the wool fibre is of great importance to the manufacturer, as it has considerable influence on many of the processes of manufacture. The tinges found on wool as it is taken from the sheep's back are many and varied. The dirt which inevitably gets into the fleece when on the animal, can usually be removed in scouring, and it is then that the color of the wool is judged. It is often found that the color of the wool has been effected permanently by the conditions under which it has been grown. If, for example, dung and clay portions have for a long time been adhering to the wool on the under part of the sheep, then it is found that those portions of the fleece have come to assume a permanently discolored appearance, which reduces the scope of the wool. Material of this kind cannot be used for goods which are required in their natural white condition, as for example many varieties of costume and flannel cloths. For the lighter dyed shades also it is found that a discolored ground does not give satisfactory results in matching, and the depth and purity is invariably affected. Such sections of the fleece are sorted out in most factories and placed together in a lot which is used for the making of the darker dyed shades, it being found best suited for the production of blacks, browns and blues.

The white fleece of the sheep is often found with a certain proportion of black hairs which vary in amount according to the breed of the sheep and its trueness in relation to the original type. The black hair is specially prevalent in certain kinds of American wool. When some of the pure white breeds have been crossed with, for example, the blackface sheep, then black hairs in the resulting projeny may be expected, and even when endeavors have been made to return to the original pure breed, it has been found almost impossible to obtain the wool in its original purity. As all are aware, the sheep breeders are faced with the demands of the wool trade on the one hand, and the demands of the frozen mutton trade on the other, and it usually happens that the sheep, which gives the wool fibre in its purest forms is not a large animal, giving a limited weight of mutton. The endeavors of the farmers to increase the size of the animals by crossing the smaller sheep with those which have a larger body but different class of wool, are responsible for many of the defects to be found in the wool supplied to the manufacturer at the present day.

Kemps in Wool.

In a case tried recently one of the standard classes, such as the Cheviot, was crossed with an Asiatic breed which was black in the face only, the resulting lambs were, strange to say, completely black in their coat of hair. But in addition to the introduction of dark or black hairs, nature has still another means of indicating her disapproval of tampering with existing standard types of animals, and this is to be found in the presence of kemp hairs in the fleeces of many kinds of crossbred animals. Kemps are thick, horny fibres, which may be 12 or 20 times the diameter of the fibres in the normal fleece, and do not develop in the normal way. They have not the surface serrations which is one of the first qualifications of a wool fibre, the material is hard and lacks the property of color absorbancy. Consequently the material cannot be spun with the same facility, and the color shows up quite differently to that of the surrounding fibres. These kemps are found in many kinds of merino crosses and also in crosses with the Cheviot sheep. As a result, a larger animal has been evolved which gives a greater weight of mutton, but the effect on the wool is to reduce its purity by causing great numbers of those kemps to be present in the fleece. Now it frequently happens that after having evolved a larger animal, the state of the mutton trade is such as to encourage the farmer to specialise on the production of the best class of wool, and he proceeds to breed back again, endeavoring to attain the pure standard type once more. It is very remarkable that such endeavors prove in the main futile and ever afterwards the fleeces have to a considerable extent the evidences of the cross-breeding.

There is, of course, the demands of the wool market to consider, the trade requires at one time more of the pure fibre and at another the requirements are served by the thicker fibred and more robust crossbred. The farmer may be at a loss in some occasions to know in which direction to turn, but it is certain that there can be nothing but bad results to the quality of the fibre by careless cross-breeding, and that in all endeavors to suit the requirements of the trade, the departure from the original standard types of sheep and wool cannot but be harmful to the whole trade. Owing to crossbreeding, many kinds of our wool such as the merino for example, have become much altered in quality and general characteristics, the pure fibre as it was at first known being almost impossible to obtain. It is also well known that certain defects may miss a generation and re-appear as rank as ever in the succeeding lot. When the standard classes are too much departed from the quality of the fibre cannot be depended on to any extent, an uncertain element has been introduced.

In Great Britain several centres of technical education have taken up the question of evolving a sheep which will have a large body, give a good weight of mutton and at the same time leave the fineness and general properties of the wool unimpaired. Whilst we would be the last to discourage experiment and research, yet we think that the experiments should for the present be confined to the centres of education, and that the farmers who are engaged in sending their wool to the markets of the world to be purchased by the manufacturer should confine his attention to the standard classes of animal. In some countries the quality of the fibre has been so much depreciated by careless breeding that they require at frequent intervals to replenish their stock with animals of the pure-bred class, so as to maintain the reliability of the fibres qualities, and prevent the deterioration from wool to hair.

Natural Wool Coloring.

What has been said regarding color applies to the bulk of the trade in manufactured woollen goods, for there are sections of the trade where the material has of itself some natural coloring in one or more tints, and which tints are of distinct service to the textile industries, although it must be noted that their utility is greater in the hosiery section than that for woollen cloth. In articles which are more of occasional than constant use such as wraps, shawls, etc., natural colored material of various tints are quite suitable. The goat and camel wools are the best known of such fibres, which have those properties. In addition to the variable tint, the degree of variation of the diameter of the individual fibres presents a great drawback to their use for the more permanent types of woollen cloths. The Shetland wool is too limited in quantity to take a really important place in the market for textile materials. The wool from this animal possesses fibres which vary widely in tint. On the same fleece may be found several shades of grey and other samples are of many degrees of brown. This free melange of fibres forms one of the features which go to make up the product known as the Shetland shawl. We frequently hear great faith expressed in the fastness of the natural coloring pigment found in such materials and the fastness of artificial dyestuffs declared to be inferior to that of the natural shade. If, however, samples of such natural wools be examined, it will be found that the fastness is a very elusive quality as evidenced by the fact that it has not been sufficient to withstand the rays of the sun during its year of growth. If the color be brown, then on the staple of wool it is frequently seen that the brown varies in depth and fastness as it approaches the skin, the tips presenting a dull faded appearance. It is true that the resultant shade is determined by the appearance of the material when the fibres have been thoroughly mixed in carding, but this fact should effectually silence those who persist in giving forth the fastness of the natural color as being exemplary.

But the color of natural white wool may be influenced permanently by the ingredients which are found present in the environment of the sheep and is dependant to a considerable extent in the constitution of the soil, and the vegetable matter which grows around. In a wet season clay gets attached to the wool in great quantities, and even after its removal, the influence of the clay is seen on the color. The effect of a sandy soil is even more marked, because the small particles of sand become fixed firmly in the scales of wool and they are almost impossible to dislodge, the particles giving to the whole shade a decidedly red aspect.

Some varieties of wool present a permanent yellow tinge even after the most careful scouring and this is due to the amount of coloring pigment which is secreted in the medullary cells of the fibre. In the blackface wool fibre for example are to be seen large patches of medullary substance which give the prevailing dullness of tone to so many varieties of this fibre. If wool of a decidedly yellow tint be required for white goods, the cloth has to be subjected to one or other of the well known forms of bleaching. The color of wool may be permanently injured by injudicious treatment in scouring, the most general defect being the use of too hot scouring liquor, or it may be that the alkali is present in too great a proportion, both may render the wool permanently discolored, and discolored in such a way that no amount of subsequent bleaching will remedy matters.

Handle of Textile Materials.

The subtle property of textile materials known as "Handle" or "Feel" is of the greatest importance as regards their use in woollen cloth. This may be termed the quality of the material in relation to the sense of touch and this sense is one in which a high degree of fine training is possible. The quality of touch as applied to textile materials and to wool in particular is one which is capable of development during a considerable portion of the lifetime of the individual, and the member of the staff of a textile firm who has the sense of touch developed in this way is found extremely useful in judging the quality of cloth. To determine and apreciate the varying stages of the "Handle" of wool, so as to be able to differentiate between different classes is very desirable, and the wool buyer has to spend much time and give much attention to the training of this faculty. It is difficult to say what constitutes the mysterious property of handle. It has no doubt to do in the first instance with the structure of the fibre, and in particular to the harness or otherwise of the outer layer of scales. In all animal structures we have the hard outer portion which has for its function the protection of the softer and more actively developing inner sections. If the environment of the sheep is such that a hard exterior is required, then a hard covering develops on the fibre, if, however, as is the case in warm countries, such as Australia, the climate does not call for a hard covering, the cuticle is soft and this gives a soft handle to the whole material. If the merino wool were grown in a colder climate or in a mountainous district, a distinct hardening of the cuticle would be observable with a corresponding decrease in softness of handle of the material. In this connection it may be asked why we can obtain such exquisitely fine material from mountainous districts such as the cashmere from the Himalyas. An examinaton of such a fleece will reveal the interesting fact that the protective function is undertaken by a set of fibres known as beard hairs which grow to a considerable length in excess of the normal fibres of the fleece. They are much harder and thicker than the undergrowth, and take on the duties of protection for the finer qualities of the composition of the fleece. The delicious softness of the cashmere may be regarded akin to the softness of the fur of the Angora rabbit, and which in an extreme degree is present in the down of certain birds. In those instances, the handle is truly all that can be desired from point of view of softness, but the excessive softness is attained at the expense of strength and physical structure, such materials not being robust enough to stand the elementary manufacturing operations. It is ever so even with other important properties of textile materials, one property may be present in an extreme degree, but other essential qualities are weak as so its utility is considerably reduced.

Other Elements in Handle.

But there are other elements in the handle of wool which have to be considered, and an important one is the property of bulkiness. One fibre may be of soft, but may lack the property of bulking in the hand. Two fibres may be as soft as one another with the same diameter of fibre and length of staple, but they may be entirely different in the properties of bulking, which may be defined as that which the fibre possesses of diffusing itself. There is also spring and elasticity connected with it, and to a certain extent waviness of form. Straight fibres will not bulk well, because they tend to lie together closely side by side. A good bulking wool fills out the space much better, and gives to the cloth a fuller and richer impression. It has a very desirable springiness and when made into yarn gives good diameter, so as to fill out well in the cloth. You may have two yarns of the same count and presumably of the same diameter, set in the same reed and under the same conditions of weaving, yet the one will appear bald and flat, whilst the other has a fuller appearance due to the difference in this property. Wools which are characterized by this quality in a special degree are the Puntas Arenas of South America, reputed to be the bulkiest wool grown. of British breeds, the best known are the Oxford and South Down varieties. The crossbred wools which have those varieties in the cross, also possesses the property of bulkiness in a varying degree.

This property is, perhaps, most useful in knitted goods such as hosiery and underwear, because the knitted loop is naturally open in structure and the bulkiness of the material serves to fill out the spaces between the loops. In the domains of woven cloth, the best examples of cloth where the bulking property is most desired is the flannel fabric for summer wear, and also to a certain extent the Cheviot and Crossbred worsted varieties. For the latter cloths ,the wool, which is a crossbred between the merino and the Lincoln and Leicester sheep is used for the worsted, and for the Cheviot the wool bearing the same name which is originally native of the Scottish Borderland, but has important varieties in other districts, notably in Sutherland. Materials such as Mohair, Alpaca and the pure Lincoln wools are examples of wools which do not excel in the bulking property, largely due to the fact that they are lacking in waviness of fibre. In the finished cloth, when a soft and bulky handle is required in addition to the natural bulkiness of the wool, the operation of raising is performed which has the effect of creating a pile on the cloth, by drawing a certain proportion of the fibres on to the face.

Length of Staple.

Sheep are shorn each summer and the length of wool taken from the animal as regards an average length taken all over the fleece is known by the term length of staple. The length varies considerably in different parts of the fleece, the portions taken from the neck and legs being shorter than those from the shoulder and hips. The wool on the underpart of the sheep is also shorter than the normal, owing to the increased wear to which it is subjected during the life of the animal. Excessive rubbing causes the fibres to wear at the ends; a considerable proportion of fibres found at the skin of the animal are awanting at the surface of the fleece, as they have been shortened by wear. The strongest fibres survive their full length. The variation in length of staple found between the different classes of wool is a property which is most useful in cloth manufacture because the short, medium and long stapled varieties can each be adapted to the making of a cloth with a special character .

The original length of wool staple is seldom maintained throughout all the manufacturing operations. In teasing, the natural locks or tufts of wool are disentangled and in the process, large numbers of the fibres are broken, whilst in each of the succeeding stages of carding or combing, the breakage of fibres continues to a greater or less extent. What conduces considerably to this breakage of fibres is the existence of what are known as cotted fleeces, where for some reason or other, the wool has formed itself into small bunches of fibres on the fleece, the fibres being so firmly welded together that they can only be separated by a considerable number of the fibres giving way. The cotted fleece is one of the trials of the sheep farmer, and reduces the value of his clip. Cotting may be induced by the washing or dipping of sheep, where a movement is set up amongst the fibres which causes the imbrications of the individual fibres to catch on to each other, and thus bring about a modified degree of felting.

The length of staple forms one of the most useful modes of classing wool and there are recognized three sorts, Short, Medium and Long. The short stapled class measure anything from 2 to 4½ inches, the medium from 4½ to 7or 8 inches, whilst the long stapled class are from 8 inches upwards. As is well known, the longer varieties are found most useful for making into worsted yarns if the required fineness of fibre is also present, whilst the medium and shorter varieties are best suited for the manufacture of carded yarns.

A. S. FULLER—HETHERINGTON AGENT.

A. S. Fuller has been appointed agent for Messrs. John Hetherington and Sons, Manchester, England, in Canada and United States, succeeding S. C. Lowe, who, as announced in last issue, has resigned to act in a similar capacity for the Mason Machine Works of Taunton, Mass. Mr. Fuller will make his headquarters in Boston in the same offices occupied by Mr. Lowe at 178 Devonshire Street.

WOOL SALES POSTPONED.

The semi-annual wool sales at Sydney, N.S.W., to have taken place this month, have been indefinitely postponed, according to a dispatch dated August 27. It was also stated that the sales at Melbourne, Australia, fixed for October 7, have been postponed.

MANAGEMENT OF A FANCY WEAVE ROOM

By L. O. BUNTON,

There are almost numberless details that must be considered in the management of a fancy weave room that do not have to be considered on a plain job. On account of the complexity of the business it is absolutely necessary for the man in charge to have some system of records; for it is impossible for a man to keep everything in his head as some men do on small, plain jobs. The problem is to have a system that is coherent, fairly complete, and not too expensive to maintain. My idea in this line is that a system should be as simple as is possible in consistency with the inclusion of all stress on this last clause for the reason that many of the very best are not trained bookkeepers.

When an order is received at a plain mill running staple goods no one but the office force know anything about it unless there is some unusual feature attached and in that case the superintendent writes a note or tells the overseer to make the necessary changes. Instead of receiving large orders at rare intervals a fancy mill almost daily receives comparatively small orders for many varieties of fabrics. As the fabrics are usualyl made to order and include many different weights, construction, colors, and hundreds of weaves it is necessary to have a copy of the order or at least a part which gives all details necessary to the manufacture and delivery of the goods.

When the weaver gets a copy of an order, the first thing he should do is to see that he has sufficient number of feeds, pick gears, and any other supplies that will be needed to make the gods, and if not they should be ordered at once. In this conection it is valuable to have a perpetual inventory of reeds and gears. This can be kept on a small memorandum book or in the back of the order file. This is very easily done by entering the kind and number of reeds and gears as they are received and by having all broken ones saved until they are counted and deducted from the inventory. By looking at the inventory and the division of looms the weaver can tell in a minute whether or not he has the needed supplies available.

A sufficient number of shelves should be provided to keep every dierent kind of reed and gear to itself and when not in use they should be kept there. This will require close watchfulness but it is very essential for a mix-up of these parts can cause more confusion, loss of time, and bad work than almost any other detail of similar character. Of course, the weaver can count these parts when he receives an order but he can keep the inventory with much less work, and especially so if the shelves are at some distance from his desk.

After seeing to the supplies, the next step is to give an order to the warping or beaming department. This order should specify the order number, style, color, number of yarn, pattern, for laying-in, if colored work, beams, ends length and date needed.

There is in use a tag system in which the weaver or designer gives to the warping or beaming department his orders in the form of a tag containing all necessary details. This tag is made in duplicate, one of which is fastened to the beam and the other returned to the office when the beam is made. The system is followed up and a tag is returned to the office at each step of the work. The data on these tags is entered on a book in the office at regular intervals and the person in charge can tell at a glance where every part of the order is located—provided no one has made a mistake about returning the tags—personally I have not had much success with this system for reasons before mentioned.

When special yarns have to be made the weaver should give the preparatory department an order in time to have them ready when needed. By having a few warper combs cut down, most of the warpers can be run on a standard number of ends and the sets can be filled in on the warpers with combs having a fewer number. By this method much work can be saved in changing the number of ends on the warpers. When the warping or long chain beaming department finishes an order it should be turned over to the slashing department. The order should contain all facts necessary for the slashing department as well as the warping. The back of the order should be ruled so the slasher tender can put down the exact number of cuts or yards made on each style. The order should then be turned into the weaver or designer and entry made on the customer's order.

No. ....

WARPING ORDER.

........................191

TO OVERSEER OF SPINNING:

Please warp the following section beams:

.... **Beams with** .... **body ends, and**....................**selvage ends each.**

.... **Beams with** .... **body ends, and**....................**selvage ends each.**

Seven Warps Per Beam.

Style No................

Order No................

Commence Warping ....

Section Beams per set on Slasher...................

Ends in Warp.........................

.........................**Overseer of Weaving.**

Approved,

.............................**Supt.**

THE WARPING ORDER.

Considerable foresight is necessary to keep warps of all styles that are not running in the weave room and not get too much yarn tied up on a few styles. For

Read before a recent convention of Southern Textile Association.

instance, if 15 looms are all that are necessary to meet the required delivery on a certain style, or that number of looms are all that are available and there are 20 beams to a slasher set, then 5 beams would be left over. If the mill was running 100 styles, which is not unusual for the last few years, it would be an easy matter to get several hundred beams on the floor and at the same time have looms waiting for warps. The man in charge of this work should have a report every Monday showing how many warps on each style will run out during the week, and how many warps on the floor, this will give him a chance to plan the work back to the warpers and have the right warps coming through at the right time. This report will also show how many warps will need to be drawn. A daily warp report is also a great aid but the weekly report is more valuable, because it takes two or three days to get the stock through the warping, slashing, and drawing-in departments.

After writing the warping orders, the overseer should give the foreman of draw-in room orders for drawing the warps. These orders should contain the style number, reed, spread and spaces for the name of draw-in hand, chain builder and harness builder. The back of the draw-in order should contain the harness lay-out unless the person whose duty it is to build harness understands the work well enough to figure the lay-out from the draw-in draft. This part of the business can be simplified by having a list of the reeds and spread for each style where it can be easily seen and by giving the harness builder one lay-out for each style and have him keep them on file. The draw-in orders should be filled in the order they are to be drawn and when a draw-in hand is ready for a warp the trucker or foreman gets the order from the file, gives it to the draw-in hand and puts up a warp to correspond with the order, the harness should be built and marked before the warp is put on the draw-in frame and the chain should be built and tagged by the time the warp is drawn. When the warp is drawn the foreman takes up the order and the data on it is used to keep a record of the stock and the work done by the draw-in hand. At a place convenient for the fixers there should be a list showing the filling and gear to be used on each style, also the width of the goods.

DRAW IN ORDER.

Style ....

Beam St..

Ends on Beam ....

Cuts on Beam ....

Dent Reed ....

Width in Reed..

Drawn by ....

Reeded by..

Harness Built by..

Inspected by..

.... Date ....

....

Overseer

THE DRAW IN ORDER

When changing styles the fixer can look at this list much easier than he could go to the office and ask what reed and gear to use. Also when there is a great deal of changing of styles, the overseer should keep posted on a bulletin what styles he wants put on. It is comparatively easy to keep track of the stock until it gets on the loom and then it is somewhat difficult to find at any time how much is on the loom beam. Some mills have a series of numbers on style tag and the timekeeper goes around each day and punches out a number on every loom that has had a cut checked up that day, but this requires a great deal of work. My system is to keep track of the amount that goes on the loom and deduct the amount baled from this to get the amount on looms at any time, loose goods in cloth room is counted as being on the loom. When the last of order has been put on the looms then the stock should be checked up measuring the beams with a cut measure made as the slasher beam is filled.

On a job that runs several numbers of filling and is constantly changing styles each loom should have a filling box and the fixer should change the filling when putting on a warp of a new style. These boxes cost money but they will pay in the long run, for it is almost impossible to prevent mixed filling without having a box to each loom. By having a box to each loom it is not necessary to change warps to get all styles using one number of filling together, but new styles can be put on anywhere old styles run out. Each morning the weaver should give the spinner a report showing a number of looms on each filling and changes to be made during the day, this gives the spinner a chance to keep the proper amount of each filling on hand.

Harness Build No. 1.................... Heddles ....

....................2....................

....................3....................

....................4....................

....................5....................

....................6....................

....................7....................

....................8....................

....................9....................

....................10....................

....................11....................

....................12....................

....................13....................

....................14....................

....................15....................

....................16....................

Total.......................................

....

....Designer.

THE REVERSE SIDE OF THE DRAW-IN ORDER.

A complete record of patterns is absolutely necessary. The pattern book should contain a clipping of each style and draw-in and chain draft and all the details necessary to manufacture them, also a quarter yard swatch full width with complete detail ticket should be kept on file. An ordinary day book does good service as a draft file, the pages of the book are numbered and the drafts for each style are placed in the book at the page corresponding with the style number, this makes it very easy for the draw-in hands or foreman to find drafts when required.

The preceding remarks refer almost entirely to fancy work but the following will have some bearing on plain work. There are a great many mathematical problems to overcome and the eternal problem of human nature is a very important factor in the reduction of seconds, but these are entirely separate subjects. We are describing systems at the present time. Nearly all mills now have the looms numbered and the loom number written on the cloth, as soon as an imperfect place is found in the cloth, a ticket with the loom number and the kind of imperfection written on it should be put in a place convenient for the weaver to get it. When the weave room and cloth room are separated by a paritition only, a hole should be cut in the wall and a box should be fastened to the wall on the weave room side and just below the hole. The grader drops the ticket through the hole just like mailing a letter, and the weave room overseer or second hand should look into the box at least four times a day or every time he passes and get the tickets and give them to the person responsible for making the cloth.

This system is much better than waiting until the end of the day to get the cloth room report, however, the cloth room should give the weaver each morning a report of the number of pieces containing each kind of imperfection, so he will know what to give the most attention. The bad cloth should be shown to the weavers each day even though there is only one piece, for the least break in the system will require several days to mend. The cloth table is the place for the overseer to teach the weavers how to prevent bad cloth. The loom fixers should inspect the cloth on the loom at least once a day and write their initials on the cloth. My experience has been that it is best to have this inspection made at a certain time each day, say just after starting time, for the men are not so liable to forget it or put it off until too late. The second hand should also make at least one regular daily inspection of the cloth, so, also, ought the overseer on a job up to one thousand fancy looms or two thousand plain looms.

The second hand should give out supplies or write orders for them, this gives him a good chance to teach and caution the fixers how to set up the looms to make the parts give the best service. The way to save supplies is to fix the looms so they will not wear out and break up the parts. A record of supplies used on each section is very valuable, for it shows the management who are the efficient men and if properly handled will create a good-natured rivalry between the men and cause each to do his best.

Every one understands pay-rolls, but there are some features about them that are sometimes not so easy on a complex job, when there are many different weights, picks, lengths of cuts, etc., it is impossible to judge with accuracy the cuts in a roll, and it takes too much time and work to measure them, so the best thing to do is to weigh the cloth and figure out the cuts. This is very easily done by keeping a convenient record of the weights of a cut of each style of goods and the timekeeper soon gets this into his memory and does not need to look at the weight sheet. I like this system of checking up the cloth by the loom number for it is much easier to trace an error with this system, as new styles are added almost daily and the price per cut for weaving has to be figured for each, the overseer should have a price constant or rather two constants for good and fair running patterns of each class of goods, by using this system he can get the price per cut for weaving simply by multiplying the picks per inch by the constant.

Simple Mistakes in Cotton Bleaching

By F. BENESCH.

The causes of stains on bleached cotton pieces are many. They may be divided into two classes, those made very distinct by sharply marked borders, and those, usually larger, which do not show up well before dyeing.

When the pieces are to be scoured after weaving, it is of great importance to see that they are packed properly, so that there are no open places, and the lye is forced to pass through every part of the goods. Stains may be caused by neglect of this precaution. They are brown in color. If not too dark, they can be removed by chloring and souring. It is obvious, however, that considerations of expense dictate that such stains must be prevented by proper packing. The scouring lye of caustic soda must be pumped warm on to the goods. If it is pumped cold, the parts of the fabric that it first touches are apt to be mercerised, and hence dyeing stains, or in other words, unlevel dyeing, cannot be avoided, as the mercerised parts dye darker than the unmercerised parts.

Rosin stains may occur from unsaponified rosin in rosin soaps. Here prevention is the only cure; these stains are very difficult to deal with; in fact, their removal at any reasonable cost and without damage to the fibre is practically impossible.

When the scouring is finished, the goods must be quickly rinsed in the kier with cold water to prevent them drying on to the hot tins, whereby lime stains are caused.

Rust stains occur when the goods, still damp from the scouring, come into contact with iron. If they still contain lye, the fibre may be tendered by conversion into oxy-cellulose, as well as stained. The kier must therefore be frequently painted inside with a mixture of milk of lime and egg-white. Rust stains can be removed with oxalic acid, and the goods must be very thoroughly rinsed after this treatment. After scouring, the goods must be thoroughly rinsed.

Acid stains are caused by imperfect rinsing after souring, especially if the goods are dried after the rinsing. They are irremediable if the fibre has been tendered, and in the case of cotton it nearly always is. Such stains, of course, never occur except through gross carelessness.

If goods which still contain free acid are soaped, the effect of the acid is neutralised, because the soaping comes quickly in the natural sequence of the operations, but another difficulty is introduced. The acid sets free fatty acids, which, when the goods are rinsed with ordinary water, form lime soaps, and these act as a reserve in dyeing.

Defective rinsing after bleaching with bleaching powder and souring with sulphuric acid leaves sulphate of lime on the fibre, which causes white stains, and cannot be removed once the goods are dry.

Strong lyes of bleaching powder may cause tendering by the formation of oxycellulose. This substance may also be produced from the fibre by prolonged action of sunlight or even of the air on goods soaked with much weaker bleaching powder lyes. Oxycellulose may also be formed if air is present in the kier, and made very active by the high temperature prevailing. The parts of the fibre which are converted into oxycellulose are permanently tendered, and there is no cure. They, of course, cause unlevel dyeing by the difference in affinity for dyes between the changed and the unchanged parts of the fabric.

Army Clothing

WOOLLEN OR WORSTED?

In both the United Kingdom and Canada the woollen mills have been exceedingly busy turning out khaki cloth for army clothing and naturally a good deal of attention has been given to this trade during that time. With the exception of officers' clothing and tunics the cloth is usually woollen so that in England a big portion of the business has gone to the heavy woollen district and other woollen goods centres of Great Britain. Some attempts have been made to induce the British Government to use worsted cloth in the manufacture of this clothing, one of the chief exponents of the proposition being Mr. Howard Priestman of Bradford.

In a recent letter to the "Yorkshire Observer," Mr. Priestman says that "the cheapest possible material is good enough to clothe a soldier," according to the practice of using woollen cloth entirely. He says in part:—

"I pointed out in 1911 that only one out of the dozen cloths that are used to dress our soldiers contains any worsted at all. That single exception is the service serge of which the tunic is made, and of that fabric just one-third part is worsted. It is said by cynics that this country thinks little of her soldiers in times of peace and much in times of war. Let us hope that we shall now be sufficiently grateful to dress them in something better than the cheapest material we can buy. It might be pointed out, of course, that self-interest would lead us in this direction. In 1911 Bradford was not so hard up for work as it is now. To-day both patriotism and self-interest should induce us to see that Army uniforms are made of the best material that can be bought—that is, of worsted. The present service serge is a 21oz. fabric with fifty-two warp threads of twofold 24's worsted and forty-four picks per inch of single woollen yarn, equal in counts to single 51½'s worsted. In other words, it consists of a relatively fine worsted warp filled with just twice its weight of woollen weft. Put in another way, we may say that in every yard which weighs 21oz. there are 7oz. of two-fold worsted warp against 14oz. of a cheap woollen composed of much shorter material.

"Technically, of course, the material is not shoddy. Shoddy is the product of old cloth which has been pulled to pieces in a "devil." The fibres will average under an inch in length, whereas this one must average at least an inch and a-half. We are told that the increase is obtained by the use of material which is produced from old stockings, old flags, and the like, but in these days of strange rumors perhaps it is safer not to believe all that we hear. It is also worthy of notice that trousers for the service uniform are made not of serge, but of what is called "tartan" cloth. In appearance this greatly resembles serge, but it is made wholly of short fine-fibred material and is spun on a woollen mule. It is shrunk a good deal in finishing, but it is not sufficiently milled to cover the weave; nor has it any of the attributes of cloth, as that term is understood in Army contracts. It is much less dense and more elastic than heavily milled material, but is less dense and less elastic than real worsted. Why fabric of this kind should be used for trousers in preference to a serge it is not easy to conjecture, for woollens have a reputation of bagging at the knee far more than cloth with a worsted warp. But the fact remains that all service-dress trousers are of tartan drab mixture produced from wollen yarns and woollen only.

"We shall doubtless be told that a pure worsted fabric is far too expensive for such a purpose as this. At the time I last wrote 3s 4d was the listed price for the standard drab serge in question. In order to see if he could compete a manufacturer kindly made for me a whole piece of cloth from pure worsted yarns which conformed with the Army specification. It came out at 2d a yard above the 3s 4d. It was 12 per cent stronger in the weft and 9 per cent stronger in the warp than was require dby the specification. It was made of fibres something like 10in. in length, instead of from woollen yarn, and there is little doubt that it would outwear two of the present service coats."

Woollen manufacturers, whose opinions were given, were of the opinion that only those biassed in favor of the Bradford trade would make such assertions as the foregoing. The principle acted upon has been to secure the best fabric regardless of the cost. Warmth is the principal consideration, and therein lies the great objection to worsted clothing. Woollen cloth is milled, and for that reason it turns the water much better than worsted. It is not so porous as worsted. It is more serviceable, and it does not become shiny and therefore shabby in appearance. One prominent Batley manufacturer stated: "I do not agree with the assertion of Mr. Priestley that tartan cloth is made wholly of fine-fibred material, and that it has none of the attributes of cloth, as that term is understood in army contracts. All the yarn used in the production of that particular cloth is spun to over 30 skein, after which it is doubled, and it makes a very as worsted, but it is sufficiently long, as is proved by strong fabric. It is true that the fibre is not as long the fact that it stands the very severe test to which it is subjected by the Government. The basis of the contract is that the cloth must be of a certain strength, and this is a condition that is enforced."

Messrs. Joseph Simpson Sons, Toronto, have installed several Harley-Kay machines for making heavy wool half-hose.

TRADE OF CANADA WITH GERMANY

PRINCIPAL TEXTILES IMPORTED THEREFROM

Articles.	1909 Quantity.	1909 Value. $	1910 Quantity.	1910 Value $	1911 Quantity	1911 Value $	1912. Quantity.	1912. Value. $	1913. Quantity.	1913. Value. $
Cordage, rope and twine (Dut.)	......	44	......	709	.....	1,274	......	1,434	......	4,098
(Free)	......	......	......	.....	.....	.....	.....	.....	......	......
Cotton and manufactures of:										
Clothing:										
Blouses and shirtwaists (Dut.)		628	....	3,143	...	7,085	....	4,638	....	6,775
Shawls (Dut.)	....	114	.....	....	....	.....	....	745	....	.....
Shirts (Dut. doz.)	291	1,775	127	817	570	2,673	291	1,457	528	2,075
Socks and stockings (Dut. doz. prs.)	149,040	208,740	276,856	3[illegible]4,101	334,417	421,742	248,088	304,657	316,777	441,898
Underskirts & drawers (Dut.)	......	1,393	......	583	....	928	....	960	....	604
Other clothing, N.O.P. (Dut.)	......	18,720	......	26,289	....	24,669	....	38,076	......	71,268
Embroideries, white & cream (Dut.)	......	19,919	.....	31,512	...	33,437	....	47,007	......	45,041
Fabrics:										
Belting of all kinds, except rubber and leather (Dut.)	......	367	......	203	.....	1,698	....	7,075	......	5,436
Bookbinders' cloth (Free)	...	323	....	109	.....	......	....	1,659	......	2,124
Gray, unbleached (Dut. Yds.)	....	....	98	98	2,465	397	8,632	1,898	6,131	997
Printed, dyed or colored, N.O.P. (Dut. Yds.)	87,125	14,687	117,169	20,148	242,211	32,583	215,300	36,127	346,268	63,770
Velvets, velveteens and plush N. O. P. (Dut. Yds.)	41,262	12,509	36,327	1[illegible],948	44,219	16,143	69,235	22,669	72,351	25,944
White or bleached (Dut. Yds.)	17,033	2,324	35,819	3,772	66,997	4,915	52,801	4,953	45,674	6,573
Lace, white or cream-colored (Dut.)	....	93,303	......	96,765	...	114,021	....	152,065	.....	226,904
Sheets, bed quilts, pillow cases and damask of cotton in the piece, including uncolored table cloths or napkins of cotton (Dut.)	...	375	...	753	...	11,378	....	27,411	.....	44,017
Thread, sewing, in hanks (Dut. Lbs.)	2,321	760	3,780	[illegible],748	2,601	1,618	11,405	3,711	990	544
" " on spools (Dut. Lbs.)	....	1,910	..	1,186	...	679	.....	1,860	......	17,639
Yarn, knitting, hosiery or other cotton yarns (Dut. Lbs.)	2,197	583	1,067	484	140	67	1,295	275	3,054	1,339
Yarn, No. 40 and finer (Free, lbs.)	19,720	8,338	19,027	[illegible]3,399	20,877	22,117	37,781	10,777	19,600	17,797
Yarn, polished or glazed, when imported by manufacturers of shoe laces (Free, lbs.)	16,093	4,302	6,050	1,401	[illegible]540	1,397	4,400	1,170	.....	....
Other cotons, etc. (Dut.)	....	12,725	.....	12,847	...	23,121	....	32,352	....	59,692
(Free)	....	......	.....	....	..	......	.....	151	......	......
Total cotton & mfrs. of (Dut.)	.....	390,832	.....	566,397	....	697,164	....	687,966	....	1,020,516
(Free)	....	12,963	.....	14,909	.....	23,514	.....	43,757	....	19,921
Curtains and shams (Dut.)	.....	398	....	614	....	860	......	662	....	757
Lace, lace collars, & similar goods, etc. (Dut.)	.....	72,706	....	98,391	.	123,880	....	141,593	.....	198,238
Flax, hemp, jute and mfrs. of:										
Carpeting, rugs, matting and mats of hemp or jute (Dut.)	.	887	....	350		1,395	...	6,399	.....	358
Damask of linen, uncolored, in the piece, stair linen, diaper, doylies, tray cloths, uncolored table cloths or napkins of linen, quilts, counter panes, pillow cases of linen, and sheets (Dut.)	..	[illegible],019	....	16,0[illegible]	.	31,217	...	32,355	....	30,096
Fabrics, brown or bleached, unbleached, printed, dyed or colored (Dut. Yds.)	[illegible]	[illegible]	1,480	666	9,514	1,121	2,716	655	24,764	3,155
Hemp, dressed or undressed (Free Cwt.)	1,800	8,778	224	1,364	224	1,353	671	[illegible],526	224	1,678
Towels (Dut.)	..	707	...	902	..	[illegible],800	...	1,409	....	5,755
Other flax, etc. (Dut.)		[illegible],648	....	[illegible],666	.	11,42[illegible]	..	7,503	.....	8,557
(Free)	.	...	..	....	.	....	....	64	.....	2,286
Total flax, hemp, jute, etc. (Dut.)		14,717	..	23,659	.	47,988	....	48,321	....	47,921
(Free)		8,778	....	1,364		1,353	...	5,590	....	3,964
Gloves and mitts (Dut.)		256,428		193,193		204,83[illegible]	...	255,258	.....	380,057
Silk and mfrs. of:										
Clothing:										
Shawls (Dut.)		[illegible]		426	...	2,1[illegible]	.	1,811	....	261
Socks and stockings (Dut. doz. prs.)	[illegible]	[illegible]	6,164	[illegible],987	10,907	84,456	13,007	74,003	26,082	80,602
Other clothing, N.O.P. (Dut.)		[illegible]		13,881	.	26,935	..	26,669	...	47,240
Fabrics:										
Bolting cloths [illegible]				.	....	.	....	37	......	6

Articles.	1909 Quantity	1909 Value $	1910 Quantity	1910 Value $	1911 Quantity	1911 Value $	1912 Quantity	1912 Value $	1913 Quantity	1913 Value $
Fabrics for the manufacture of neckties (Dut.)		.....			.....	.				[illegible]
Velvets, velveteens, plushes, N.O.P. (Dut. Yds.)	[illegible]562	17,942	12,760	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	29,000	24,[illegible]
Other fabrics, N.O.P. (Dut.)	..	84,[illegible]	....	[illegible]263		[illegible]		[illegible]		[illegible]
Other silk, etc. (Dut.)		3,371	.	[illegible]		[illegible]		[illegible]		[illegible]
(Free)		....	....	601						[illegible]
Total silk & mfrs. of (Dut.)		122,768	....	117,333		[illegible]		[illegible]		[illegible]4,649
(Free)		....	....	601		[illegible]		[illegible]		6
Wool and manufactures of:										
Carpets (Dut.)		28,366	....	[illegible]		[illegible]		[illegible]		[illegible]
Clothing:										
Knitted goods, including knitted underwear, N.O.P. (Dut.)		31,904	....	[illegible]		[illegible]		[illegible]		[illegible]
Outside garments for women and children (Dut.)		186,939	..	161,810		[illegible]		[illegible]		18,048
Shawls (Dut.)		5,353	....	[illegible]		[illegible]667		[illegible]84		16,764
Shirts (Dut. Doz.)	.	....	30	171	[illegible]	139		.	54	184
Socks & stockings (Dut doz. prs.)	60,389	85,670	60,062	93,22[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6[illegible],304
Undershirts and drawers, N.O.P. (Dut.)	....	3,665	.....	156		[illegible]		[illegible]		246,454
Other clothing, N.O.P. (Dut.)	....	58,269	....	1,768		[illegible]		136,117		....
Fabrics:										
Cassimeres, cloth & doeskins (Dut. Yds.)	15,118	22,237	53,475	11,250	84,610	[illegible]	74,597	15,963	[illegible]	46,563
Coatings & overcoatings (Dut. Yds.)	4,723	4,755	8,907	6,717	5,879	3,8[illegible]	8,434	7,053	[illegible]22	1,978
Dress goods, coat linings, Italian cloths, alpacas, orleans, cashmeres, henriettas, serges, buntings, nun's cloth, bengalines, whip cords, twills, plains, or jacquards of similar fabrics, composed wholly or in part of wool, worsted, the hair of the camel, alpaca, goat or like animal, not exceeding in weight six ounces to the square yard, to be dyed or finished in Canada (Dut. sq. yds.)	....		.....				1,957	[illegible]		
Felt cloth, N.O.P. (Dut. Yds.)	79	40	40	44	.		1,518	[illegible]	[illegible]	[illegible]
Flannels, plain, not fancy (Dut. Yds.)	5,828	3,202	131	36	[illegible]	29[illegible]	2,328	[illegible]	[illegible]	51[illegible]
Italian lining, cobourgs, lustres, mohairs & alpacas (Dut. Yds.)	3,905	1,587	1,447	14[illegible]	7,318	[illegible]276	381	[illegible]09	2,46[illegible]	86[illegible]
Tweeds (Dut. Yds.)	7,445	5,127	3,183	2,423	8,361	4,812	6,058	[illegible]294	39,547	19,363
Other fabrics and mfrs., N.O.P.	....	96,863	.....	[illegible]3,503	.	165,362	.	149,496	...	[illegible]2,415
Felt, pressed, of all kinds, not filled or covered by or with any woven fabric (Dut. Lbs.)	18,296	7,903	6,885	3,517	73,070	33,989	[illegible]39,579	37,445	[illegible]	18,739
Wool and the hair of the camel, alpaca, goat, and other like animal, not further prepared than washed, N.O.P. (Free, Lbs.)	....	....	51,575	7,999	22,036	19,479	[illegible]6,867	9,507	[illegible]653	19,358
Yarns (Dut. Lbs.)	70,048	37,175	74,303	13,303	67,202	45,114	101,312	58,670	138,374	77,367
(Free, Lbs.)	....	....	....	....	474	56	280	398	.	.....
Other wool and mfrs of (Dut.)	....	92	....	95	...	366	....	4,570	.	6,291
(Free)	....	....	.....	....	..	.	..	..		...
Total wool and mfrs. of (Dut.)	....	579,147	....	56,950	.	786,279		776,494		[illegible]060,594
(Free)	....	....	....	7,999	.	20,03[illegible]		9,907		19,358

CANADA'S TRADE WITH GERMANY.

Fiscal Years.	Imports. Total.	Exports. Total.	Totals. Imports and Exports.
1894	$5,872,085	$2,046,052	$7,918,137
1895	4,983,369	626,976	5,610,345
1896	6,454,705	757,531	7,212,236
1897	5,785,546	1,045,432	6,830,978
1898	5,763,784	1,837,448	7,601,232
1899	7,381,149	2,219,569	9,602,068
1900	8,706,641	1,715,903	10,422,544
1901	6,677,959	2,141,552	8,820,816
1902	10,919,994	2,692,578	13,612,572
1903	12,127,867	2,097,699	14,225,566
1904	8,028,544	1,819,223	9,847,767
1905	6,642,095	1,146,654	7,788,793
1906	7,040,091	1,872,557	8,912,648
1907 (9 mos.)	5,483,207	1,066,605	6,549,812
1908	8,250,745	2,374,607	10,625,352
1909	6,001,406	1,476,552	7,478,006
1910	7,958,264	2,501,191	10,459,455
1911	10,087,199	2,663,017	12,750,216
1912	11,146,739	3,814,911	14,961,660
1913	14,473,833	3,402,391	17,876,227

TRADE OF CANADA WITH AUSTRIA-HUNGARY

PRINCIPAL TEXTILES IMPORTED THEREFROM

	1909.	1910.	1911.	1912.	1913.
Cottons	25,217	18,820	33,326	37,483	55,784
Curtains	100	27	156	......	1,322
Embroideries	925	790	1,657	1,252	340
Braids, cords, fringes & tassels, N.O.P.	3,854	4,125	8,397	9,917	8,049
Flax, hemp, jute & mfrs. of	15,506	17,468	17,807	9,735	15,463
Gloves and mitts	14,181	31,146	25,896	22,173	53,022
Wool and mfrs of:—					
Blankets (Dut. Lbs.)	......	189	2,178	4,429	4,889
Carpets:—					
Carpets, all kinds (Dut.)	2,267	3,009	5,090	5,266	2,848
Mats and rugs, including hearth sizes, 30 sq. ft. and smaller wool, N.O.P. (Dut.)	4,429	3,675	2,371	7,174	3,188
Clothing:—					
Shawls (Dut.)	93	2,855	10,672	2,203	3,758
Other clothing, N.O.P. (Dut.)	1,424	1,358	1,297	3,598	3,605
Fabrics:—					
Cassimeres, cloths & doeskins (Dut. yds.)	1,352	9,981	14,360	16,128	5,613
Other fabrics, N.O.P. (Dut.)	6,164	22,767	8,020	11,665	28,676
Felt, pressed, of all kinds, not filled or covered by or with any woven fabric (Dut., Lbs.)	55,709	67,871	106,781	33,638	29,981
Other wool and mfrs. of	17	......	270	......	131
Total wool & mfrs. of	71,455	111,705	150,769	84,101	82,689

TRADE OF CANADA WITH AUSTRIA-HUNGARY.

Fiscal Years.	Imports. Total.	Exports. Total.	Totals, Imports and Exports.
1894	$ 155,952	$ 922	$ 156,874
1895	183,453	......	183,453
1896	204,637	9,238	213,875
1897	442,742	20,865	463,607
1898	274,867	126	274,993
1899	257,777	1,380	259,157
1900	234,659	1,072	235,731
1901	289,387	1,101	290,488
1902	241,382	3,287	244,669
1903	350,840	1,553	352,393
1904	804,073	338	804,411
1905	699,459	688	700,147
1906	794,353	5,784	800,137
1907 (7 mos.)	849,040	27,064	876,104
1908	1,365,933	11,577	1,377,510
1909	1,663,258	15,000	1,678,258
1910	1,410,800	60,508	1,471,308
1911	1,347,565	156,931	1,504,496
1912	1,533,219	55,865	1,589,140
1913	1,674,349	154,594	1,828,943

COLORS FOR UNIFORMS.

Of late years there has been a great change in the color of military uniforms. The old idea was that dark colors were best, and was based upon the correct assumption that they were faster than light shades. In those days no attention was paid to making troops inconspicuous in the field. The relative visibility of variously colored fabrics in the field is difficult to estimate, but is, of course, affected largely by the background. A special grey used in the German army is known as Feldgraw, and is less conspicuous when in or near woods than khaki, but is easier seen on roads or in rocky country. Light blue-grey cavalry cloaks are in favor for German troops, and a mixture in equal parts of brown, green, and white is much used for cavalry uniform.

Loom Development

AN ENGLISHMAN'S VIEWPOINT.

When one considers the enormous earning powers of the plain power loom, the very considerable number of it in everyday use, and its apparently impregnable position, any criticism of its design and construction may seem unwarranted. Yet the power loom is generally uneconomical in power, in the main badly designed, and often badly constructed. A very considerable difference may be observed between the machines for interweaving the threads and those for spinning them, and, although latterly there have been improvements, there still is a very considerable leeway to make up before the ordinary plain loom will compare favourably with the machines in the spinning mill. The power loom has always been called "a foundry job," and those responsible for the production of looms are generally termed loom "founders" or makers, and not "textile machinists," as is the case with the producers of spinning machinery. Many hundreds of plain looms are put on the market to-day the machining on which is almost negligible. It is only a comparatively few years since the practice of milling loom framing joints was largely adopted, and loom founders drew much attention to this as a new departure. Even to-day it is still so far from being a matter of course that one finds it mentioned in specifications. Surely in such a machine as the power loom, where the whole process of weaving entails a series of shocks, it is highly essential that the parts should fit closely and evenly together. More than 60 per cent. of the 805,452 looms in Lancashire are weaving plain cloth, and many of these looms have been sold outright for a price which is equal to only 10s. per cwt. It may well be asked, What can be expected for this amount?

Consider the lengthy working life of these looms, their earning capacity, and note the difference in price between them and other textile machines—although they, too, are cheap enough; whilst in comparison with machines used in other industries the price of a loom appears ridiculously low. The fact that in spite of their abnormally cheap first cost and the small amount that has to be expended in upkeep such looms are producing millions of yards of good cloth yearly, is no reason why they should be allowed to remain as they are. All machinery is being scientifically improved, and the co-operation of ideas between loom makers and engineers versed in other branches of scientific engineering should be secured. Many problems are already pressing upon the manufacturer, and there is no doubt in the present writer's mind that a new type of weaving machine must be and will be evolved, and the old design absolutely discarded. The main weaving operations will still have to be accomplished—namely, the dividing of the warp threads, the passing of a weft thread between them, and the beating up of this weft thread into its position at the fell of the cloth. But these results can be secured in ways quite different from and better than those at present practised.

Ever since Cartwright amended his designs of the first power loom and modified the mechanisms in order to reduce the power consumed in its operation inventors have been tinkering with the details without attacking the principle. Cartwright's loom in its mechanisms was a power-driven copy of the hand loom, and although many very excellent improvements have been made in the power loom, these merely fortify the inherent faults. One of the most extraordinary motions ever employed in any kind of machinery is that utilized for picking or propelling the shuttle across the loom. The very heavy blow which the shuttle sustains and its virtually uncontrolled flight across an intervening space is wrong from every point of view. Moreover, the power consumed in the performance of picking is, in comparison to the useful work performed, much too high. This is due to a variety of reasons—the mechanism employed, its method of operation, and the fact that excessive resistance has to be overcome. Probably more inventions have been introduced to avoid this method of picking than have been applied to any other feature of the loom. Positive picking was proposed, and a loom fitted with the device was shown in Manchester about 1870. This was the invention of an American, Lyal. Its chief fault was its slowness. Many similar attempts to produce positive picking have been made, but other parts of the loom, notably the reed and slay, have been against their successful application.

A lesson might well be learnt from the new type of tape loom recently exhibited. Originally invented by Poyser, it has latterly been improved in an almost revolutionary way by the invention of a novel kind of reed. This operates on an entirely different plan from the reed of an ordinary loom. By means of this reed positive picking is possible, but other advantages also are secured, not the least being the gentle treatment of the warp yarns. In this tape loom every motion is positive, there being no dwell in any part, as a consequence of which the speed of the loom is enormously increased. Although one does not advocate the application of such devices to plain looms, the point remains that only by very radical alterations can a really better weaving machine be produced. A positive or semi-positive pick is by no means an impossibility, but it would appear necessary to use some other method than mere mechanical contrivance to secure it. Electricity has been scouted as an impossible medium, but the future adaptability of this agency cannot be defined, and it is being applied in new ways every day. In fact, recent work in this direction has served to show by contrast that the possibility of electricity as applied to loom practice are absolutely untouched and that developments should undoubtedly take place. Again, claims of compressed air as an aid to picking cannot be ignored. Many attempts have been made to propel the shuttle across the loom by releasing a volume of air under pressure, but the defect in all the systems so far proposed has been in the method by which the pressure was secured and its release in relation to the shuttle. By improved means recently invented the amount of air pressure required is greatly reduced, and it is possible for a person to blow a shuttle from side to side of the loom. This is remarkable when one considers that the shuttle employed carries $3\frac{1}{2}$ times the amount of weft to be found in an ordinary loom shuttle; moreover, no swell, check straps, or such devices are needed to bring the shuttle to rest, which is of considerable advantage. It must be fully appreciated, however, that electricity and pneumatic pressure cannot be successfully applied to the plain loom as it exists to-day. The whole machine will have to be redesigned if satisfactory results are to be obtained, and no doubt the present horizontal lay-out will give way to some other construction.

Although it is not contemplated that a new efficient loom will be immediately forthcoming, necessitating the early "scrapping" of the many thousands already in existence, it is urged that loom-makers should be moving with other industries and preparing for the day when weaving labour will be much less easy to obtain than it is to-day. The advantages to be secured are higher production, less attention, less consumption of power, and the occupation of less floor space. And the more one considers the problem the more apparent does it become that all the improvements which we now hear proposed are spoiled by the limitations of the machine itself. The only way out is to evolve a radically new central mechanism which does not impose such limitations.

WHAT IS CONTRABAND?

Absolute Contraband.

1.—Arms of all kinds, including arms for sporting purposes, and their distinctive and component parts.

2.—Projectiles, charges, and cartridges of all kinds, and their distinctive and component parts.

3.—Powder and explosive specially prepared for use in war.

4.—Gun-mountings, limber boxes, limbers, military wagons, field forges, and their distinctive and component parts.

5—Clothing and equipment of a distinctive military character.

6.—All kinds of harness of a distinctive military character.

7.—Saddle, draught, and pack animals suitable for use in war.

8.—Articles of camp equipment and their distinctive and component parts.

9.——Armor plate.

10.—Warships, including boats and their distinctive and component parts of such a nature that they can only be used on a vessel of war.

11.—Aeroplanes, airships, balloons, and air craft of all kinds, and their component parts together with accessories and articles recognizable as intended for use in connection with balloons, airships and air craft.

12.—Implements and apparatus designed exclusively for the manufacture of munitions of war, for the manufacture or repair of arms, or war materials for use on land or sea.

Subject to the addition of other articles.

Conditional Contraband.

1.—Foodstuffs.
2.—Forage and grain, suitable for feeding animals.
3.—Clothing, fabrics for clothing, and boots and shoes suitable for use in war.
4.—Gold and silver in coin or bullion, paper money.
5.—Vehicles of all kinds available for use in war, and their component parts.
6.—Vessels, craft, and boats of all kinds, floating docks, parts of docks, and their component parts.
7. Railway material, both fixed and rolling stock, telephones.
and material for telegraph, wireless telegraph, and
8.
9.—Fuel, lubricants.
10. Powder and explosives not specially prepared for use in war.
11.—Barbed wire and implements for fixing and cutting same.
12.—Horseshoes and shoeing materials.
13. Harness and saddlery.
14.—Field glasses, telescopes, chronometers, and all kinds of nautical instruments.

Subject to the addition of other articles.

KHAKI COLORS ON COTTON.

This can be dyed by the use of bichromate of potash, sodium, bisulphite, formaldehyde, and pyro-lignite of iron, without using any coloring matter beyond the green supplied by the chrome and the brown by the nitrate of iron. The process is as follows: 20lb. of bichromate are dissolved in 20lb. of water, and 40lb. of sodium bisulphite of 36 deg. B. the bisulphite having previously stood for fifteen minutes mixed with 16lb. of formaldehyde. Nine gallons of this liquor are now mixed with 11 gallons of pyrolignic of iron standing at 10 Be. In this liquor the goods are well padded, then dried and steamed for three to five minutes in the Mather and Platt. Afterwards they are developed with soda ash on the jigger at a temperature of 80 deg. C., then rinsed and soaped. The shade is exactly what is required for British khaki, and leaves nothing to be desired in point of fastness. When this dye is dabbed with hydrochloric acid it gives the well-known green stain which is so often asked for as a test. Greener shades are of course obtained by increasing the proportion of chrome, and vice versa with that of the iron liquor.

COLONIAL WOOL SALES.

The arrivals up till August 26 for the fifth series of London wool sales to commence September 29 amounted to 114,474 bales, as follows: N.S.W. 12,726 bales; Queensland 31,820 bales, Victoria, 13,305 bales; South Australia, 1,058 bales, West Australia, 916 bales; Tasmania, 163 bales, New Zealand, 41,479 bales; Cape, 130,001 bales. Total 114,474 bales. Of this number 38,000 bales Australian, 2,000 bales New Zealand, and 11,000 bales Cape have been forwarded direct from the ship to the Continent, Yorkshire, etc., leaving in London 63,474 bales. Adding the wools held over from the last series the quantities available on August 26 were:

	New Arrivals Bales	Held over Bales	Total Bales.
Australian	21,994	1,000	22,994
New Zealand	39,179	6,300	45,779
Cape	2,001	200	2,201
Totals	63,174	7,500	70,974

Mill and General Textile News

The proposed alterations and additions to the factory of the Chipman and Holton Knitting Company, Hamilton, Ont., have been postponed indefinitely.

Benj. A. Foster, formerly with Draper Bros. and Co., Canton, Mass., has been engaged as boss finisher with Bates and Innes, Limited, felt department, Carleton Place, Ont.

James Fairbairn, formerly with the Keystone Knitting Co. of Georgetown, and recently of the Best Knit Co. Brampton, Ont. has taken a position with the Regent Knitting Co., of Montreal, Que.

Leo. J. Layden, formerly manager of the Best Knit Co. Brampton, has been appointed superintendent of the Oxford Knitting Mill in Woodstock, succeeding Jas. Lalor, who resigned.

Letters patent have been issued by the Province of Ontario to the Dominion Linens, Limited, of Guelph, Ont., converting 1,750 shares of the capital stock of the company into preference stock.

The Reid Rayner Knitting Mills, Ltd., Tryon, P.E.I., has been incorporated with a capital of $36,000. The company has started operations in a small way manufacturing men's all wool underwear.

Samuel Tease has started a small knitting business at 917 Lansdowne Ave., Toronto, manufacturing sweaters, sweater coats, toques, jersey and other worsted lines. His product is known as the "Teas Knit."

The Mercury Mills, Limited, of Hamilton, has leased one of the plants in the old cotton mill at Dundas, Ont., occupied by the Chapman Engine Works and is installing 2 sets cards and complete spinning equipment.

Messrs. Kromer and Griffin of Buffalo, N.Y., have purchased property in St. Catharines, Ont., and will proceed with the erection of a factory for manufacturing silk underwear at once. It is stated that no bonus or exemption has been granted the company by the municipality.

Garf. Kirby, formerly in charge of the knitting department of Boyd, Caldwell and Co., Appleton, Ont., has resigned to take a similar position with H. T. Arnold and Sons, Georgetown, Ont. He is succeeded by J. W. Cunningham, formerly with the Kingston Hosiery Co., Kingston.

James Moreland has been engaged as superintendent of bleaching and finishing by the Canadian Niagara Linens, Ltd., Niagara Falls, Canada. Mr. Moreland has been connected with the Brookfield Linen Co., of Belfast for about twenty-two years, and almost eleven years with the Niagara Textile Co., of Lockport, N.Y.

An interesting outcome of the war was reflected in a recent decision handed down in the Toronto courts in a case where a German firm sued a Canadian firm for payment on a shipment of dress goods. The Judge held that so long as the war lasts no German firm has any status in a Canadian court, so refused to give judgment in which a German firm was involved.

British trade returns for August show a marked falling off in imports and exports for the month, due to the war. Imports show a decrease of upwards of $65,000,000 and exports a decrease of nearly $100,000,000, as compared with the corresponding month last year. Exports of cotton and woollen fabrics and materials show a falling off of nearly $30,000,000 for the month, as compared with the same month last year.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI **MONTREAL, OCTOBER, 1914** **No. 10**

The Dyestuff Shortage

The dyestuff shortage now facing our industries is a matter of considerable concern. Domestic stocks are small at any time, sufficient to supply a normal demand for about six weeks or two months, but this stock is being rapidly depleted. In fact, it is about exhausted and the prospects of being able to secure further supplies are not encouraging. The Order-in-Council passed by the Dominion Government prohibiting the importation of German goods and the subsequent embargo placed by the German Government on shipments of dyestuffs and chemicals to this country practically shuts Canadian industry off from all available supplies. As we are absolutely dependent upon Germany for our supplies of these materials the situation is most critical, and unless some way out of the difficulty is found immediately many of our concerns will be seriously handicapped, and in some cases compelled to shut down.

For some time it was possible to secure these materials from United States concerns, that is, when it was the property of those firms, but as those stocks are exhausted, supplies from that quarter are no longer available. Canadian dyestuff concerns have disposed of their stocks in a very careful manner, looking after the interests of their customers in every possible way and so long as there was any materials to be had, prices were kept at the normal level. Of late shipments of dyestuffs from Germany have been received in the United States, but these are not available to Canadian manufacturers, on account of the embargo on German goods. These shipments are brought out in neutral bottoms through the port of Rotterdam and to date have been sufficient to supply the United States demand. More shipments are now on the way, and steps are being taken to have a regular line of American ships engage in the traffic until the war is over. If exceptions were made in the Canadian embargo, it would be possible to secure sufficient supplies in the United States for Canadian industries, but under present conditions our industries must suffer. Pressure has been brought to bear on the authorities at Ottawa to make such a trade possible, and manufacturers are anxiously awaiting the outcome. Our dependence on German dyestuffs makes the step imperative if we are to keep our industries in operation, so that there appears to be no other way out of the difficulty than to allow the importation of these goods, although the German embargo places difficulties in the way of such trade that will have to be overcome.

A good deal has been said regarding the manufacture of these materials in Canada, but authorities agree that this is not practicable at the present time, on account of the comparatively limited demand for the product. In the United States there is a sufficient demand to warrant the building up of such an industry and there is little to prevent such being done, providing the manufacturers are willing to pay more for the product. Plants of this kind cost millions of dollars, and take years to build. It is well known that in Germany millions of dollars have been spent in bringing out one or two colors, and there are many colors that are only manufactured by one or two firms in the world. There are firms represented in Montreal who have spent millions in bringing out and improving the indigo colors, but are now selling the product at a mere song compared with the prices prevailing in former times. These facts show the difficulties that are to be encountered in building up such an industry. If the United States decides to make a trial, the manufacturers must show their willingness to pay more for the product. There is nothing to hinder us making investigations along that line ourselves and manufacturing any goods we are able to on a reasonable basis. The time appears to be ripe for such a move, but in the meantime our industries must not be compelled to suffer.

A Lesson From Germany

During the Fiscal Year ending March 31, 1913, Canada imported merchandise from Germany to the value of nearly fourteen and a half million dollars, of which over three million dollars' worth were textile materials. These goods consisted principally of knitted goods, embroideries, lace, yarns, silk fabrics and of what is termed in our Customs returns as "other clothing." Knitted goods formed the largest single item, amounting to nearly one and a half million dollars, consisting chiefly of socks and stockings, gloves and mitts, and the finer lines of men's, women's and children's underwear.

Our imports of textile materials from Germany are comparatively insignificant when compared with those from Great Britain, although it is well known that a considerable quantity of German goods are annually imported through British houses, thereby obtaining the advantage of the reduced tariff. It is a remarkable fact that German manufacturers undersell the world in this market on fine lines of both cotton and woollen goods, and also in specialities. The Germans have made great progress in the perfection of specialty machinery, as evidenced in their progress in the manufacture of specialty knit goods, such as knitted ties and scarfs of all kinds, and the fact that a large proportion of the machines making these lines in the United States and Canada are of German make. In the spinning of fine yarns and the manufacture of fine goods, whether cottons, woollens, silks, or other lines, they are unexcelled, and their product finds a market in every portion of the globe.

Most of the lines imported into Canada from Germany are not manufactured in this country, and with the present equipment of our mills very few of them can be made here. The demand for most is limited, although a few, such as cotton gloves, are imported in large quantities, so that it is not likely that Canadian manufacturers will attempt to equip their plants with the necessary machinery for their manufacture. Our imports from Germany in these lines have been referred to as trash by some of our leading manufacturers, but most of it is trash for which there is a comparatively large demand and which cannot be replaced at the moment by manufacturers in any other country. The Germans have made great headway in the manufacture of smallwear at a low price, and their success is in a great measure due to their educational methods and subsequent training. Technical and industrial education has made great strides in Germany, and on that basis a great industrial system has been developed. The entire country has been given over to this work, and more research and investigation has been carried on in Germany during the past quarter century than in all the rest of the world. Any person with a new idea was given a hearing in Germany. People were encouraged to investigate and any invention brought out in other countries, after making a success, was immediately adopted in Germany. The textile industry is no exception, and perhaps the influence of the excellent educational facilities provided is not so evident as in other industries. German progress in the manufacture of dyestuffs and chemicals has been the envy of the world, and our dependence on Germany for such lines is now pronounced. Technical and industrial education has been the secret of German progress.

Although at war with Germany, we must recognize these facts. Canada is disappointingly behind in the matter of industrial education, and the provision of facilities for research and investigation work. Our laxity in this direction is now strikingly apparent but the opportunity is here for us to make a start. There is no better campaign that could be taken up by our manufacturers at the present time than a campaign for more and better facilities along the line of industrial and technical education as outlined in the report of the Commission appointed by the Federal Government some few years ago, and which has lain practically untouched since it was brought out.

The Cotton Situation

The "Buy-a-Bale of Cotton" movement in the United States and the general campaign to stimulate holding by southern planters and investors is having some effect on the financing of the present cotton crop in the United States, which according to the latest estimate, will be one of the largest in the history of the country. With consumption so greatly lessened on account of the war the financing of this year's crop so as to prevent a wholesale wiping out of planters, brokers and investors is the biggest problem now confronting American financial and business enterprises. The entire industry stands to lose on the crop. Those who are holding raw material in stock or have stocks bought for future delivery previous to the closing of the exchanges will lose heavily, while in any event the planters are bound to suffer, although Government assistance will help out the situation where they are concerned.

Curtailment of acreage next year has been decided upon. The conference of Southern Governors and Congressmen, held in Washington recently to consider the best manner by which the present situation in the cotton growing industry in the United States could be relieved, favored a curtailment of the 1915 acreage, and if necessary the 1916 acreage as well. Some thought was given to the total abandonment of cotton planting next year, but this proposal met with strenuous opposition from many quarters, and resolutions were adopted pledging the Governors and Congressmen to work for curtailment of the 1915 acreage.

This appears to be the only method affording permanent relief. Other methods do not consume cotton nor curtail supply, and their successful operation is doubtful, but curtailment of acreage will stimulate holding, and should maintain a good level of prices. A long, drawn out war will have a most serious effect on the cotton-growing industry of the world, but in order to help out the situation, cotton manufacturers, assisted by the public at large, must make every effort possible to keep their mills running at full capacity. Consumption affords the only permanent relief and everybody can take a hand in increasing the consumption. A "Buy-a-Bolt-of-Cloth" movement is more in order just now and would go further toward relieving the situation in the cotton market than any other scheme. Our cotton mills are busy but are not working at capacity by any means. Merchants must forget their "cold feet" and get into the market. They have as much at stake in the present situation as have the manufacturers. Their prices depend on the success of the cotton crop, and disaster to the the cotton-growing industry would spell ruin to many merchants throughout the world. increased consumption where possible, and curtailment of next year's acreage appears to be the only means of meeting the present situation.

The Cancellation Evil

The action of the knit goods manufacturers in the United States in refusing to accept cancellations of orders has called forth varied comment, but the mills have stuck to their guns, and their action has gone a long way toward eradicating one of the most evident abuses in the trade. Similar action should be taken by the manufacturers in this country. Cancellations have been heavier than ever this year, and on that account many of the mills have been placed in a most serious position, but appear to be unable to get sufficient co-operation to wipe out the abuse. A recent editorial appearing in the "Textile Manufacturers' Journal" of New York, gives the situation to a nicety, and applies equally well to conditions in Canada. It says, as follows:—

"It must be a new experience to underwear buyers to be told that cancellations of orders are absolutely refused. It is refreshing to note this evidence of backbone on the part of knitters, which is so diametrically opposed to their attitude in many previous seasons. It was time the worm turned, and evidently manufacturers and their selling representatives have come to realize it. So far as we can learn, the edict has gone forth that bona fide orders will have to be taken as per contract, and though in instances shipments may be deferred at the earnest request of buyers they will eventually be delivered unless the house is financially irresponsible. Here even a good deal of latitude will be taken, and more or less chances will be run in the hope of securing the money for the merchandise ordered.

"Manufacturers and selling agents have come to realize that such a course was absolutely necessary, and more so this season than ever. With a tendency on the part of the buyer to play safe and not run any risk of loading up with merchandise which might drag, it was appreciated that unless a firm stand was taken much of the business taken for the current season might be wiped off the books. At a time when new orders were conspicuous by their absence, it was felt that radical action should be taken to conserve the interests of the manufacturer.

"The latter is obliged to pay for his yarn supply, and he could not see any reason why his customer should be granted any more consideration than the yarn dealer gives his client. Of course, this has not always been the case, and the buyer has come to feel that he could accept or refuse his contracts as he saw fit until he has grown arrogant in his assumptions.

"Certain of the demands made by buyers of knit goods this season have been ridiculous. A million dollar house in the South is reported to have demanded that an order for four cases be cancelled or payment would not be forthcoming. The buyer was politely but firmly told that the goods would be shipped as per contract and that payment would certainly be expected in due course. These instances could be multiplied indefinitely, but one is enough to indicate the position which is so frequently taken by the trade —that they have a perfect right to insist upon cancellation if for some reason they don't wish to take the merchandise. For this, of course, the manufacturer and his selling agents are largely responsible, for they have allowed the buyer to take advantage of them, either for fear that he might be lost as a customer by some assertion of independence, or on the other hand, for fear that they might be involved in litigation of doubtful issue.

"It is stated that the knit goods trade, with the exception of the woollen piece goods selling agent, has been the most culpable in allowing the abuse of cancellations to grow. If this change of attitude marks the beginning of better commercial methods, it is a matter for congratulation by the whole selling trade. It often takes times of stress to develop remedies for trade abuses, and present conditions may have their bright side if they are the means to this desirable end. All honor to the leaders, be they manufacturers or selling agents, who had sufficient faith in their own judgment and knowledge of correct commercial practices to stand firmly against the cancellation of orders by the knit goods buyer."

WOOL SALES CANCELLED.

The wool sales scheduled to take place in Christchurch, N.Z., on November 12, have been abandoned, and it is stated that the holding of other New Zealand sales for November is doubtful. Melbourne brokers have also decided not to hold any wool sales in Australia until sales have been held in London.

BUSINESS ECONOMICS

LARGE SCALE PRODUCTION

By PROFESSOR W. W. SWANSON

(Third of a Series of Articles Dealing with the Economics of Modern Business and Commercial Enterprise)

The outstanding characteristics of economic activity to-day is the great scale upon which industry is carried on. This is strikingly evident in great manufacturing nations, such as the United Kingdom, the United States and Germany; and it is exemplified also in Canada, although to a lesser extent. It should be noted, however, that large-scale production is not quite the same as carrying on industry through mergers and combines, although the two are very often confused in popular thinking. Large-scale production is very often the characteristic feature of a single concern, although great combinations, such as the United States Steel Corporation, or Canada Cottons, Limited, may appear to indicate that operation on a large scale, is practised by mergers or combines alone.

The Location of Manufacturing Industries

The forces that are active in determining the location of industries are also, in great measure, the factors that determine the growth of an industry. These may be enumerated as follows:

1.—Nearness to materials.
2.—Nearness to markets.
3.—Water-power.
4.—A favorable climate.
5.—A supply of labor.
6.—Capital resources.
7.—The momentum of an early start.
8.—the habit of industrial imitation.
9.—Economic advantages of specialized centres.

Most, if not all, of these causes of the origin and growth of an industry are familiar to all and need no special comment. The nearness to coal and iron explains the rise of great manufacturing cities such as Birmingham, Sheffield and Glasgow, in the United Kingdom, and of Sydney, Lethbridge and many other centres in Canada. The furniture factories of Berlin, Stratford and Woodstock owe their rise and development in part to the fact that they are near the greatest consuming markets of Canada. The availability of water-power gives sufficient reason for the phenomenal growth of Welland from a village to a town, and explains, too, in large measure, why those cities that can assure manufacturers a supply of cheap power attracts factories and mills to their borders. A favorable climate for cotton and woolen manufacturing is in some degree responsible for the growth of Manchester, and the innumerable towns that cluster around that great city. An abundant supply of skilled labor and of cheap capital explains the great manufacturing developments of Birmingham, Leeds, Sheffield and other English cities. The momentum of an early start is important. Although an industry may be located at a point where there are no particular natural advantages, that centre may hold its established trade, and even attract additional. Many Ontario towns have forged ahead in spite of their natural disadvantages, because of the momentum of an early start, and established trade connection. Oshawa has few natural advantages, and yet according to an investigation conducted by the Canadian Courier some time ago, that town has more industries, a greater output, and a larger weekly pay-roll, than any other town or city in Canada, in proportion to population. The habit of industrial imitation accounts for the locating of new mills at points where others have already met with success. The economic advantages of specialized centres are many. For example, in Pennsylvania, hundreds of thousands of men are at work in the iron and steel industries of Pittsburg, and other cities. This means that there will be an abundant supply of women and girl workers for the silk and other trades.

Advantage of Large Scale Production.

Chief among the advantages that large - scale production offers is the extent to which division of labor may take place. This means a greater output at a smaller cost per unit, and the greater utilization of machinery. The extent to which division of labor may be carried, when the industry is conducted on a large scale, is illustrated by the meat-packing business.

It would be difficult to find another industry where division of labor has been so microscopically worked out. The animal is surveyed and laid off like a map. The men are classified in over thirty different specialties, it twenty rates of pay, from 16 cents to 50 cents an hour. The 50 cent man is restricted to using the knife on the most delicate parts of the hide (floorman), or to using the axe on splitting the backbone (splitter); and, wherever a less skilled man can be slipped in at a lower wage a place is made for him, and an occupation mapped out. In working on the hide alone there there are nine positions, at eight different rates of pay. A 20-cent man pulls off the tail; a 23-cent man pounds off another part, where the hide separates readily, and the knife of a 40-cent man cuts a different texture, and has a different "feel" from that of the 50-cent man. And so on, throughout the whole work.

There are other great advantages of large-scale production, such as a more efficient organization of the producing and selling forces, the use of machinery on a more extensive scale, the utilization of by-products, and the possibility of conducting experiments to discover newer or cheaper processes. All these indicate gains over the methods that must be adopted by the small business.

Limitations to Size of Industry.

Not all industries, of course, lend themselves to operation on a large scale. Agriculture, conspicuously, is one of them. While it is true that wheat-farming in the Canadian and American West has offered some illustration of large-scale production, yet on the whole experience has shown that where fickle nature must be depended upon for the functioning of a business the same routine methods cannot be adopted as in manufacturing. So with work whose success depends upon the talent and capacity of workers, who may be termed artists. This explains why, in part at least, France has not developed huge industrial establishments such as are to be found in Germany and England. Moreover, there is a distinct limit to the size of the mill where large-scale production may be undertaken with advantage. After a certain point is reached, the difficulties of superintendence are so great, that no advantage is gained from increasing the scale of operations. Better results are obtained by duplicating the original plant.

Large-Scale Management.

The reader should keep in mind the point that has already been emphasized—that large-scale production and large-scale management involve different considerations and problems. Large-scale management involves not so much an increase in the size of the individual establishments as the combination under single management of several establishments. It takes two forms which Professor Taussig describes as "horizontal" and "vertical."

Horizontal combination is the union under single management of a number of enterprises of the same sort. They are usually few, and each is usually on a large scale. Illustrations of such are found in Canada Cottons, Limited, of which Mr. A. O. Dawson is managing director, and the Canada Cement Corporation, Limited, of which Mr. F. P. Jones is general manager.

"Vertical" combination is generally known as the integration of industries. This involves a combination of allied, but not similar, industries. The usual outcome of the division of labor has been that the several steps in production which succeed one another, have been conducted in several establishments. This is seen particularly in the iron and steel industry of the United States, in the meat-packing industry and in several others. The movement in Canada in this direction is small, and has been notable chiefly in the milling, the lumber and the steel industries.

The Trust Problem.

Once again the reader is reminded that these latter combinations are quite different in nature and degree from large-scale operation. Combinations and mergers furnish us with the "trust" problem; and so important is this phase of the movement that it will need to be described later in detail.

Practical Tuning and Construction of Power Looms---VII.

THE OPERATION OF THE DOBCROSS DOBBY.

By Beaumont Mettrick

The Dobcross Dobby, or witch, is held in great esteem in this district (West Riding of Yorkshire), and is claimed to be the best and surest mechanical means of working this particular part of loom, that is the dobby head. The healds are worked positively, by means of levers, operated upon by toothed cylinders and gear wheels. It is a neat compact arrangement, and easy to be got at by the tuner, when repairs are necessary. Another advantage is that the healds and boxes work in conjunction, and are moved by the same cylinders through vibrator levers, and indicated from the same log cylinder, so that the pattern and box chain cannot get across, and thereby cause accidents.

Shedding. — In this dobby, allowance is provided for the work of 48 healds, and can be made to suit any number below this, 24 and 36 being the commonest in use, according to the style of fabric woven. 24 shafts are quite sufficient for the low woollen grade, and 36 to 48 for fancy wollen and worsted goods. The manner of shed formed is the open one, with a positive action, allowing for the loom to be run at a good speed, without detriment to the wear and tear of the warp, as the warp threads change direct from top and bottom, and vice versa, at an eccentric speed, owing to formation of gear wheels and levers controlling the heald shafts.

This shedding is better than the negative type when weaving broad woollens and worsted cloths of a heavy nature, and where the sheds formed are of an irregular nature, such as are formed when weaving backed and double cloths.

The positive shedding always allows for the warp threads being held tightly on the bottom of the shuttle race, if the healds are geared up correctly.

Gearing of Healds.—Diag. 31 illustrates the method of gearing up the healds on the Dobcross Dobby. It will be observed that a complete circuit is formed from the pivot E1, and this allows for a positive movement of the healds; that is, when the top shaft K is lifted, by means of the top arm of jack E, being drawn to the right by the vibrator lever D, it will draw in the streamer wiresH, and their leather connections I (which run over grooved pulleys J, and are regulated by screws J, and are connected to hooks on the top shaft K of the healds).

The jack E pivoted at E_1 allows the bottom arm to drop along with the wire Q and connecting to leather L, which is fastened to two streamer wires, O and O, which connect the bottom jacks M_1 and M, together, these are pivoted to bottom rails of loom

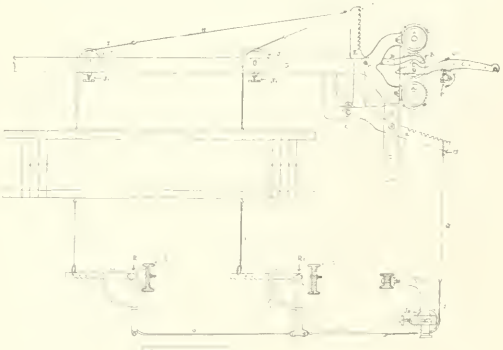


Diagram 31.

framework at R_1 and R^1. A bell crank lever arrangement is formed between the wires and heald cords L, which are joined to bottom shaft K_1 of healds, thereby a complete circle is caused, which moves on the pivot E_1 of the heald jacks. In fixing the bottom jacks and streamer wires, care should be taken to keep them in their respective places.

Formation of Shed.—To obtain a perfect shed in the loom, all the warp threads, whether working at the top or bottom must work in a plane, as shown in Diag. 32, which gives a good shed on the Dobcross Loom, when using shuttles 2 in. square, with healds geared up to 36 jacks, the heald connections U moving one notch on the arm of jacks every four healds, and starting from the fifth notch on the first jack. An even rise of healds is thus provided, and allows for increased distance from the edge of cloth, and also gives perfect slopes of warp lines. If the warp lines are not level, that is, if warp lies upon the shuttle race, these threads are liable to be broken by the passage of the shuttle, and they may cause the shuttle to be thrown out of the race, which, of course, means danger. Therefore special care should be taken to see that all the threads that form the bottom part of the shed lie flat upon the race, and those that form the top part should clear the shuttle, thus allowing it to have a clear passage across the shed.

Care should also be taken to see that the healds are fixed perfectly level, and that both ends move the same distance. If not, uneven shedding takes place, which fault is often the cause of bad lists, shady cloth, owing to one side of warp being stretched more than the other, and broken ends at that particular side of cloth.

Hanging of the Heald Shafts in Position. — When even sheds are required, such as for soft or tender

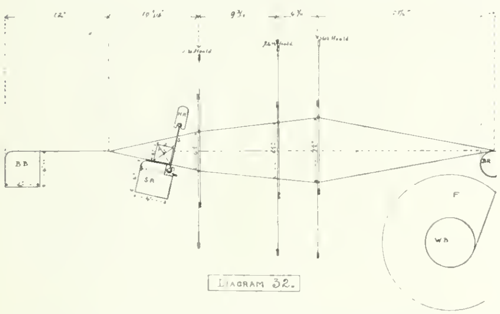


DIAGRAM 32.

yarns, it is advisable to hang the healds in position, so that the centres or eyes of the healds are level with a cord, stretched from breast beam B B to back vibrating roller B R, when the vibrator gear wheel is half turned, or when the healds are half changed from top to bottom. The warp threads are then stretched equally, whether at top or bottom of shed. For special purposes, such as obtaining cover on the face of the cloth, when in the loom, the healds are fixed lower, which would give a tight shed at the bottom, and a slack one at the top position, thereby allowing the sley to beat up the weft on a slack top shed, thus causing the slack warp to bend around the weft, resulting in a soft face on the cloth in the loom, which could be further enhanced in the finishing.

As the healds farthest away from the edge of the cloth move a greater distance when forming the shed, therefore causing more stretch of threads, it is advisable to draw on these shafts the threads that are the strongest, and that do not repeat very often in the pattern, as this allows for better running, and not as great a strain upon that particular heald and its connections.

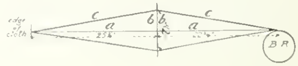
In order to find the stretch of any particular warp thread, the following formula may be used:—

C = sq. rt. of $a^2 + b^2$.

C = Distance from edge of cloth to top eye of heald.

A = Distance from edge of cloth to centre of shed.

B = Lift from centre of shed to top slope (or bottom), e.g., find the stretch of yarn where forming a shed, drawn on the last shaft of a loom, $25\frac{1}{4}$ in. from the edge of cloth, the shed being $7\frac{1}{2}$ in. deep at this shaft, and the back rail being $22\frac{3}{4}$ in. from it.



(1)

C = sq. rt. $a^2 + b^2$

C = sq. rt. $25\frac{1}{4}^2 + 3\frac{3}{4}^2$.

$= 25\frac{21}{40}$ ins. (nearly)

(2)

C = sq. rt. $a^2 + b^2$

C = sq. rt. $22\frac{3}{4}^2 + 3\frac{3}{4}^2$

$= 23\frac{1}{20}$ ins. (nearly)

$$\text{Stretch} = (25\tfrac{21}{40} + 23\tfrac{1}{20}) - (25\tfrac{1}{4} + 22\tfrac{3}{4}) = \tfrac{23}{40}\text{ ins.}$$

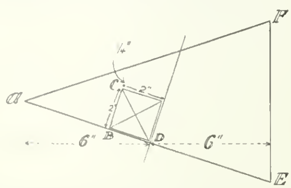
Size of Shed.—The size of shed required to give the best results, should vary according to size of shuttles used, and quality of warp yarn employed.

If the shuttles are 2in. deep, the shed should not be above $2\frac{1}{4}$ in. deep at the front edge of the shuttle, when the going part is at the back centre. (The $\frac{1}{4}$ in. is allowed for clearance of shuttle.) By keeping the shed as small as possible (as in case of good smooth warp yarns), an increased production of cloth is obtained, as the repairing of one broken warp thread takes up more time than the changing of 2 or 3 shuttles. For good strong yarns a larger shuttle may be employed, but smaller ones are better for tender or unsized yarns. When rough yarns such as mohair are used, a larger opening of the shed is necessary, as the warp yarns are liable to catch or hold each other when the shedding takes place, and if not properly separated, flying shuttles broken warp, stitches, etc., may take place. If the size of shed is too small, and impedes the passage of the shuttle, extra power is required in the picking, in order to drive the shuttle across from box to box, and the previous defects also occur.

To find the exact amount of movement required by the healds, when forming a shed, the following formula may be used.

AB : BC :: AE : EF

A to D = Swing of going part or shuttle race.
B to D = Width of shuttle.
B to C = Dept of shuttle + clearance.
A to E = Distance from edge of cloth to 1st heald.
E to F = Depth of shed at 1st heald.



e.g.: What depth of shed is required when using shuttles 2 in. deep, allow $\frac{1}{4}$ in. for clearance, swing of going part 6 in. (or size of cranks 3 in.) distance of 1st heald from edge of cloth 12 in.

$$AD - BD : BC :: AE : EF$$
$$6 - 2 \quad : 2\tfrac{1}{4} :: \; 12 : \; X$$

$$\frac{2\tfrac{1}{4} \times 12}{6 - 2} = \frac{27}{4} = 6\tfrac{3}{4} \text{ inches.}$$

= depth of shed required at 1st heald.

(To be Continued.)

The Shortage in Dyestuffs

By DR. LOUIS J. MATOS.

The present dyestuffs situation, due to the European war, presents one of the most remarkable problems that has ever confronted the textile industry and other trades dependent on the use of artifical colors. It points unerringly at the great dependence of our mills and factories on certain specialties that have not been developed far enough in this country to enable us to be, as it were, self contained in the face of a temporary adversity.

The slowly impending tie-up of the foreign artificial dyestuff supply is bringing the trade face to face with the alternatives of resorting to discarded dyeing processes requiring the use of obsolete dyes or of stopping dyeing altogether. The past few days has made the dyer realize the precarious position in which he is placed, first, by being to a remarkable degree unfamiliar with the natural dyewares and the practical processes for their application, and second, by the fact that, with the possible exception of logwood, stocks of many of these old time dyes are not as plentiful as some imagine. With the constant extension of the artificial color industry, the natural coloring matters have been cultivated to a less and less extent, so that in some instances, the yield is very small, and what is grown is in a few cases only large enough to supply the needs of pharmacy.

The sudden recourse to old dye receipts has also brought out the fact that the younger generation of dyers having access to these formulae have, with very few exceptions, no practical knowledge whatever as to how shades are built up with the older dyes. As a result, the application of them will not be so easy as one might suppose. Any of the older recipes seem easy to work, but the practical results are, in almost every case, far from those desired, where the dyer has not had practical experience with the particular recipe.

The writer has asked a number of practical dyers since the war began, how each would produce a pink on silk with safflower, and several replied that they did not know, while all the others admitted that they did not know what safflower was. Safflower may not be used extensively, but the lack of information regarding it illustrates a general condition.

The present stringency brings logwood prominently to the front. This wood, besides having been more or less used for blacks, will doubtless be pressed into service for various other shades, such as slates, grays and blues, for which it was long since abandoned in favor of the artificial blue dyes.

It is extremely difficult to make parallel columns of the old dyes a nd the artificial colors, showing just how the older dyes can now be brought into play, and what they can take the place of, for the reason that the artificial colors are so much in the majority, and permit of a much wider range of shades and intermixes.

Let us consider wool. We have, as a general run of shades, the following: Black; Dark Blue; Medium Blue; Browns; Yellows; Reds; Scarlets; Greens, and the subsidiary and intermediate shades such as slates, mode browns, olives, etc. Black is produced upon a chrome mordant with log-wood, and shaded to meet the requirements with fustic. The following recipe will show the process.

For a blue-black, on 100 pounds of wool, mordant with

Bichromate of potash	lbs.	2
Bluestone	lbs.	2
Oil of Vitriol	pt.	½

Boil for 1½ hours, and wash well, then enter the dye bath containing 12½ pounds of 51 deg. log wood extract.

For a jet-black, mordant as above, but dye in a bath with 10 pounds of 51 deg. logwood extract and 2 pounds fustic extract.

For blue on 100 pounds of wool, mordant with

Alum	lbs.	8
Argolds	lbs.	4

Boil, wash well, and dye in a straight logwood bath at the boil.

If a violet tone is desired on the black, the addition of a small quantity of muriate of tin to the mordanting bath will swing the shade.

A general mordant for mode shades on wool is to use in varying proportions: Alum, or sulphate of alumina, tin crystals, crude argols (which is a crude cream of tartar, and which may be supplied from the California wine growing regions) according to shade.

Dye with: Logwood extract, Brazil wood(which also has various other names), fustic extract, quercitron bark extract, etc.

By increasing the proportion of Brazil wood, the production of various shades of brown is easy, and the cast or tone of the brown is further under control by regulating the fustic or quercitron, which are the yellow elements.

Bright reds bring us to consider cochineal which was completely disposed of long ago by the introduction of azo scarlets. Cochineal is dyed on wool previously mordanted with

Stannous chloride	lbs.	2
Oxalic acid	lbs.	3
or		
Stannic Chloride	lbs.	3
Oxalic acid	lbs.	3½

A scarlet on 100 pounds of wool is dyed with chochineal argols stannic chloride oxalic acid, and shaded to the yellow with a small quantity of flazine, a product obtained from quercitron bark. Cochineal scarlets and reds have the disadvantage of becoming purplish on contact with ammonia.

Pinks are made from cochineal, only less of the mordant is used and also less dye. Duller hued reds are made with cochineal on an alum mordant.

The problem of using real madder is interesting, but it is believed that it is practically out of the market as a dyeware, having been killed by the artificial product.

Green may be dyed upon a mordant of alum with fustic extract, indigo extract, a little logwood and a small quantity of soda.

Bronze shades are made with logwood and fustic, with sulphate of alumina and soda, boiling 1 to $1\frac{1}{2}$ hours.

The resurrected use of wood dyes revives at the same time the dearth of familiarity with the old time mordants, which ,even more than the knowledge of the old dyes, constituted the major portion of the stock-in-trade, the real secret. so to speak, of the old time dyer. A mordant of considerable use to be used in the dye bath along with logwood and other wood colors, is as follows:

Alum . . . . .parts	30
Binoxalate of potash	30
Bluestone	30
White vitriol (zinc sulphate).	10
parts	100

For 100 pounds of wool, from 2 to 10 per cent of this mixture was used along with the dyes in the dye bath, boiling until the bath became exhausted, or until the proper shade was obtained.

Yellow was generally produced with either fustic or quercitron bark on a tin and alum, or only a tin mordant. Fustic alone is always dyed upon tin.

Cotton Dyeing with the Natural Colors.

Blacks are dyed with logwood and chrome, or with the aid of bluestone.

Browns are to be made with cutch to which is added a small quantity of bluestone, and dyeing for $1\frac{1}{2}$ to 2 hours, then squeeze, and fix the color on the cotton by boiling in a bath containing bichromate of potash, and then wash. Logwood and other dyewoods are to be used for shading. Very dark browns are obtained by passing cutch dyeings through a bath containing a small quantity of an iron salt, such as copperas.

Yellows on cotton may be obtained by mordanting with alumina, and dyeing with quercitron or fustic. Pale shades, such as straws, can be dyed by adding alum directly to the fustic bath. Turmeric, a long since discarded dyeware, may be dyed in a simple bath by slightly acidulating with oil of vitriol.

A shade of red resembling safranine and Turkey red shades may be obtained from barwood, a west African product, by dyeing upon a sumac or tannic acid and a stannic chloride mordant.

Pink on cotton may be obtained from safflower, by boiling directly with the color, and finally developing the shade by means of acetic acid added to the bath after all the color has been taken up. The question is, however can safflower or carthamine paste be now purchased on the market?

Grays on cotton can be made by working the cotton in a sumac liquor for several hours, and then in a solution of "black iron liquor" (ferrous acetate) or copperas. The gray shades may be modified by adding logwood in small proportions. A further treatment with chrome and copper salts will also modify the shades.

Olives are obtained by mordanting with sumac and iron, then dye with fustic or quercitron bark, in the presence of alum, and finally saddening with a little logwood in the same bath.

Blues on cotton with natural colors are obtained with indigo, and the process is too well known among cotton dyers to need repetition here.

For certain lines of work, however, recourse may also be necessary to the old mineral dyes, such as chrome orange, prussian blue, etc., and a summary of them will constitute the subject of a separate article.

The manufacture of coal tar dyes in this country has been pretty thoroughly exploited during the past few weeks, and many expressions of opinion have found their way into the public or lay press regarding the situation.

Since the first artificial dye was discovered and developed in Great Britain, which country, by the way, still produces by far the greatest amount of coal tar, coupled with the peculiar educational system of Germany, the universities of which have catered to the production of investigators in organic chemistry, and serve as "feeders" to the color works, it is no wonder that the color industry has developed in those countries.

Again, the development of the mechanical side of dye production, a side that is absolutely different from the chemical investigation and research work necessary to discover dyes, calls for a class of chemical engineers, equally as well trained in their work of dye making as the research chemist is in his, and these men have resulted from the industrial conditions surrounding the industry.

When the demand arises that coal tar colors are to be made in this country, the universities will produce the men, and the machine shops and foundries will also arise to the occasion, and be ready to make the appliances, pots, digestors, autoclaves, presses, stills and other apparatus for use of which there does not now exist any demand here, but when it does, they will be made.

At present to undertake properly to equip a plant would be out of the question for the reason just stated, but with the apparatus, and the details of the process, it is believed that there are practical organic chemists now in this country who could guarantee that some dyes could be made and delivered.

The present opportunity is favorable for the gas engineers and others in charge of coal distilling industries to investigate the uses to which the waste tar from their plants are put, and to see if it would not be more productive if it was diverted into channels that might yield greater returns. —Textile World Record.

IPMROVED ATTACHMENT FOR KNITTING MACHINES.

The Wildman Manufacturing Co. of Norristown, Penn., has just brought out an improved dogless attachment for their rib machines for holding the dial in fixed relation with the cylinder, midway between the cylinder needles. The chief feature is the method of supporting and holding the dial entirely independent of the cam ring, so that the dial is mechanically connected to the cylinder, not only independent of the fabric itself, but also independent of play and wear in the ring. The central ring, which displaces the ordinary cross bar, is doweled so that no mistake or misplacement can occur after it is removed. The convenient lock screw adjustment is retained and the rigidity of the support is increased. There are also other advantages such as the dial-cap brace with screw adjustment, the positive latch-opener and the control of the two-speed drive.

EMBARGO ON ANILINES RAISED.

A London report dated October 2, states that the embargo on the export of aniline dyes from Great Britain to neutral countries has been raised.

Effect of European War on British Industries

(From Our London Representative.)

London, September 25.

Since the outbreak of the great European war on August 4th, the British textile industries have passed through many vicissitudes, the like of which have never been experienced in past history. There is now, after the first two weeks' unsettled conditions, a better feeling, and business is commencing to run more smoothly—so much so that many woollen mills are speeding up for full capacity with every prospect of working full-time night and day. One of the strangest of orders which the government departments caused to be issued since the war began was a prohibition of the exportation of cotton yarn from the United Kingdom. Of course, the Lancashire spinners were not going to submit to a prohibition like this unless it was really necessary, and the Manchester Chamber of Commerce made a representation to the Trade Board on the subject. The result, as might be expected, is that the embargo cannot be justified, and the customs announce that it has been removed.

Looking back over the cotton trade, at the end of July it had already entered upon a period of normal depression. It was then suddenly realized that we were on the verge of a European war. On the last day of July the cotton markets closed prematurely to prevent the slump that would otherwise have been inevitable. When Liverpool reopened a few days later the spot price was fixed at 6.50d for middling American (and 8.30d for good fair Egyptian), the January-February price at 6.12d, and all future contracts were transferred to that position. On August 18th the price for spot was reduced to 6.20d (Egyptian F.G.F. to 8.15d) and January-February 5.90d. With sellers enormously in excess of buyers the liquidation has been slight and slow. Since the beginning of September the spinner and the Liverpool Cotton Association have been negotiating as a result of which it has been agreed that a 20-point reduction be made in American cotton. This brings middling down to 6d, with January-February to 5.70d (Egyptian cotton being reduced to 8d for F.G.F. Brown on spot, and January at 8.20d). It is contended that prices have been unnecessarily maintained, and one well-known spinner asks: "What I should like to know is, How are we going to do any trade when middling is fixed at 6d per pound and in America it can be purchased at 4.12d?" He adds that he had heard merchants (both cotton and cloth) and brokers and agents' explanations of the necessity of keeping the Cotton Exchange closed and a fictitious price fixed for spot cotton and futures, but their explanations only prove that this is being done to protect the bigger people who can stand the loss. It is well known, too, that there have been enormous straddling operations between New York and Liverpool—a style of operation which is very little indulged in by the actual spinner. The result is that neither merchants nor manufacturers feel disposed to buy. It is now rumored that there will be a gradual reduction until prices are brought down to a level equal to what would be experienced under ordinary circumstances. It appears that good cotton is still good at Liverpool, and that there must be a good deal of poor stuff also to swell the statistics.

The prices of yarns are very irregular, and few transactions of any weight are to be recorded. Delivery instructions dribble in, and contracts continue to dwindle down. It appears that spinners are to some extent buying cotton to arrive in England late in October, and doubtless this will have some effect upon the market. Sooner or later, however, there will be a rush for yarn.

The Cotton Trade in Lancashire.

In the cotton trade there has been a contraction of 19 per cent in the numbers employed since the end of July, and another 40 per cent are working short time. A substantial part of this state of affairs is due to the war. With the exception of about half a dozen all the mills are running at Blackburn. In Burnley there are roughly 100,000 looms and about half of these are running three and four days a week, whilst in the Bury district about 30,000 looms and 8,000 weavers are affected by partial stoppages. In the spinning section, fully 200 workers are unemployed, whilst about 70 per cent are on short time. At Leeds fully 1,000 people are affected in the cloth trades, but these may be employed any day on army contracts for blue serge. The Stockport mills are running alternate weeks and at some of the doubling mills workers are employed five hours a day. In Rochdale about 75 per cent of the cotton mills are stopped and the operative spinners association have 1,200 spinners and minders receiving out-of-work pay. The cardroom association have between 2,000 and 3,000 members out of work. The weaving section is showing considerable improvement. Summing up the whole situation, the cotton mills in Lancashire are practically all either working half-time or stopped. Of course, in a crisis like the present one, it is very difficult to estimate what the near future may bring, particularly when there is a war rate of about one per cent and charges for freightage at their usual customary figures. Under these circumstances, trade should become normal.

Wool, Woollen and Worsteds.

The fifth series of wool sales in London have been postponed to October 6th. So long as the moratorium is in force it is impossible to hold the sales. Most of the buyers have already had 75 per cent of their turnover knocked and to hold sales in these circumstances would be nothing less than a fiasco so far as crossbreds are concerned. The financial position, however, is strengthening slowly, and it must be given time. Merino buyers are of opinion that the sales should have been held on the originally fixed date, but others are of the opinion that if they were held on the original date there would be an unwarranted fall in prices—a tremendous irregularity in prices and a fictitious range of values, which would cause no end of confusion. The situation, however, has been relieved by the statement that enough wool was bought at the last sales, and it is safe to say that the trade is now somewhere about 50 per cent of its normal, so that no wool need be bought for some time to come. Mr. Andrews of the British Association of Wool Buyers, says that in the past, South American wool was bought through Belgian and German houses. The German houses will not be able to buy now, and although their Belgian friends might assist them, Bradford will have to do something in the way of buying wool direct. Some of the London banks were making special efforts to place credit at their disposal for this purpose. The demand for New Zealand slipe crossbred wools in connection with the Government orders received for khaki yarns, etc., has been considerable lately, and values of these descriptions are increased by two cents per lb. In merino wools, however, there is very little business doing, the few parcels that have changed hands recently ruling decidedly in favor of buyers. Other classes of wools are practically unchanged in values, there bing a limited inquiry. In Scotland, cheviot wools are selling at top rates, but other classes of white-faced wools are not sought. The high rate of exchange is still hampering business in wools with the Colonies and America.

From reports that have reached me as to what is going on at the mills (woollen and worsteds), and from conversations I have had with several prominent manufacturers, I learn that employment is very fair, and in some towns there is great activity. It is estimated that since the government gave out their orders for khaki some 16,000 bales of New Zealand slipe crossbred wools have changed hands in the first two weeks of September. At Huddersfield, a state of activity, which had hardly been expected, has set in, due to orders for cloth from the British and French governments. The execution of these orders will take close on 15 weeks. There are also big orders for the British Admiralty and other government departments to be attended to. In addition, orders for the home trade in fine and cheap worsteds are being dealt with. Trade with Canada is dull. Manufacturers report that part of the German and Austrian rade has already been diverted their way. In Dewsbury, there is the same story to relate, except that Canadian orders are very few. Business with the United States has also fallen off. The blanket departments of Dewsbury are also extremely busy, whilst for rugs there is an enhanced call, and several firms are working day and night. At Leeds the clothing houses are very slack and few orders are being given out to the woollen mills. The Rochdale manufacturers' machinery is running day and night with orders on hand, and this state of affairs will continue for the next three months to clear off the orders. A fair amount of business in flannel is being done with Canada. At Bradford, khaki orders are being received, and the prospects for worsted spinners are good. Indeed, all the woollen and worsted mills are doing very well, and the same may be said of the hosiery manufacturers.

At the East India wool sales—an emergency series arranged to help users on with government orders—20,751 bales were offered, but withdrawals were heavy. Dark greys and blacks sold freely at generally an increase of 10 to 15 per cent in values, whilst khaki lots made extremely high prices. Ordinary whites and yellows were down in values to the extent of 5 per cent.

Bradford Wool.

The tone at Bradford market has considerably improved and a good amount of business is doing. Of course, 96 per cent is due to the demand for khaki manufacturers who are unable to cope with the demand for the new armies recently raised by the government. Bradford is consequently benefitting directly and indirectly. Very large sales of wool, both colonial and English have been effected, and for the classes most wanted prices are firm to hardening. Trade undoubtedly is expanding. There is evidence on all sides of a boom among the outside woollen manufacturers amongst whom khaki work is plentiful. Several Braford firms have had to come to London to buy privately the classes most suitable, and further important weights have been secured. In the top market some change is to be seen. A fair business is doing in coarse and medium tops, and there is a good enquiry for 36's, 40's and 50's to 58's. What is surprising is the irregularity in the quotations of topmakers. For instance, many good super 60's have changed hands at 32 cents, 64's at 54 cents and 70's at 56 cents, while other firms report that they have been able to make more and in some cases less has been accepted. On the whole, the Bradford market manifests signs of being steadier in fine crossbreds and merino tops and there is every likelihood in the course of a few weeks of prices hardening all round. In consequence of the large number of blankets required, English wools are passing off at a cent per lb. dearer. Mohair is at a standstill, and alpaca inferiors are selling cheaper.

Dundee Jute.

The prices of raw material in the Dundee jute market have been up and down lately, everything depending on shipping. First marks are going at £25 10s; Daisee 2, £22 10s; red S.C.C. 13|c, £22 10s September. The demand all round is good. Yarns have been quiet, but there is a strong feeling that prices might easily develop any day for everything. The quoted value of common 8 lb. cops is 2s 9½d (equal to 67 cents), and spools 3s (72 cents). Hessians are slow in sale. The value of 10½ oz. 40in. is 3 5-12d with 8 oz. at 2 46-48d. The quantity of jute actually afloat is considerably less when compared with September of 1913. Sacking wefts have been sold forward into January and the prices paid according to period at 2⅞d to 2 15-16d for 24 lb.

In London, during September, there has been a fairly active demand for spot and floating parcels. Russia and Holland have participated to a moderate extent, but the chief business has been negotiated with Dundee Spinners, who have paid exceptionally good prices for approved quality of all grades. Native first marks have changed hands at from £35 to £35 10s. Top numbers £36 to £36 10s. Medium grades £31 to £32. Heart SCC Group, Top numbers £24 to £25. Native rejections £16 to £18. Business in shipment has been small owing to the difficulties of freight and finance. First Marks, steamers named, are offered at £29 10s, September Bill Lading at £25 10s. Daisee middles and medium grades at £23. Towards the close there is rather less demand both for spot and shipment. Spinners are of the opinion that, in view of the selling pressure from Calcutta, prices for all positions must eventually recede.

MORE MERGER RUMORS.

Rumors regarding the merger of several Canadian knit goods concerns have been incirculation for some time, but the unsettled condition of trade has apparently put a quietus on any negotiations that may have been pending. It was understood some time ago that the Harvey Knitting Company and the Oxford Knitting Company of Woodstock, Ont., and the Shawinigan Knitting Company of Shawinigan Falls, Que., would be amalgamated into one organization and overtures were made to the town of Woodstock looking toward the location of the entire organization in that town. Undoubtedly, as soon as trade conditions became brighter and the financial market easier, the amalgamation will be put through, as the proposition is looked upon with considerable favor by the town of Woodstock, and those interested.

Woolen Cloth Manufacture--II

ESSENTIAL FIBRE QUALITIES

By WILLIAM DAVIS, M.A.

The fineness of fibre has much to do with the success of any variety of wool in manufacturing. There is a tendency for the fibre of wool to become coarser owing no doubt to the extent to which the crossbred is being devloped. The pure merino wool which is produced in Australia is the best example of a fine wool, being the finest sent to the market. The value of fineness is seen particularly in spinning. For the production of the finer counts of yarn, it is a first essential to have a fine fibre of wool which will ensure the thread the necessary consistency, so as to hold the fibres together and bear the strain of manufacture. There is a very definite relation between the fineness of fibre and the fineness of the counts of yarn which can be produced from this fibre. Coarse fibred wools are used for the production of the coarser counts of yarn. Many fibres are found unsuitable for spinning into yarns because they do not possess the qualification of waviness of form. Straightness is a hindrance to spinning beeause the points of contact between one fibre and another are limited, they fall apart readily and so cannot be spun together into the form of yarn. If fibres from the animal, vegetable and mineral kingdom be examined, it will be noted that each species has a characteristic form in which it lies. The cotton fibre tends to take sharp angles which is common to other vegetable fibres, wool on the other hand shows in a series of curved forms. This curved nature sets up a firm cohesion amongst the constituent fibres, they cling together because of their many points of contact, and thus facilitate the production of sliver and thread. The curling nature of wool is seen in nearly all its varieties, but the property of general waviness varies considerably in different classes. Crimpness of form is always of considerable assistance in spinning and also in the felting proeess of finishing, it conduces to the uniting of the fibres into on homogeneous mass. There are several explanations of the wavy characteristics of wool, the best being that it is due to the development of the scales ,as they develop more closely on one side of the fibre than on the other.

Strength depends to a great extent on the feeding and health of the sheep, a healthy sheep produces a vigorous staple, but disease at once tells on the soundness of the fibre and also on the tensile strength. A thread requires to be made up of a certain number of fibres which when twisted round each other produce a resultant strength which must be adequate to withstand the strains to which it will be subjected in weaving, and if the fibres are unsound it is evident that this strength cannot be attained. This has ultimately a very important effect on the wearing qualities of the cloth. Very closely connected with the requirement of strength, is that of stretch and elasticity. Some fibres have been found entirely unsuitable for textile manufacture because of their brittleness and unyielding character. The material should have a certain proportion of yield so as to give to the various movements of the body without causing the garment to go out of shape, as also to conduce to the comfort of wear.

Plasticity.—This property is a very useful one in woollen cloths and is often confused with elasticity. If the material be steeped in warm water, an appreciable softening takes place, and if the substance or cloth be stretched whilst still damp and warm, it can be dried so as to retain the new shape. It is by reason of this property that woollen cloths can be delivered to a uniform width and it is in the operation of tentering that variation in the effect of scouring can be remedied. Very ofte nthe operation is overdone, and the cloth is stretched beyond its natural limits of plasticity, with the result that when the cloth becomes damp again, it springs back to its normal shape. If the fabric is not overstretched and the wool be of good quality, the subsequent damping of the fabric does not cause any alteration in size. Owing to the frequency with which tentering is overdone, the best tailors prefer to have their cloths shrunk before beginning to cut the garment, this being done by steaming and pressing when dry. In this way he is certain that the shape and size of the suit will not be affected by rain or dampness.

Luster.—It will be unnecessary to enlarge on the structure of the wool fibre in its microscopic aspects. It is now universally known that it is serrated in structure and that the serrations or imbrications arrange themselves pointing from the root upwards. In certain wools the scales extend over the whole width of the fibre, the scales are large and flat, whilst in others the scales are too small to extend the full width, but there may be two or more in the width or diameter. It is well established that the closeness of scale formation has a decided influence on the property of lustre in wool, the large scales reflecting the light much more perfectly and thus appearing more lustrous. In the smaller scales, the light is much more broken up and the whole material assumes a duller aspect. When the effect of the scales is lessened in the chlorinating process, the lustre of the chlorinated fibre is much in excess of that of the unchlorinated. It would, however, be an advantage if the true form of the wool fibre as seen under the microscope were shown on all occasions. For long we have been accustomed to a series of diagrammatic sketches showing fearful knotched structures, bold in outline and definite in form which far from represent the real appearance. In fact, when those structures have been impressed on the mind, it becomes difficult to recognize the real fibres when they are viewed under the instrument.

The Felting Property of the wool fibre has also been too intimately connected with the scaly structure of the wool, and it has frequently been entirely traced to the scales that wool contracts in length and breadth when subjected to scouring. Now a very ordinary observation can prove that the shrinking property of wool is due to a great number of other causes especially when viewed in connection with the manufacture of woollen fabrics. The degree of felting in a cloth is connected with the temperature of the scouring liquor, the nature of the soap used, the time of treatment, degree of pressure in length and breadth. In a wider sense the phenomenon is also due to the sett of the cloth in the reed, the nature of the yarn, method of spinning and even the weave employed often has a very important influence on the degree of shrinkage. When dealing with underwear, it is well known that a garment made from wool will shrink whenever the temperature reaches a certain stage, without any rubbing with soap. As wool melts at a high temperature, this points to the fact that the heat has a tendency to soften the fibre and that the temperature has the effect of melting the fibre in a modified degree and that as one fibre comes to coagulate to a certain extent with its neighbor, they are made to stand in a more intimate relationship. Naturally, this effect is accentuated when pressure is applied and with the lubricating action of the soap. The elasticity of the fibre has also been shown to play an active part and also the crimpiness or waviness of the fibre. The latter factor operates actively, because the fibres have more points of contact possible than would be the case if they were straight and parallel. When the wool is on the sheep's back, all the fibres are growing the one way and the scales also are lying edge to edge. Now it is evident that the felting by the interlocking of the scales will be best encouraged when the scales of the wool fibres come to oppose each other in direction and when they readily slip into each other and form a compact union. The natural arrangement of the fibres are first of all disturbed in the teazing and carding processes of woollen manufacture and when the fibres are taken out of their natural tufts and re-arranged in the form of a sheet where the original order is completely lost. The fibres come to lie over and under each other in every direction and at every angle, and it will be readily understood that all this conduces to effective felting. It can also be explained in this way how wollen yarns and fabrics show a much greater tendency to felt than the worsted spun yarns. In the former the fibre arrangement is as mixed as it can well be, a thorough melange of the fibres being sought after, in the worsted yarn system, the fibres are taken out of their natural tufts as before, but in place of the mixing process, the fibres are arranged as far as possible parallel on the combing machine so that the chances of having the scales opposing are very much reduced. Such yarns made up of parallel fibres are also more compact and firmer spun so that the free movement of the fibres in felting is impeded.

DUBIED MACHINERY CO. STOCKS.

We have lately received a communication from Mr. E. O. Spindler, 350 Broadway, New York, representative of the Dubied Machinery Co., of Couvet, Switzerland, stating that his house is still in a position to accept import orders for reasonable deliveries. The factory of the Dubied Machinery Company in Switzerland being outside the war zone, is less affected through the European disturbance than factories in the countries engaged. Mr. Spindler states that he has at the present time a considerable and particularly well assorted stock of power and hand knitting machines in the bonded warehouse in New York, which enables him to supply the wants of the sweater, necktie, etc., manufacturing trade for some months to come.

REID-RAYNOR KNITTING MILLS, LTD.

This company, which, as announced in last issue, has been organized to manufacture men's all wool unshrinkable underwear has taken over the plant of the old Tryon Woollen Mills at Tryon, P.E.I., which has been idle since 1907. The mill is equipped with two sets of cards and 680 spindles and has both steam and water power facilities. The capital of the new concern is $36,000, divided into 1,100 shares of $25 each, which have all been subscribed. Mr. E. R. Reid of Charlottetown, P. E. I., is the manager.

Blending and Preparatory Processes in Woolen Spinning-XIV

BLENDING WOOLS.

By JOHN W. RADCLIFFE

The means by which a variety of materials are mixed together to form a blend may vary according to the constituents and nature of the blend to be made. Whatever means is employed it is imperative to have the various qualities so intermixed that the color and quality of the subsequent blend is of the highest possible standard. Indifferent or bad spinning, as well as streaky piece goods are often the result of faulty mixing in the blend room.

In many mills it is often found that the person in charge of the blending department, is a man possessing very little education, as in such mills blending is considered unworthy of much attention, and therefore is left in the hands of any persons capable of doing manual work. This is a very mistaken idea, as it is in the blending of the materials that the foundation of the threads' structure is laid.

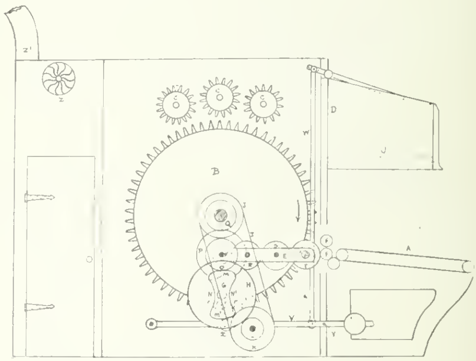


Fig. 27

In order to illustrate at least one feature of blending suppose a blanket yarn has to be produced from a mixture of wool, cotton and mohair noils. If these materials are blended together without regard to uniformity of mixing, the result will be, that at various stages of the carding and spinning operations, the individuality of the respective materials will become pronounced, and thus cause defective slivers and yarns. Such a method of mixing will tax the most ingenious and skilled operative, in his endeavors to obtain a good thread, whereas, if the process of blending be thoroughly and efficiently carried out, the danger of having these results, will, if not entirely eliminated, be reduced to a minimum.

A popular method of blending is to arrange the quantities of the materials in such a manner as to make it almost impossible for any one of the qualities introduced to become isolated from the others with which it is blended. Suppose for instance that a blend of 1,000 weight has to be made for the blanket yarn referred to, made up in the following proportions: 250

lbs. of wool, 500 lbs. of cotton and 250 lbs. of mohair noils. In the first place the wool and mohair should be mixed together. The method of procedure is to make a pile of the materials on the blending room floor, in layers of 50 lbs. each.

This having been completed, the men in charge should take their forks, and commencing at the top, should work them downwards to the bottom layer of the blend. The material is then passed through an opening machine, known as the "Fearnought," illustrated at Fig. 28, and at the same time an appreciable quantity of oil is sprayed upon the mixture by a mechanical oiler which works in conjunction with the opening machine, as will be understood more fully at a later stage.

The mixture, having undergone the opening process, is then taken and blended with the remaining 500 lbs. of cotton in a similar manner to the previous blend of mohair and wool; but, instead of five alternate layers of 50 lbs. each they may be arranged in wider layers of 100 lbs. each—if floor space will permit—if not, then alternate ones of 50 lbs. each. This being accomplished, the men work from the topmost layer to the bottom, as before, and again pass the material through the "Fearnought," but without adding a further supply of oil, as cotton can be worked dry.

Where mixtures are to be made with a view to color only, a similar method of procedure may be adopted, as the following example illustrates: A cheviot heather mixture is to be made in the following proportions: 500 lbs. of green dyed wool, 50 lbs of red dyed wool, and 50 lbs. of blue dyed wool.

The red and blue wools will be mixed together first, in two alternate layers of 25 lbs. each, or in two separate layers of these two colors.

When this combination has been passed through the "Fearnought," the mixture is taken and combined with 200 lbs. of the green dyed wool, in 50 lb. layers of the red and blue mixture and 100 lbs. of green alternately, and treated as those previously; after which, the 300 lbs. of the red, blue and green mixture is taken and combined with the remainder of the green dyed wool, in layers of 50 lbs. of mixture and 50 of green, repeated six times. It is then submitted to the action of the "Fearnought" for the last time and the necessary supply of oil added. By this arrangement the whole of the material becomes thoroughly mixed, which is essential if streakiness is to be prevented in the finished yarn or fabric. Any extra attention given at this stage, in either mixtures for quality or color is amply repaid by the perfectness of the final results.

It must be borne in mind that the examples given only illustrate the broad principles of blending. Mixtures have often to be made that require more intricate arrangement, as will be better understood when range making is dealt with.

It is essential at this stage, for the benefit of those not already initiated in the main principles of blending, to give a general description of two of the machines, that are inseparable to a knowledge of this very important subject.

At Fig. 27 is shown the most salient parts of what is known as the automatic shaker, which is a very useful machine for the removal of dust from wools. That are so infested prior to their being used in the blend.

A large quantity of clip and skin wools are being used at the present time, which are of a dry and dusty nature. To put such materials straight into the blend, without removing the major portion of the dust with which they are infested, would be simply courting disaster in the subsequent operations. The oil applied to the blend for the lubrication of the fibres, would co-mingle with the dust and lime, forming a sticky pasty substance, which, besides quickly filling up the wires of the cards would leave a resiuum on the fibres themselves that would greatly enhance the difficulties of any subsequent scouring operations. Even though such wools are subjected to some process of dusting prior to blending, there is always a certain amount of dust left in them, which in the process of carding alone gives the operative some idea of what must happen were the wools to be carded without the treatment suggested.

To begin with, the dusting machine is the most efficient, which, when in operation, works with a regular feed and a regular delivery.

Such a machine, when fed with consistent regularity, will eliminate the dust from the batches of wool subjected to its action, and the need for regularity in this respect, can be best understood by discussing for a moment one phase of woollen carding.

It is one of the objects of woollen carding to produce condensed yarns of the utmost regularity, as variations in this respect cannot be remedied by any intermediate process between carding and spinning.

It will be understood probably that the chief cause of variation in woollen carding is the faulty feeding of the machine.

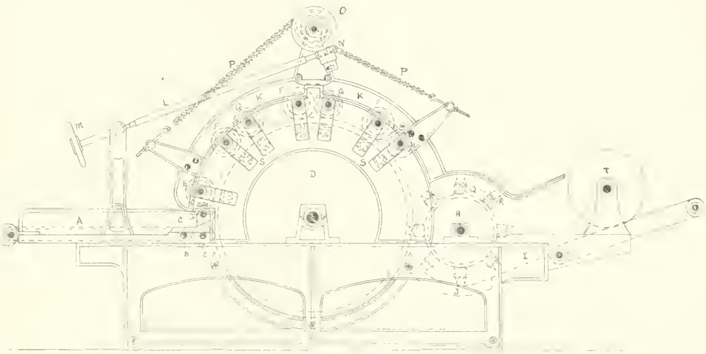


Fig. 28

Now, supposing a machine of this description is fed by an automatic hopper feed of the most up-to-date type. It does not follow that there will be consistent regularity in the condensed threads if other factors have been outrageously neglected, so that we come to the point of relationship between the dusting machine and the carding machine, so far as regularity in the carded slubbing is concerned.

The automatic hopper feed for supplying the material to the cards is so designed and operated, as to weigh off and deposit upon the initial feed sheet of the scribbling machine, regular supplies of material. It does not follow, that these regular supplies, though equal in weight, will be consistent in equal proportions of dirt and wool, as the balance of the scale does not discriminate between the one and the other, so that it may be gathered that variations may be the outcome of erratic losses during scribbling and carding, occasioned by the respective weights in feeding being composed of irregular proportions of dirt and wool.This being an obvious fact, the reason for regulary in the removal of the dust, will be readily understood.

It is with this object in view that automatic dust shakers, such as the one illustrated at Fig. 27, are employed, and although the one illustrated is not the most up-to-date type, it is very popular amongst woollen manufacturers.

The wool is fed upon the feed sheet A, by which means it is transferred to the revolving swift B, which in conjunction with the workers C, agitates the wool in such a manner as to loosen the fibres of the tangled locks. By so doing, the dust, or at least a great porportion of it is removed, and the wool itself is in a more open condition for the succeeding operation.

(To be Continued.)

Shaping Education to the Industrial and Vocational Needs of the Community

In the city of Richmond, Va., December 9th to 12th, 1914, there is to be held a Convention, the unique plan for which is already attracting widespread interest among educators and others who are following the rapid growth of the vocational education movement.

The City of Richmond has requested the National Society for the Promotion of Industrial Education to make an industrial and educational survey for the purpose of obtaining full information concerning the principal occupations, especially those in which young people are employed, in order to formulate plans for improving the opportunities for training and preparation for the vocations. The survey was begun the first of last May and will be finished the fifteenth of October.

The special Committee of the National Society for the Promotion of Industrial Education in charge of the Survey includes Dr. Leonard P. Ayres of the Russell Sage Foundation, L. W. Hatch, Department of Labor, Albany, N.Y., Chas. H. Verrill, Bureau of Labor Statistics, Washington, D.C., J. A. C. Chandler, Superintendent of Schools, Richmond, Va., Charles H. Winslow, Bureau of Labor Statistics, Washington, D.C., Charles R. Richards, Director, Cooper Union, New York City and C. A. Prosser, Secretary of the National Society for the Promotion of Industrial Education.

A synopsis of the findings will be printed in tentative form and reported to the National Society for the Promotion of Industrial Education at the Richmond Convention in December for study and for the making of recommendations.

This means that for the first time this problem is being gone into closely. A great wave of enthusiasm for industrial education is going over the country, and there is great danger of rushing into a programme without having the facts. What the society expects to do in Richmond is to get the facts, and come out with a programme of recommendations that it will take several years to achieve.

No such survey has ever been made in a community previous to a Convention as a basis for its procedure. The survey will prepare full information regarding conditions and will present the findings, charts, diagrams, slides, statistics, and statements showing what has been done and indicating what plans and types of work should be developed and carried on in the future.

In the analysis which is being made, the industries are to be reduced to occupations, and the occupations to operations. The investigation seeks to find out how far the boy or individual can get on in the job; how far the industry can give the worker training, which it does not now give, and great a factor are the schools in preparing for such work, and including "What is the next step."

The National Society for Promotion of Industrial Education is seeking to serve as a clearing house to the nation on the subject of industrial education; to act as a friendly forum for a discussion of conflicting views; to furnish a common meeting place or platform for the discussion of questions of capital and labor as pertaining to such instruction, and to assist local communities in making surveys and investigations to learn what they should do in the way of industrial education of their people.

SPECIAL COURSE IN DYEING.

The Lowell Textile School, Lowell, Mass., in a folder issued recently, draws attention to its course in chemistry and dyeing, which prepares young men for positions in the manufacturing and application of dyes and chemicals. For a number of years the course of instruction in this department has included the manufacture of dyestuffs which have been used at the school in dyeing textiles. The scope of the work will be much extended during the present year.

COTTON CROP CONDITIONS.

The cotton crop report issued October 2 by the United States Department of Agriculture, showed the condition on September 25 as 73.5 per cent ,which gives an estimate of 15,300,500 bales. The second cotton ginning report of the season announced that 3,381,-863 bales, counting round as half bales, of the growth of 1914 has been ginned prior to September 25. This compares with 3,246,655 bales, or 23.3 per cent of the entire crop ginned prior to September 25 last year.

(The three following papers were read before the National Association of Cotton Manufacturers, at the semi-annual meeting in Lenox, Mass, on September 30.)

WEFT YARN INSPECTION.

By FREDERICK H. BISHOP, Secretary, Universal Winding Company, 95 South Street, Boston, Mass.

The struggle which is now taking place in Europe, and which is likely to result in a re-arrangement of the frontier lines on the European Continent, must inevitably have a stimulating effect upon the cotton industry of this country. We shall be called upon to supply to the world's market the cloth and yarn which has in the past been purchased from European Continental countries, and should the struggle be protracted to such an extent as to reduce production in the Lancashire district in England, the cotton mills in this country must supply the finer cloths which have heretofore been imported from that section. In meeting this demand the quality of production, as well as economy, should have careful consideration in order that the increased production of our mills may be maintained when we are again in active competition with foreign manufacturers.

It is along this line that I desire to call your attention to the desirability of inspecting weft yarn, eliminating, as far as possible, the unavoidable imperfections, which come through the preparatory processes culminating at the spinning frame. For many years it has been the custom among the mills producing the best qualities of cloth among the mills producing the best the use of cleaners on their winding machines, or by the inspection of the yarn at the warper and in some instances, the use of both operations.

Within recent years the inspector of weft yarn has received considerable attention, especially in England, where so large a proportion of the weft yarn is spun on mules. This tendency has been materially increased by the introduction of machines for rewinding weft yarn, inspecting it during the winding process, and at the same time very largely increasing the quantity of yarn for delivery in the shuttle. Another thing that has contributed to the introduction of this process is the spinning of cop yarns in mills equipped wholly for this purpose, and the sale of the yarn to the weavers. The inspection of the yarn protects the spinners from criticism regarding imperfections due to the spinning process, such as lumps due to imperfect piecing of the roving, and soft places in the yarn which would not weave without breaking. As inspected yarn is wound in very compact form, there is practically no loss through the breaking down of the cops in shipment. The weavers readily pay an extra price for this inspected yarn, both for the quality and for economy of use in the shuttle, as the weavers are able to produce a much greater quantity of cloth of superior quality, and with an added loom efficiency of from 5 per cent to 7 per cent. The waste in weaving from the inspected yarn is practically nil as against from 4 per cent to 7 per cent in weaving direct from cops. Under these conditions the inspection of weft yarn is becoming a very important factor among the weavers in the Lancashire district. While the conditions are materially different in this country, owing to a large percentage of weft yarn being spun on ring frames, and the fact that most of our mills are equipped for both spinning and weaving, the proposition is still worth serious consideration.

The adoption of this process of inspection by yarn mills in this country equipped for ring spinning might be of great advantage in opening new markets, enabling them to supply weaving plants with both warp and weft yarn, it being evident that the weaving mills would benefit largely through that, and at the same time fully recompense the yarn mills for the additional operation of inspection. Should this practice become general, it might naturally lead to the establishment of mills devoted exclusively to weaving—thus obtaining the same benefits now enjoyed by the weaving mills abroad.

In the regular sequence of operations in the handling of yarn from spinning cops or bobbins for use in warps, or for other purposes than for weft, the inspecting can take place without additional handling, while the inspection of weft yarn cannot be accomplished except through the introduction of an additional operation, and the lack of efficient mechanism for winding and inspecting the yarn at one operation mechanically has in the past made the cost of inspection apparently outweigh the advantages to be secured; the use of weft yarn direct from the spinning frame becoming a confirmed habit for this reason alone as it appears evident that where it is considered essential to eliminate imperfections from warp yarn, it should be equally desirable to improve the weft yarn to the same extent if possible. In the endeavor to maintain this habit, it has not been possible to obtain the economic efficiency of spinning frames, as a gauge for all numbers coarser than 40 must of necessity be controlled by the shuttle capacity, thus reducing the capacity of the spinning frame and affecting the quality of the yarn. It is obvious that in the spinning of coarse numbers of weft yarn on 1⅜-inch ring, there is not sufficient distance between the bobbin and ring to uniformly lay the twist in the yarn, and with the proper stretch, this defect being aggravated by the necessity of using a filling wind on the bobbins. Where spindles are driven at proper speed in combination with 1⅜-inch rings and with heavy travellers, the yarn balloons and whips so much as to impair the surface quality of the yarn, the heavy pull of the traveller also having a disturbing effect between the traveller and the rolls.

In weaving cloth requiring weft yarn of coarser numbers than 36 or 40, the interior diameter of the shuttle has heretofore governed the size of the ring used in spinning; the yarn for the average shuttle of 1½-inch inside measurement being generally spun on a 1⅜-inch ring, while on the finer numbers the spinning ring or mule spindle has been adapted to best results in spinning without regard to shuttle carrying capacity. Thus it is that of necessity a very coarse yarn is spun on a 1⅜-inch ring, when it could be spun better and more economically on a 2½-inch ring, and on the fine numbers pin cops are used in shuttles that could carry readily 300 per cent additional yarn. This lack of harmony between the spinning and weaving departments of a mill, together with a loss of loom efficiency and the attendant imperfections and waste in weaving, is an important factor in considering the advantages of weft inspection.

In mills where advantage can be secured by spinning to the number of the yarn, instead of to the shuttle capacity, there is an increase of from 5 to 10 per cent spindle capacity, according to the number of the yarn, and a very substantial saving in the cost of bobbins. On quite a range of numbers the spinning bobbins can be gauged to hold sufficient yarn for inspection and winding, carrying about 100 per cent of the shuttle capacity, and without knots except such as occur from taking out imperfections. The use of inspected yarn on bobbins containing 100 per cent more than when spun on bobbins for direct use adds at least 5 per cent to the loom efficiency. In weaving coarse counts from spinning bobbins, a large portion of the time of the weaver is devoted to the replenishment of shuttles, and this proposition holds good up to No. 40 yarn. In regular mill practice on plain cloth, weavers can attend to 50 per cent more looms, and at the same time secure a 5 per cent added loom efficiency. This applies to the handling of plain looms, and not to those where the handling of the weft yarn is mechanically performed. These economies of operation more than cover the cost of inspection where they can be introduced, and are cited in justification of the process of inspection as one whereby the cloth mills weaving cotton cloth can improve their output without increasing the operative expenses of the mill.

In a paper read by Mr. J. R. Horne to the British Association of Managers of Textile Work, the cleaning of yarn is taken up in detail, and many illustrations inserted regarding the different methods in use for this purpose. He stated that he had found forty-eight different patént specifications covering various types of cleaners that have been issued since 1871, and that as far back as 1856 the process had been introduced into mills for the purpose of improving the quality of yarn. Most of the illustrations of cleaners in his paper are well-known in mill practice, and include several pattented and manufactured in this country. The attention given to this matter, as evidenced by the production of so many different methods of cleaning yarn, shows plainly that the object to be attained warranted such action. Mr. Horne says, "Of course the clearing of yarns, although often combined with the process of winding or reeling, cannot be done without expense, as the production of a simple winding machine without a clearing arrangement is greater than one with clearers. This is explained by the fact that lumps and knots all pass on to the winding bobbin without any check whatever, whereas on a frame with clearers the yarn is checked or broken in its passage to the bobbin when these imperfections get to the clearer, and this temporarily stops the production. Therefore, cleared yarns must be more expensive than uncleared." The additional expense of inspecting warp yarn is incurred for the purpose of improving the quality, and no other economical result is obtained through the operation. As the winding of the yarn from spinning bobbins to spools for use in warping creels is a necessity, the application of yarn cleaners to the spoolers has not been considered an additional operation to be figured in cost, and the added expense has been included in the pay of operatives with lower production. The actual cost of inspection at the spooler averages about 25 per cent advance of labor cost, and the use of additional spooling machines through decreased spindle speed. When yarn is inspected at the warper, the expense of inspection is substantially greater, as the time and attention of the warper tender is confined to one machine as against three on the same warps with inspection omitted.

Whenever a change in any process of manufacture is proposed, with intent to reap some economic advantage, the elimination of operation is regarded generally of being desirable if not essential, and any improvement which increases the number of operations must be of so great advantage as to offset the additional detail involved in extra handling of work or material. Perhaps this is one of the reasons why the inspection and preparation of yarn for delivery from shuttles has not kept pace in this country with the great improvement made both in the spinning of yarns and of looms for weaving. The history of the past twenty years in cotton manufacture covers great improvements in preparatory machinery, and in spinning machinery, especially in ring spinning, which system to-day supples so large a per cent of the weft yarn used in this country in the cotton industry. Perhaps even greater advance has been made in the improvement of looms for increasing capacity, and the adaptation of warp stop motions for improving fabric.

The economic advantages which would accrue from the system of weft yarn inspection as installed in a new mill weaving yarn coarser than 40s, and spinning with rings adapted to the yarn, would rest upon the following points:

1. Increased production of spinning spindles by 5 to 7 per cent.
2. Saving of 50 per cent more or less on bobbins.
3. Increase of 100 per cent in shuttle capacity.
4. Elimination of waste at the loom.
5. Loom efficiency increased by 5 per cent, weavers to handle 50 per cent more looms with 5 per cent gain. Thus a weaver handling twelve looms with inspected yarn, in place of eight with uninspected yarn, will secure an increase of 12.6 per cent loom production.

While results would vary in mills on different grades of cloth, the average gain would cover expenses of inspection and repay investment in from three to five years in a mill running non-automatic looms.

From the above it will be easy to compare the relative advantages on looms constructed for automatic replenishing of weft in the shuttle, the quality of product in all cases being of primary importance.

BEAM DYEING.

By JOHN BRANDWOOD.

The latter half of the nineteenth and the first half of the twentieth centuries will be known in history as the age of invention, for in this brief period of time, we shall have scrapped practically all the means and methods of existence that have been in vogue down the annals of time, as far back as history records.

Take, for instance, our means of locomotion. Only a little over half a century ago, we were going on in the same old way as our forefathers did thousands of years ago. To-day, a streak of fire(as it were) is carrying us over sea and land to the uttermost parts of the earth. To-morrow (so to speak), a streak of lightning will carry us away through the clouds and under the sea. All down the ages, our thoughts were slow and heavy, and the methods of transporting our thoughts, slower and heavier still. To-day, we may speak our thoughts to each other hundreds of miles away. Tomorrow, we shall talk to, and see each other, to the far distant parts of the earth, just as if we were face to face. For long, long ages we struggled and starved and died through want and disease: to-day, we are living in a world of plenty, amidst wealth and luxury. Tomorrow, famine, starvation and disease, will be things of the past. For long, long ages, we toiled and struggled and died, because we could not produce enough. To-day we are suffering because we have produced too much. To-morrow we shall understand, and then we shall produce neither too much nor too little. Nature has had stored up, for untold ages, on the earth and in the earth, for us, and for our children, for all time, enough and to spare for all our material needs, and we are only now beginning dimly to comprehend it. Nature has all along, in song and story, shown the way. Even the little birds around us have sung the story in our ears, for so long, and we would not hear. There is no mystery, or anything strange, in all this, if only we will understand. We can, if we will. It is only this, that we are beginning to understand nature, and work in harmony with her. And as we will to understand, we shall understand, and as we do understand, we shall get closer to nature. What are our submarines and aeroplanes doing but copying nature? What is our wireless, but the establishment of harmonious relationships, in order to transmit our thoughts and have not many of us proved for ourselves that "thought transference" is as real as the food we eat?

All true invention is simply following or copying nature, and compact dyeing is no exception to this rule. Only yesterday, the art of dyeing was conducted in the same way as it had been from time immemorial. As a matter of fact, the dyeing trade has been completely revolutionized every five years for the last twenty years. Perkins led the way when he showed us how to "copy nature," by restoring to us the beautiful colors nature gave us and stored away for us untold ages ago.

The great awakening now going on in the hands of the multitude has forced the pace, and will force it more and more. There can be no hesitating or going back. The multitudes are demanding and will demand better and faster colors in increasing variety. The unfolding of nature will go on. They who understand and assist in this unfolding will prosper in the best and highest sense. They who would bar the way to the unfolding will only "kick against the pricks." They will be ultimately compelled to get on or get out. Not only must we give all the best and fastest colors, but we must give them at the lowest possible cost. This is why mechanical dyeing must ultimately completely supersede the old and out-of-date methods, kn w . . skein or chain dyeing, for, not only is mechanical dyeing the only possible way of getting perfect dyeing on a large scale, but it is the only one possible, from an economic point of view.

Beam Dyeing.

Harvey was the pioneer of beam dyeing, when he discovered the circulation of the blood. We cannot get any closer to nature than this. The heart pumping the blood through every fibre in the body, and the lungs oxidizing the blood and keeping it good, is a perfect analogy to the liquor pump circulating the dye liquor through every particle and fibre of the yarn on the beam, and the air pump fixing the color and making it good. And when we have got to the efficiency of the heart and lungs, we shall have got a mighty perfect apparatus. In beam dyeing, as in everything else, we cannot improve upon nature, but we are now hugging her pretty closely.

The advantages of beam dyeing are such that it must ultimately supersede every other way of coloring warp yarns on a large scale. The chief advantages may be summed up as follows:

1. The cost of beaming or dressing entirely saved, which may be anything from one-half cent per pound up to four cents per pound, according to the quality and the counts of yarn being worked.

2. The cost of dyehouse labor reduced to the astonishing low rate of one-tenth of a cent per pound, where the plant can be kept running fairly continuously.

3. The production from the loom increased about ten per cent. This is because all the elasticity and the full strength of the yarn is maintained.

4. Cost of dyeing materials reduced, especially when working with indigo, indanthrene, hydron, helindone, algole, thio-indigo, ciba, and other vat colors, which are the latest, fastest and most expensive colors at present known.

5. No streaky or uneven dyeing—perfect penetration, every particle of the fibre being equally permeated, and not plastered on the outside, as in chain dyeing. Faster and brighter colors—no broken or damaged yarn—no beaming room required, and not more than a quarter of the dyehouse room—easy and reliable matching of dyeings.

Essential Requirements in Beam Dyeing Plant.

Any beam dyeing plant to accomplish the above results must—

1. Dye the whole set of beams of one color at one operation. For instance, where, say, six beams of indigo blue are required for a set of denims or chambrays, the whole six beams must be dyed together at one operation, and the color must be even and fast,—in short, perfect.

2. They must be equally suitable for all classes of colors, so that the same plant, with a modification of treatment, will dye equally well all classes of colors, or substantive colors, and dye each class of colors as economically as is possible.

3. It must use a section beam of the usual size, that will hold 300 pounds of yarn and can be run in the warper, in the dyeing apparatus, and in the slashing frame without trouble, and one that will last indefinitely.

These conditions fulfilled, then we may say without hesitation that the final problem has been solved in dyeing warp yarns on a large scale, and that every manufacturer of colored goods on a large scale will, before long, have to adopt it, or get out of business.

I used the words "on a large scale" twice in the last sentence. That was to emphasize the fact that beam dyeing is of no service to the manufacturer who uses little colored, and a great variety of colors, in the manufacture of high-class. Take, for instance, a manufacturer of high-class shirtings. He will use a hundred colored ends, may be altogether, and several colors in a piece of cloth. Beam dyeing is of no service to him, for he could not use a beam, or even half a beam, of one color in any cloth he makes. Here, beam dyeing is obviously not suitable or economical, but even he cannot go on in the old way. The way for him is to dye in a smaller way than the beam, viz., in the cheese or spool. Cheese dyeing offers advantages in economy of production that make it a sound business proposition. The cheeses or spools are put behind the slashing frame, and run along with the beams of grey yarn, and in this way the unnecessary labor in beaming is cut out. There is, however, nothing like the saving effected as there is in beam dyeing for the cost of manipulation in dyehouse labor, dye materials and steam, is practically as great as in chain dyeing. Still, the beaming is eliminated, which makes it the most economical way of producing of this kind, in which only a small minority of threads are colored.

I expect by now, the colored manufacturer who reads this article will be wanting to know if it is possible and practicable for the three essential requirements given above to be embodied in any beam dyeing plant or apparatus, and, if so, if such a plant is already in existence. My reply to the above is in the affirmative. Such a plant is already at work in the States and Canada, dyeing and bleaching over a quarter of a million pounds weekly, and reaping all the advantages mentioned above, and plant is being installed for a further half million pounds weekly. Such being the case, every colored manufacturer is entitled to some little guidance as to what are the essential features in mechanical construction of such plant and apparatus, and how such results are accomplished. Let us take the section beam or dyeing cylinder, as we will call it, first. This is constructed in an ingenious way, making it equally adaptable to the warper, the dyeing apparatus, and the slashing frame. It is made from metals that are in no way affected by any chemical or dye liquors used in a dyehouse. It is no heavier or bulkier than an ordinary wood section beam. It holds 300 pounds of yarn, and cannot get damaged by rough handling. It lasts a life-time. It is patented in all industrial countries. This dyeing cylinder is filled in the ordinary way in the warper, but on the warper there is a simple, but reliable attachment, which enables the beam to be wound to any degree of hardness or density required for dyeing, for in beam dyeing, as in any other method of dyeing, different qualities of cotton behave differently in the dyebath, and also different colors require different treatment. Hence the need for controlling the hardness or density of the beam. The attachment mentioned not only controls the density, but ensures its being uniform throughout the beam,—so essential in beam dyeing. It is a single roller covered with special material, which assists the yarn on its warp on to the beam, by travelling at a greater surface speed than the yarn itself, or retards the yarn by travelling at a slower surface speed as may be required. An arrangement of levers and clutch ensure the roller being out of action just before the beam stops, and until just after it starts up. The speed of the roller can be readily adjusted. It is impossible to imagine any other way of accomplishing this object. The principle and apparatus is patented in all industrial countries.

The Dyeing Apparatus Unique.

The dyeing apparatus itself is unique in that it may be constructed to dye any number of beams, the general rule being to dye the full number of beams for each set at one operation. The beams all automatically find their positions in the dyeing chamber and are not taken out until they are finished and ready to go to the slasher. The dyeing is, of course, done in the vertical position and in a closed chamber, under pressure greater than that of the atmosphere, and the apparatus can be immediately adopted so as to dye indigo, indianthrene, or any of the vat colors, azo, developed and sulphur colours, under the conditions most suitable for each dyestuff. The writer and his two brothers who have hugged this problem pretty closely for the last twenty years, began by dyeing beams in the horizontal position.

In all compact dyeing, we are quickly compelled to recognize the axiom that no two things can occupy the same space at the same time, and the deadlock in trying to dye beams in the horizontal position is that air-pockets will form in the upper part of the beam, and cannot be got rid of. One makeshift we adopted many years ago was to rotate the beam during the dyeing operation, but it was only a makeshift, and a poor makeshift at that, for all that generally happened was that the air-pockets just stayed there—the result being patchy, spotted and uneven dyeing. In the end, we scrapped every apparatus we had for dyeing beams in the horizontal position. The only right, safe and certain way is to dye in the vertical position in a closed chamber, and this principle, arrangement and apparatus is patented in all countries by three patents. Further, this arrangement enables any number of beams to be dyed at one operation, and the space required is not one-quarter of the space required for a chain dyeing plant of a similar capacity.

Another unique feature of this system is the oxidizing. As is well known, all the best and fastest colors are colors of what are known as the vat colors, such as indigo, indanthrene, etc., and all such colors must be oxidized or fixed on the yarn by means of oxygen of air. In the earlier attempts, vacuum was utilized but even a perfect vacuum, if it could be got, is not powerful enough for this purpose. Then air pressure was applied up the centre of the beam, and was found to be a little better, for the effective pressure was lost in its radiation outwards, and so the color was only partially fixed, and was uneven. This system is unique in that the air pressure is applied on the outside of the beam, and so the mean effective pressure is maintained all the way through the beam, and the whole set of beams are oxidized together at one operation. This principle is patented in all industrial countries, and is the only certain method of achieving perfect results, as well as being by far the most economical. On this apparatus, raw stock can be dyed just as easy and straightforward as beams, on the same plant, and thus for the first time, raw stock can be dyed indigo, and other oxidation colors, perfectly fast and even, so that it will spin just as well as grey cotton. There is no matting or shortening of the staple. The cotton is not made harsh or rough in the dyeing. The cotton is automatically filled in the cylinders, which automatically empty themselves, and not hydro-extracting is required as is the case in all other systems for raw stock dyeing. The plant is also just as suitable for bleaching as dyeing. The beam dyed yarn can be quilled and a greater production ensured than by quilling from the chain.

By no means an unimportant feature is the simplicity and reliability of matching the dyeings, and the ease and regularity with which one batch of beams after another can be matched off. When it is realized that here is dyeing being conducted at last on a scientific basis, with the weight of yarn, weight of color, volume of liquor, and time of operation all under easy and absolute control, it is easy to see that matching is simple and results are sure.

This system, in my opinion, will revolutionize colored manufacturing within the next few years. It may, therefore, be honestly stated that beam dyeing is at last not only possible, but practical—not only practical, but absolutely essential—essential now to the colored manufacturer who means to maintain his lead, essential before long to every colored manufacturer who means to keep in the running.

THE PRODUCTION AND PREPARATION OF RAW COTTON FOR THE SPINNER.

By A. M. ALLEN.

In the production of cotton, the character of the raw material can, to a marked degree, be determined by the producer, but the knowledge on the part of the producer as to what staple and character of cotton gives the best results in the hands of the spinner is, generally speaking, very meagre.

The planter by cultivating a particular soil in the same way, perhaps, that he and his forefathers have treated the same soil for many years and in some cases, for generations, obtains a bale of cotton which may sell above or below the bale of cotton produced by his neighbor, but which, to him, may appear to be practically the same cotton. He himself, however, is unable to make a comparison and determine the elements which make the one more valuable to spinner than the other. He is not, therefore, equipped to work intelligently for the improvement of his raw materials, the production of which he in most cases has chosen for his life buisness; in other words the planter is without full knowledge of the value of his cotton in terms of yarn. Without this knowledge, to a greater or less degree, the planter is not prepared to make much advance towards reducing the cost of production by increasing his yield and improving his staple and grade. Education along these lines is of importance to the spinner and any assistance rendered to the planter by the spinner will certainly bring profits to both.

When once the cotton has matured and split open the boll, no longer needed, it is then ready to start on its perilous journey to the spinner, during which this delicate and valuable fibre is subjected to abusive treatment that subtracts from the value it possesses at this time, a sufficient number of millions of dollars every year, which, if employed in extending the spinning industry in America, should in ten years give to the United States the added capacity to manufacture her entire cotton crop.

The unnecessary waste of approximately $100,000,000 annually is but an addition to the cost of production, ultimately paid by the planter. I used the term unnecessary waste, and do so advisedly, for the loss occasioned by the mutilation of the fibre in the process of ginning and compressing, in exposing the raw cotton to the elements, in dragging it through dirt, oil, and deleterious solutions, in putting it in packages that force the cost of transportation far beyond that required, in putting the bales of such form as to invite disastrous fires, in clinging to a method of wrapping and a style of bale that most easily gives to the dishonest man the best opportunity to plate his bale, to water-pack his bale, to substitute old bagging and cheap foreign matter for cotton, all of which, I say, is unnecessary and costs more initially and throughout the entire process than it costs to prepare the cotton in such manner as to eliminate all the above items. The proof of this is found in the fact that it is now being done in a practical and commercial way in sufficient magnitude to make futile all arguments against it.

The enormous economic waste in the handling of this American cotton crop has been the subject of discussion for a generation by the planter and his organizations, by the transportation companies, the bankers, the insurance companies and the spinners, both in America and Europe, until our Government has awakened to a full realization of its magnitude and its uselessness, which, like some great disaster imposes a loss felt by all our people and one which becomes a heavy tax especially upon planter and spinner. The Agricultural Department is devoting great energy and skill to the education and training of the planter to aid him in increasing his yield and improving the character of his cotton.

The unsightly and carelessly packed American cotton bale as delivered to the European spinner, our best customer, and whose patronage has in a large degree contributed to the wealth and prosperity of this nation, has so discouraged him because of the seeming uselessness of his appeal for better methods, that within the past two or three years, more especially he has turned his attention with unusual vigor to the development of cotton growing territory in other portions of the world. We, the Americans, have sat idly by, smug in the belief that no other country on the globe could produce this valuable product in competition with us, blandly remaining blind to the fact that it requires only soil, sunshine, rain and industry to produce cotton. The rapid advance of the past few years in acquirement of knowledge of how to build productive soils, has shown us that no country has a monopoly on the production of the raw material which furnishes food and raiment for the human race.

The desire of the foreign spinner has been to free himself from the well nigh intolerable conditions imposed upon him by the American cotton interests. This is so apparent to the observing mind, that "he who runs may read," and it is encumbent upon every loyal American to remove the hoodwink from his eyes and set himself to the task of so bettering the American cotton industry as to preserve our hold upon the trade and the foreign customer. To do this, we must deliver to him the raw material in such attractive condition as will make complaint unnecessary and make strenuous effort to cultivate his good will as we seek to do in all other branches of trade. In view of the fact that we grow more than 65 per cent of the world's cotton, is it not lamentably short-sighted in us to delay in adopting the most modern and up-to-date methods and machinery for producing and preparing this product for the market.

Our first study should be of the soil, seed and cultivation. What more important than the production in one district of one variety of cotton and that the best adapted to the particular soil, climate and conditions of that particular district? Our Government is doing splendid work along these lines and in some cases local bankers and merchants are supplementing the work of government agents by offering subtsantial prizes for best results. If the spinners will add their quota of encouragement by recognizing the greater value of large quantities of the same grade and staple in one neighborhood by the prices which they pay for it the planter will them have substantial inducement for bettering his grade and staple. Results will be obtained when the planter finds what it pays.

One of the most unfortunate obstacles in the procuring of a better grade of cotton is the custom in many local communities of paying practically the same price for all cotton. The planter being unable to class his own cotton discovers, however, that his neighbor who neither selects his seed nor cultivates with care, and who picks his cotton, gathering with it the bolls and trash, sells his cotton for practically the same price for which he is selling his carefully selected, well cultivated and clean picked cotton. The local buyer makes no discrimination, either because he is not a judge of cotton, or because the low grades thus help to hold down the local market. While he may occasionally buy a low grade bale for more than it is worth he is generally able to buy the high grades for much less than they are worth.

The remedy for this would seem to be the establishment of neighborhood classing stations under the direction of state or government agents from which the planter could obtain from reliable disinterested sources some knowledge of the spinning value of his cotton. This would serve the double purpose of giving the planter an idea of the value of his cotton and enable him to compare the results obtained from different methods of cultivation and different varieties of seed.

After the cotton is picked, demonstrations have shown that it can be greatly improved if, prior to ginning, it is placed in a closer bin and allowed to warm just short of over-heating. This results in a hothouse growth of the immature fibres while all the fibres take up a little more oil, giving the strength and character so much desired by the spinner. Actual results, by this treatment, have shown an added market value of from one-half cent to one and one-sixteenth cents per pound.

We dream of a mechanical picker that will gather the crop free from trash. The genius of the world, is I believe, approaching a solution of this problem and that a mechanical picker will be produced which will pick the cotton clean and at a material reduction in cost from that of hand picking, which is the most expensive operation in the entire process of preparing cotton for market.

Ginning is the first real torture to which the cotton is subjected. The saw gin is by far the most practical of all machines yet produced for separating the seed and the fibre. To realize that this process consists in forming the seed cotton into a roll resembling a log then holding it against a gang of saws upon a mandrel usually composed of seventy or eighty sharp-toothed saws running at a speed of four hundred revolutions per minute, is but to wonder how a single fibre can escape mutilation and reach the spinner whole, yet a saw gin so constructed that the relation of the saw tooth and rib at the point where the fibre and seed are separated by a shearing cut, will in the hands of an expert, separate the fibre from the seed, unscarified and practically its full length. In the hands of the unskillful, the saw gin is the most destructive agency used in the preparation of the raw material, not excepting the rapid steam compress to which we will refer later.

Especially in the late picking, all bolls of cotton contain one or more small immature seeds, which, in ginning, are carried through the ribs with the cotton, but these with other trash, heavier than the lint, are largely thrown from the cotton by centrifugal force after passing through the ribs. In those gins using a brush to doff the cotton from the saws, these imperfect seeds and other trash are again mixed with the fibre and pass into the cotton bale to be removed again at the spinning mill thus reducing the value of the cotton as offered to the spinner. But substituting an air-blast to remove the cotton from the saws and providing means for collecting the motes and trash after once they are separated, the cotton can thus be cleaned in the process of ginning. Practical machines are now in operation doing this work successfully.

The air-blast system which handles the seed cotton from the planter's waggon or the seed cotton house to the feeders, the gins and into the bale box has much to commend it from the standpoint of the spinner. The cotton being subjected in thin sheets to a blast of air throughout the process loosen much of it smoisture; the fibres in passing from the saws to the condenser are straightened out and with proper condenser are formed into a bat which, if pressed closely by passing between rollers can be laid in the bale in layers instead of dumping in uneven wads to be still further punished under the powerful compress.

Upon reaching the initial bale box, the treatment which has brought disgrace on the American cotton industry, begins. If a steam tamper is used over the initial bale box to pack the cotton, every pound of water from the condensed steam which escapes from the steam cylinder, drips to the centre of the bale, giving what is known as the water packed bale. As the sale of water at the price of cotton is alluring, the addition of forty to eighty pounds of water which cannot be detected except by laboratory test, is some inducement to be careless about a leaking steam cylinder. This with the storing of loose bales on open platforms at the ginnery to absorb still more moisture from heavy dews and rains amounts to a fraud which has taken from the spinners annually many millions of dollars, as shown by your Secretary's report of last year.

I wish to say, however, that adding water to cotton bales is not limited to America. While in Havre last year and passing through well filled cotton warehouses, I saw men everywhere throwing streams of water on the dirt floors, ostensibly to lay the dust, but in reality to throw tons of water into the warehouse to be absorbed by the cotton stored there. I concluded this was one way of restoring to the bale the weight of large samples which many bales seemed to have given up. I am not attempting to cast reflection on any one nor on any class in the cotton trade, but am simply calling attention to customs which result in enormous waste, which is a final tax on production. Practical machines are in use which eliminate and make almost impossible these abuses. The roller folder or dry packer eliminates the steam tamper. A mechanical device which draws a perfect sample throughout the bale as the bale is being formed, makes unnecessary, under proper organization, the future sampling of the bale. The use of a light weight closely woven burlap to entirely cover the bale will absorb much less water than the heavy coarse woven bagging in general use, and gin compression makes unnecessary open uncovered warehouses.

The mechanical sampler in connection with the gin compress furnishes the most perfect sample that can be drawn from a bale for it is a complete cross section of the bale. In my own experience, I have had no difficulty in making the one sample serve as the only one extracted from the bale in its transmission from the gin to the spinner. An 8-ounce sample from each of 15,000,000 bales amounts in the aggregate to 15,000 bales worth at 12 cents a pound, $900,000. Is this not quite enough to pay for establishing the character of the cotton crop? Certainly three or four or five times this amount is too much.

The last step in the preparation of the cotton for the spinner and the last mechanical operation through which it passes is one demanded by the transportation companies, viz., compressing. The introduction of the rapid steam compress has made millions of dollars for those who have owned and operated them, but they have cost the cotton industry millions upon millions in loss and damage from the unsightly bale, but more especially from the air cutting and mutilation of the fibre. Some knowledge of the fibre and a glance at the operation of the rapid press furnishes convincing proof of these facts. Compressing cotton is merely pressing the air out of the bale. The steam compress is designed to instantly drive out the air by dropping upon a 500 pound bale, 2,000 tons, equivalent to the weight of a railroad train of fifty cars, allowing forty tons for each car and load. This smashes the bale instantly to a density of sixty to seventy pounds to the cubic foot when, with the ordinary bale, the jaws of the press are ten inches apart. That is twice the density of pine wood. The air as the bale reaches the high density must cut its way through the bale, which it continues to do, until the density of the cotton prevents it, then the air remaining is compressed inside the bale, but expands when the bale is thrown from the jaws of the press. Much of the cotton heretofore called "gin cut" is in reality "air cut" the inside of many bales when opened having the appearance of being slashed in many directions with a sharp wavy knife. In striking contrast to the brutal treatment accorded the cotton fibre by the rapid steam compress is the work of the gin compress in which the power is applied slowly giving the air opportunity to escape from the interior of the bale without injury to the fibre and securing the required density without compressing to a density much beyond that of the bale after it is thrown out of the press. Five hundred tons so applied to a bale of the dimensions of two feet by two feet by four feet, will enable the bale to be tied out with a density of thirty-two pounds to the cubic foot, about the density of pine wood. If the bale is then bound with bands, slotted in the ends and fastened with rivet hooks, as in the Egyptian bale, for example, the bale will not only retain its size and shape but it will be practically a fire-proof bale charring on the outside very much as a log of wood. There being no air in the bale and the bands being riveted so they cannot yield, the density of the bales remain unchanged and the fire does not burrow into the cotton.

What then is the ideal commercial cotton bale? My answer would be 1st, a bale completely covered; 2nd, uniform size for all bales; 3rd, exact equal weight of tare on all bales; 4th, a bale that samples easily, if sampling is necessary.

Such a bale is possible only when made at the gin where the bale is formed and compressed in one operation. Uniformity in size of bales makes possible the cutting of all covering the same size and all bands the same length, resulting in uniform weight of tare. In my own practice, I have found that bales made twice the length of the square, store with the greatest economy of space. For example the bale two feet by two feet by four feet will load 100 bales or 50,000 pounds to the standard 34 or 36-foot car, and will load in two layers. Five pounds of closely woven burlap is sufficient to completely cover this bale while six bands fastened with riveted hooks are ample, making a total tare of 11 pounds. These bales are formed in the initial bale box by placing the cotton in layers which not only separates easily when opened up in the picker room but make sampling of the bale easy when that is desirable.

A careful calculation of the train cost of handling the entire cotton crop, loaded at the gin with 100 bales or 50,000 pounds to the car as compared to the custom of loading 25 bales at the gin, transporting to the compress, unloading, repressing, reloading and forwarding shows a saving to the railroads of 5 per cent on more than $200,000,000 annually; this is 5 per cent on more than one-half the cost of the Panama Canal and the adoption of modern methods and gin compression would bring to the railway companies this saving without a dollar of investment on their part. I shall be glad to furnish detailed figures in support of this statement to those who may be interested.

The arguments against gin compression thus far made, have been fully and completely refuted by actual facts and practical experience. There is no longer a commercial or economic reason for postponing the adoption of gin compression and modern methods. The machinery of various makes are at hand and at small cost.

TThe spinner can bring about the needed reforms by paying the market value for the good bale and penalizing the bad bale at least for as much as its actual commercial difference in their values.

THE STATE OF TRADE.

Conditions in practically all branches of the textile industry are fairly satisfactory at the present time, owing to the large contracts that have been placed through the Militia Department and the Department of Trade and Commerce for supplies for the Overseas Contingent, and the British forces. These contracts, and especially the latter, have been very well distributed with the result that there are few mills capable of producing the necessary materials that have not received their fair proportion. At first some dissension was heard regarding the way orders were being placed, which was in many cases quite justified, but this has been overcome to a more or less degree. The large orders placed by the British Government for blankets and underwear have been placed through the Trade and Commerce Department, and it is said are sufficient to keep the woollen industry in full operation for the next three months. The cotton industry has likewise benefitted to some extent, although its participation in the Government contracts is not as large as in the case of the woollen industry. There has, however, been sufficient business to keep them running at normal capacity, and the increased business from the flour mills and in other lines where cotton is now taking the place of jute has brought business up to a normal level in the industry. All branches of the industry are handicapped by the shortage in dye stuffs and chemicals, but are hoping that relief is in sight. Domestic stocks in such materials are about exhausted, and prices are advancing sharply, so that the situation is now rather acute, but manufacturers are hoping to be able to secure sufficient supplies to satisfy their wants. Specialty knit goods and some other specialty lines are in poor demand, and this branch of the industry is slack, but the demand for sweaters heavy socks, wristlets, mitts, etc., has been good. The distributing houses report business as very quiet. There is a dearth of repeat orders for fall, and as placing orders were considerably smaller than usual, the business for this season has fallen off considerably. Spring business has been fair, but cutters-up and jobbers are in no way sanguine regarding the outlook for the next few months, although it is felt that it would take very little encouragement to bolster the market, as stocks of spring and summer goods are light all over the country. The manufacturing end of the trade, however, is fairly well off for the present, and it is expected that the mills will be kept well employed throughout the winter.

The Imperial Cordage Co. has opened its Walkerton factory, which has been closed for some time, making hard fibre rope.

Our Old Country Letter

(From Our Special Correspondent.)

London, September 26, 1914.

Belgium is now practically a land of desolution. It is exactly twelve months ago since I was in the country appearing at the congress of textile manufacturers at Ghent as a representative of the Canadian Textile Journal. Many Canadians, I am sure, will recall to memory my despatch which was written at Ghent. I have the happiest recollections of my visit and to-day it is difficult to think of the deplorable plight our Belgian textile freinds are in. When it became known that I was writing my opinions on the congress for the Canadian Textile Journal, I was on every side extended the right-hand of fellowship, and to-day we are reciprocating those good feelings by sending our Canadian troops to give a helping hand to Belgium to free herself of the Teutonic yoke and atrocities in her fight for freedom and civilization.

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At a meeting of the wool importers committee, selling brokers and buyers, held the other day, it was decided that, owing to the abnormal situation created by the European war, the fifth series of this year's sales of colonial wool should be postponed from the originally arranged date of September 29 to October 6. Imports of wool on behalf of German and Austrian firms will, of course, not be handled, as there is a King's proclamation in vogue which prohibits any person in the United Kingdom from having any dealings with "our common enemies." To go against this proclamation would be a suicidal policy.

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The call for men to join the army while the war lasts has robbed hundreds of mills in England and Scotland of workers. The Lancashire mills have suffered considerably in this respect. One of the reasons why there was a rush to join the colors was the prospect of a period of unemployment, the idea prevailing that supplies of cotton and wool would be cut off. Certainly between the 4th of August and the 12th of August, there was a panicky feeling prevailing inwardly, but as soon as the British Navy got to work, delusions were removed, and feelings about unemployment allayed. As time went on things began to look much brighter, and to-day, to look at some of the mills, one could hardly believe that we were in the thick of a great European war. Very few people ever think of the fact that it has always been the policy of the British Government to possess a navy larger than any other nation in the world, so that in war time food supplies, as well as supplies of raw materials for the mills, should suffer as little inconvenience in transit as possible. That is the secret of our success to-day in textile industries, while a powerful nation like Germany is bottled up starving for food and for raw materials at her mills.

* * *

There is one inconvenience likely to arise in England and Scotland through the war, and that is the continued supply of raw materials for dyes and dye stuffs. Germany has always given the United Kingdom a great lead in dyes and dye stuffs, and no doubt the pinch is coming. I am told that the Manchester section of the Society of Dyers and Colorists has met several times to discuss the serious situation in the textile industries brought about by the shortage of drugs and dye-ware and they are inviting the co-operation of a number of local experts to form a strong committee with the object of advising what steps can be taken to produce supplies in this country. Previous to the war Germany was the largest producer of aniline and other dyestuffs of an artificial character, and the Trade Board is now making efforts to fill the gap by extending the production of these dye stuffs in the United Kingdom, and with that object, and also with the object of diminishing the shortage in the interval, the export of dyes and of coal tar products for use in the textile industries has been prohibited.

THE SHAKER SWEATER SLEEVE MACHINE.

The success that has attended the machines produced by the Lamb Knitting Machine Co., of Chicopee Falls, Mass., has only been gained by the efforts put forward by the makers in giving the knitting industry every improvement toward more efficiency in manufacture and better quality of goods produced on their machines. The result is that the Lamb knitting machines have obtained an enviable reputation in the manufacture of hosiery, gloves, mittens, leggings, sweaters, jackets and such lines, as well as union suits and other full fashioned goods.

The new shaker sweater sleeve machine manufactured by this company is receiving popular attention. It obviates many difficulties heretofore encountered by knitters in the manufacture of "shaker" sweaters, which have been so popular of late. This machine has the back drive, friction clutch pulley, automatic cloth take-up and four yarn take-ups, and is one of the most desirable machines on the market for this class of product. The illustrated catalogue put out by the Lamb Company fully illustrates their many models, and can be readily obtained by any interested in the manufacture of the above lines.

JUTE CROP FORECAST.

The final Government estimate of the 1914 jute crop in India places the acreage at 3,358,737 acres compared with the actual 1913 acreage of 2,910,960; the yield per acre at 3.13 bales compared with 3.37 bales, and the total production at 10,531,505 bales compared with 9,836,675 bales.

In this instance the Dundee Prices Current and Trade Report states that the largest estimate in the history of the jute crop sums up the Government final forecast in the present instance. This, however, only applies to bales which, of course, are the matter of first concern. The yield per acre has vastly increased since the Panchayat system was introduced, still, however, leaving open the question of correct acreage under cultivation, but if it proves to be a means of ariving at within measurable distance of the exact crop, no fault will be found, though it yet has to be proved. In season 1912-13 the acreage at the final forecast was similar to that returned in the present instance, though it was eventually corrected by the reduction of 400,000 acres, notwithstanding that the actual out-turn, including India up-country consumption reached 10,235,086 bales. The only instance in which the final jute crop acreage was returned in excess of the current figures was in season 1907-08, and the following season an unaccountable reduction of 1,000,000 acres took place. For once there is no question of an insufficient supply of raw jute in India at least. Transport facilities are the necessary essential and prices are giving indications of a lower basis than for some considerable time.

KLAUDER-WELDON OBTAIN DECISION.

The Klauder-Weldon Dyeing Machine Company of Amsterdam, N.Y., in a statement recently issued regarding the action in the United States Courts to prevent them from using certain patents which have been incorporated in their machines, state that in the actions brought in the Supreme Court of the State of New York by the Klauder-Weldon Dyeing Machine Company against the executors of Leonard A. Weldon and John H. Giles to compel the assignment of U.S. Letters Patent Nos. 645698 and 659906 of which the Klauder-Weldon Dyeing Machine Company claimed ownership, the Court has just rendered a sweeping decision in favor of the Klauder-Weldon Dyeing Machine Company.

The controversy arose by reason of the fact that in 1893 Leonard A. Weldon agreed to assign all of his patents, applications for patents and future inventions to the Klauder-Weldon Dyeing Machine Company. The two patents in question, however, although the inventions covered by them were embodied in the Company's machines and were always treated as the property of the company were not formally assigned to the company by Leonard A. Weldon prior to his death in 1901. The company, however, continued to exercise all rights of ownership in the patents until 1913, when the executors of Leonard A. Weldon asserted ownership and assigned one of the patents to John H. Giles. An injunction was obtained to prevent the assignment of the other patent pending the determination of the suits, and the present decision of the Court upholds the contention of the Plaintiff that the assignment by Leonard A. Weldon in 1893 covered the inventions in question, and that the patents are the property of the Klauder-Weldon dyeing Machine Company.

As the John H. Giles Dyeing Machine Company has advertised that it is building its machines under these patents, the officers of the Klauder-Weldon Dyeing Machine Company say that they will enforce their rights under these patents against the John H. Giles dyeing Machine Company and the users of its machines.

GERMAN EXPORTS OF CHEMICALS.

H.M. Vice-Consul at Leipzig reports that the statistics for the first half of this year show that the growth of the exports of German chemical products has considerably abated in strength as compared with last year. The value of the exports of chemical products during the first six months of this year was 190,670,000 marks, as compared with 482,880,000 marks during the corresponding period of 1913, and 394,040,000 marks in the first six months of 1912. The greatest increase was in pharmaceutical products which rose from 50,270,000 marks to 57,250,000 marks, followed by a rise in the exports of dyes and dyeing stuffs from 150,920,000 marks to 153,420,000 marks, artificial manures from 25,800,000 marks to 27,500,000 marks, and ether and alcohol from 21,310,000 marks to 22,260,000 marks. The exports of chemical basic materials only rose slightly from 197,120,000 marks to 198,190,000 marks. The Customs figures show a heavy decline during the half year in the value of the exports of explosives, munitions, and inflammable goods, viz., from 33,620,000 marks to 27,780,000 marks. Not much attention need be paid to this decline, however, as these goods in particular are largely exported under other descriptions.

The imports of chemical basic materials and products have increased by about 50 per cent in quantity since 1907. In the first half of this year the imports of these goods amounted to 1,221,879 metric tons, valued at 271,980,000 marks, as compared with 1,154,500 metric tons, valued at 245,780,000 marks, in the corresponding period of 1913. The increase is almost entirely in chemical basic materials, acids, salts, and other basic chemical compounds. The value of the imports of pharmaceutical products increased from 19,340,000 marks in the first half of 1913 to 23,400,000 marks in the first half of this year. The value of the imports of artificial manures fell from 16,650,000 marks to 15,020,000 marks, and of explosives, munitions and inflammable goods from 840,000 marks to 620,000 marks.—Board of Trade Journal.

at the present time afford much satisfaction. Woolen and knit goods mills are working to capacity on army contracts placed by the Dominion, Imperial and French Governments and the outlook for the coming months in these branches is exceedingly good. The contracts have been well distributed and we hear of little complaint from the industry in that regard, the work being accomplished through a special committee of the Dominion Cabinet and special agents of the British Government. The mills are being pushed for the quickest possible delivery so that overtime is being worked in a good many cases.

Some difficulty is being experienced in securing yarn supplies and domestic stocks have been taxed to the utmost but some good shipments have lately been received from the United States and with the British market again open the situation is much relieved. The demand for sweater coats has made this branch of the industry, which had undergone a very slack period, exceedingly busy. Underwear mills are awaiting further contracts now being awarded but have been well supplied during the month. Hos-

Dyestuff and chemical supplies are sufficient to fill requirements which are not large and no difficulty is being met with in that regard Small shipments of necessary materials are being received from Switzerland, the United States and Great Britain, although all German wares are excluded, both by the Dominion Government and the German embargo against shipments of these materials to Canada.

In the cotton industry business is not so cheerful although most of the mills are operating to fair capacity. There has been some demand for military supplies from the Dominion Government but ordinary business has been slack and at the present time is practically at a standstill. Further army orders are being awarded and the outfitting of subsequent contingents will give the industry a fair business for the coming months. Moreover, stocks of lightweight cotton goods and dress goods throughout the country are at a low level so that a good late business is anticipated. The "Made-in-Canada" campaign is also being felt in cotton circles and should do much to increase business with domestic mills as the season

Mill and General Textile News

A most successful field day was held on September 12 by the employees of the Plymouth Cordage Co., of Welland, Ont. This is an annual event, and is one of the most popular outings for the people of Welland each year.

The President's report at the annual meeting of the Plymouth Cordage Co., held in Boston on September 28, stated that the operation of the Welland, Ont., plant of the company had been quite satisfactory for the year, the results being quite up to previous years.

The Tay Knitting Mill, Perth, Ont., received an order from the Militia Department at Ottawa for 10,000 pairs of mitts, specially designed for the army service. It is a three-finger or finger and thumb mitt, allowing the free use of the index finger.

The Galt Hair Works, Galt, Ont., has installed ten looms as a side line to their regular business of handling hair for brush makers, weavers and spinners.

The Canadian Consolidated Felt Co., and Smart-Woods, Ltd., passed their preferred dividends last month. In the case of the former the outstanding preferred is $500,000, and of the latter $1,500,000. Smart-Woods passed its common dividend early in the year. D. Lorne McGibbon is president of the Felt Co., and Lt.-Col. Smart of the Smart-Woods Co.

Messrs. Harley-Kay, Limited, have recently installed wool sock machines in the Humphreys' Pure Wool Underwear plant at Moncton, the Goderich Knitting Co., Goderich, Ont., and with Wm. Marshall, Dunnville, Ont.

The R. Forbes Co., Hespeler, Ont., is installing a water softening and purifying system, capacity 15,000 gallons per hour, supplied by the B. Scaife and Sons Co., of Pittsburg. This is an intermittent system, in which definite quantities of water are treated all the time, so that, no matter how the quantity used may vary or the quality of the supply change, a uniform, soft, clear water is always obtainable.

12th of August, there was a panicky feeling prevailing inwardly, but as soon as the British Navy got to work, delusions were removed, and feelings about unemployment allayed. As time went on things began to look much brighter, and to-day, to look at some of the mills, one could hardly believe that we were in the thick of a great European war. Very few people ever think of the fact that it has always been the policy of the British Government to possess a navy larger than any other nation in the world, so that in war time food supplies, as well as supplies of raw materials for the mills, should suffer as little inconvenience in transit as possible. That is the secret of our success to-day in textile industries, while a powerful nation like Germany is bottled up starving for food and for raw materials at her mills.

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The regular quarterly dividend of 1½ per cent on the preferred stock of Canadian Cottons, Limited, has been declared payable to shareholders of record September 25.

MANCHESTER TRADE REPORT.

(Special Correspondence.)

Manchester, September 26th.—The general textile situation has shown very little improvement over the conditions of a month ago. A great many mills which turn out cotton cloth are barely operating. Some are faring better than this, but the outlook is such that further curtailment rather than improvement promises to develop. The most serious problem confronting manufacturers is the difficulty of securing payments and the closing of credits in many countries.

A further factor that is seriously restricting trade is the cessation of shipments to India and other eastern points because of the menace of German man cruisers in the Bay of Bengal. The necessity of keeping the mills employed as fully as possible is appreciated by everybody, and everything contributing to that end is being done. Nottingham is said to be enjoying a normal volume of business, and operations at the mills there have not been hampered. There has been extensive curtailment of production in woollen mills.

In an effort to regain part of the losses resulting from the upheaval, woollen mill agents have turned their attention to the United States and are vigorously soliciting business. In the last month prices have advanced five per cent, but agents expect to make complete deliveries for the spring.

The linen trade is beset by several adverse factors, not the least important of which is a 17 per cent reduction in the Irish flax crop as compared with last year. Mills are making heavy shipments, but they are operating only three days a week. Owing to a shortage of the raw material burlap mills are running part time. Advices from India suggest no immediate relief. Shipments of wide goods are fairly heavy.

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CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, NOVEMBER, 1914 **No. 11**

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Conditions Among the Mills

Conditions in the textile industry in this country at the present time afford much satisfaction. Woolen and knit goods mills are working to capacity on army contracts placed by the Dominion, Imperial and French Governments and the outlook for the coming months in these branches is exceedingly good. The contracts have been well distributed and we hear of little complaint from the industry in that regard, the work being accomplished through a special committee of the Dominion Cabinet and special agents of the British Government. The mills are being pushed for the quickest possible delivery so that overtime is being worked in a good many cases.

Some difficulty is being experienced in securing yarn supplies and domestic stocks have been taxed to the utmost but some good shipments have lately been received from the United States and with the British market again open the situation is much relieved. The demand for sweater coats has made this branch of the industry, which had undergone a very slack period, exceedingly busy. Underwear mills are awaiting further contracts now being awarded but have been well supplied during the month. Hosiery concerns are working night and day and the demand for blankets is unlimited, so that practically the entire woolen trade is receiving a needed stimulus.

Dyestuff and chemical supplies are sufficient to fill requirements which are not large and no difficulty is being met with in that regard Small shipments of necessary materials are being received from Switzerland, the United States and Great Britain, although all German wares are excluded, both by the Dominion Government and the German embargo against shipments of these materials to Canada.

In the cotton industry business is not so cheerful although most of the mills are operating to fair capacity. There has been some demand for military supplies from the Dominion Government but ordinary business has been slack and at the present time is practically at a standstill. Further army orders are being awarded and the outfitting of subsequent contingents will give the industry a fair business for the coming months. Moreover, stocks of lightweight cotton goods and dress goods throughout the country are at a low level so that a good late business is anticipated. The "Made-in-Canada" campaign is also being felt in cotton circles and should do much to increase business with domestic mills as the season progresses. So far the dyestuff shortage is not being felt but manufacturers agree that with a normal demand and existing conditions in that market the situation would be critical. As it is some good export business in colored cottons has been worked with the United States and America. Our manufacturers are making a big effort to extend this trade and hope to obtain a firm footing in the foreign field during the coming months.

One of the greatest results from the present situation should be the firm establishment of domestic textile wares in the domestic market. Canadian goods for the Canadian people.

The Wool Embargo Raised

The announcement from London that the wool embargo has been raised so far as Canada is concerned is most welcome to woolen manufacturers in this country. Under the embargo the woolen industry here was practically shut off from all sources of foreign wool supply upon which this season they are practically dependent owing to the fact that a large proportion of the Canadian clip that would be suitable for the goods now being manufactured had been taken by United States dealers early in the year. The embargo has not handicapped the mills, only in so far as they were unable to tender on contracts with any degree of certainty the domestic supply of both wool and yarns being comparatively small and entirely inadequate to fill the needs of the coming months. There will still be some difficulty in securing shipments of wools and yarns from Great Britain, owing to the shortage there due to the great activity in the woolen industry, but shipments that had been held up by the embargo are already on the way and representatives of the British houses here are confident that sufficient supplies to supplement the domestic stocks will be obtainable, although some delay may be experienced.

There are still some restrictions to the effect that Canadian importers must guarantee that the raw material is for domestic consumption in the manufacture of military clothing but as that is about the only business passing in the woolen trade here at present the restrictions will not handicap the mills in any way. Wool prices have not been unduly advanced on account of the embargo but they had increased steadily in sympathy with the advanced prices on the British markets. There is a shortage of suitable crossbreds and this week's London sales show a further advance in prices over last months. This situation will not be relieved until the new Australian and New Zealand clips come on the market in February. In the meantime manufacturers face a rising market in the wools most in demand and they are therefore placed in a rather trying position in regard to tendering on the army contracts which are being filled at barely over manufacturing cost. The activity in the woolen trades is doing much towards relieving the unemployment situation in Canada and the lifting of the embargo makes the former possible.

Activity in the United States Woolen Trade

The woolen industry in the United States is receiving a considerable impetus through the need for army supplies by the warring nations and what would otherwise have been a very quiet season has been turned into one of great activity. German buyers have operated heavily and lately representatives of the British, French and Russian Governments have placed enormous orders for blankets and other lines of military supplies until there are few mills in the country capable or turning out Army clothing that are not employed to their fullest capacity for the time being.

The British embargo on wool and the prohibition of exports of wool to other than Great Britain by the Colonies effects the United States woolen industry most seriously. It is the only neutral country that can command wool enough for manufacturing on a large scale but woolen manufacturers there have not a sufficient supply to look after the home trade and the European nations as well, being dependent to a large extent on the foreign supply of crossbred and wools suitable to fill requirements. There were heavy buyers of cross-breds at this year's London sales and stocks were heavier than usual but a good deal of these stocks has been retaken by British account so that stocks on hand now are smaller than usual at this time. A severe shortage will undoubtedly be felt before the new clips are on the market in February and March, as it is probable that the embargo will continue until that time.

British Exports of Yarn Cloth

The report of the British Board of Trade on the exports of yarns and cloths from the United Kingdom for the month of September, and the season to that date is very interesting, in view of the comparisons of the present war period with the normal conditions of last year. It shows the total exports of yarns for the month of September were about 10,000,000 pounds, against 8,046,000 during August, as contrasted with 15,734,400 pounds for the month of September last year. The total exports of cotton cloths for September approximated 374,000,000 yards. This compares with 313,074,000 during August, as contrasted with 548,972,500 yards exported during September, last year.

Business Economics

By PROFESSOR W. W. SWANSON.

Fourth of a Series of Articles Dealing With the Economics of Modern Business and Commercial Enterprise.

The complexity arising from the division of labor, and the growing use of machinery, have added to the number of stages in production and the period of time over which the whole process is spread. This involves a greater use of tools and machinery, and hence increases the importance of capital in the industrial process.

The Roundabout Process.

In the organization of industry it has been discovered that a greater result is obtained by producing goods in roundabout ways than in producing them directly. Where a good article can be produced in either way, we have the fact that by the indirect way, a greater product can be obtained by the expenditure of labor than by the direct method. But beyond this, the superiority of the indirect way manifests itself in being the only way that certain goods can be obtained. So important is the round-about method of production that society could never abandon it and go back to the primitive form of direct production. An example will make this clear. Eugen von Boehm-Bawerk, in The Positive Theory of Capital, says:

"I am short-sighted, and wish to have a pair of spectacles For this I require ground and polished glasses, and a steel framework. But all that nature offers toward that end is silicious earth and iron ore. How am I to transform these into spectacles? Work as I may, it is impossible for me to make spectacles directly out of silicious earth as it would be to make the steel frames out of the iron ore. Here there is no immediate or direct method of production. There is nothing for it but to take the roundabout way, and indeed, a very roundabout way. I must take the silicious earth and fuel, and build furnaces for smelting the glass from the silicious earth; the glass thus obtained has to be carefully purified, worked and cooled by a series of processes; finally, the glass thus prepared—again by means of ingenious instruments carefully constructed beforehand—is ground and polished into the lens fit for short-sighted eyes. Similarly, I must smelt the ore in the blast furnace, change the raw iron into steel, and make the frame therefrom —processes that cannot be carried through without a long series of tools and buildings that, on their part again, require great amounts of previous labor. Thus, by an increasingly roundabout way, the end is obtained."

Illustrations might be greatly multiplied, but the above admirably proves the point made. It would be impossible to carry on vast industrial, financial and transportation enterprises without recourse to the roundabout method. That method has won its way because of its efficiency and the results achieved.

Increasing Use of Machinery.

The capitalistic process involves an increased use of machinery. Machinery has invaded almost every line of production, and has displaced the labor of man. This does not mean of course, that there is less work for me to perform, on the contrary there is greater and steadier employment because of the greater productiveness of machine methods. Compare, for example, the results achieved in the making of pins under primitive and modern conditions.

In the manufacture of pins, the first operation is that of straightening the wire. This was done by a wire-straightening machine in former times, as at present; but the time under the modern method is as 1 to 40 under primitive methods. Under the machine methods in the second operation, the wire is cut and the pins headed and pointed by machines, 12 of which may be tended by one person. Under the hand method the pin was made in two parts, the head being made in the form of a coil and closed on the end of the shaft. It required seven operations to make the pin under the method, and the time required was seventy-three times as long as when done by modern machinery. Whitening the pins was accomplished by means of a whitening tank operated by hand, as is done now. But to-day the process is fifteen times shorter than under the old conditions. The operation of drying and cleaning the pins is now performed by a fanning mill; formerly a drying pan was used that took twenty times as long. The pins were formerly, as now, polished in a tumbling barrel, but the time consumed is as 1 to 15.

Pin-sticking machines are used to-day to stick the pins in paper. Under the hand method this is accomplished in two operations, crimping the paper and sticking in the pins. Folding the papers, packing and labelling, require much less time under the machine than under the hand method. And finally, the power used under the two methods, is enormously in favor of the capitalistic process.

The Creation of Capital.

It is generally stated by economists that all capital has arisen through labor and saving. Land, on the contrary, is the gift of the Creator and its origin cannot be explained from the point of view of either labor or saving.

These propositions have been attacked in recent years by certain American economists, and particularly by Professor Davenport, of the University of Missouri. It is his contention that land, in the economic sense—land that has market value—is no different in its origin and nature than any capital good. It must be noted carefully that his statement applies to "economic land." Land which is free is no more to be regarded as an economic good than air or sunshine—all of them useful, perhaps necessary, but in no sense economic goods.

It is maintained by Davenport and his followers, that not all capital has been created by labor. A diamond in the rough is capital it may be stumbled upon. A water-fall which will furnish motive power is valuable, and an economic good—a capital good, and yet it has not had any labor origin. Good wine that changes into better wine, and hence more valuable wine, cannot be said to have owed the value-increase to the expenditure of labor.

Neither have these capital goods, in great part, been saved from the products of past labor. A franchise is a valuable capital good, but it is neither created by labor nor does it owe its origin to saving.

And land, on the other hand, in any true economic sense, has been created in part by labor. Swamps are drained, timber is cleared and a hundred and one processes followed before some land has any economic value. It owes that market value to the labor expended upon it. And so, when one projects a new railway into a vast virgin territory, the land immediately acquires value. In that sense it has been economically created. Land may be denuded of its fertility, and worn out. Therefore, in a very real sense it may be said also much land is "saved" in the same way as many capital goods.

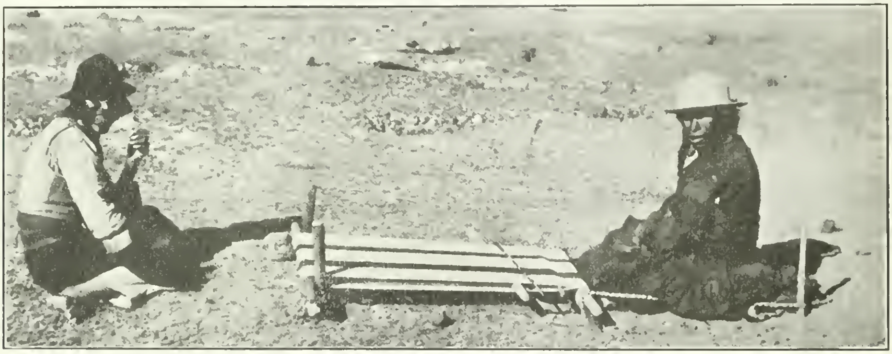
Taking this point of view, no real economic distinction can be drawn between capital goods and economic land. Both are capital in the meaning of the definition given: "Capital is wealth held for acquisitive purposes."

Capital to the Individual and to Society.

The difference between the attitude of the individual and that of society at large to what is, and what is not, capital has been greatly emphasized. But further reference may be made here to make the point clear.

Stocks, bonds and securities yield an income to the owner, and are regarded by him as part of his capital. But in themselves, such securities are merely evidences of ownership or indebtedness. A stock certificate states that the holder has certain fractions of ownership in a given concrete thing or sets of things. A bond is a mere promise to pay. Bonds that are issued by corporations relate, as a rule, to some form of capitalistic enterprise. But, as the case of government securities show, they may be the result of operations that are quite wasteful. The funds raised by their issue may be wasted on wars or upon preparations for wars. Though capital to the individual, they may or may not signify the creation or the existence of real capital.

In making a summation of a nation's wealth, therefore, evidences of indebtedness, such as bonds, may not always be counted in. Of course securities representing Great Britain's investments in foreign countries—amounting to $17,000,000,000—may be regarded both as individual and as national wealth, as they are the source of a great individual and national income. But naturally, within the confines of a country, bonds and mortgages cannot be included in the sum total of the nation's wealth, and also the mills, factories and lands on which these mortgages are based.



Curious Type of Primitive Loom used by the Bolivian Indians of the Lake Titicaca Region—Bolivia.

The Textile Arts Among the Indians of Latin America

By JANET M. CUMMINGS

(Specially Contributed.)

A piece of woven cloth, whether it be woollen, cotton, linen or silk, is one of the most interesting evidences of man's climb from the darkness of savagery to the enlightened age of modern civilization. The textile art was practised in the earliest Stone Age, and civilization's pathway is strewn with signs of the efforts made to obtain a mastery of the industry. Older far than recorded history is the tale of fabrics. According to some authorities the beginning of weaving was contemporaneous with the discovery of fire, and others believe it to be older than the first rude beginnings of the art of pottery. It is thought that the sinews and intestines of animals, and the fibres of the palm and cocoanut trees were used for weaving, even at the dawn of the earliest era of the Stone Age, or perhaps even before—many years before any period of which we have the slightest knowledge.

Textiles of great beauty, and rude looms and other implements of the weaving and spinning arts that were in use without doubt thousands of years before Christ, have been discovered among the earliest ruins of Peru, Mexico, and Central America. But of all the most delicate in texture, exquisite in design, and of remarkable construction, the textiles of the ancient Peruvians—and indeed the works of the modern Peruvians also—stand alone in the arts of the New World. Even the wonderful shawls of cashmere, or any of the archaic loom-works of the Orient, are hardly comparable to the products of the Incas and their descendants.

Ancient Peru, the Empire of the Incas, comprised not only the region included by the present boundaries of the Republic of Peru, but also nearly all of Ecuador, Bolivia, and Chili; altogether about equal to two-thirds the area of the United States.

The Inca race was a powerful, warlike tribe of people, living in the great central plateau (portions of modern Ecuador, Peru and Bolivia)), from which dominating position they extended their conquests in all directions. They developed a high order of civilization, and, at the time of the Spanish invasion under Pizarro, the empire under their sway included many tribes speaking different dialects.

The history of the Ancient Peruvians must, to a very considerable degree, be read in their graves, for they left no written records, and the Spanish Conqueror destroyed many of their cities, and suppressed their customs. In common with nearly all the Latin American primitive people, the Incas bestowed much care upon their dead, tenderly preparing them for burial, and entombing with them many objects dear to them in life.

Fortunately for the archaeologist, the conditions of climate in many parts of Peru have been such that

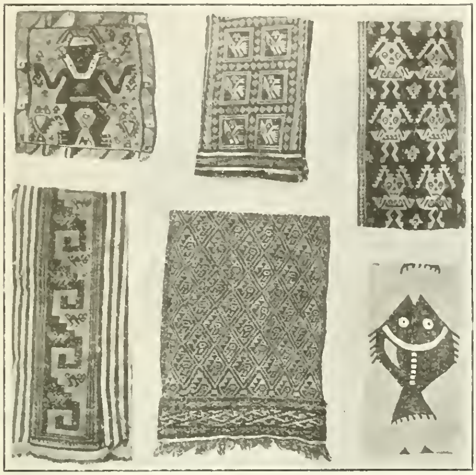


FIG. 1.

Mummy Cloths found wrapped around Mummies recently excavated in Peru.

the bodies of the dead have been well preserved. The tombs are generally found on elevated plateaus, where the extreme dryness of the air, combined with the nitrous character of the sand, has desiccated and preserved the bodies of the dead, mummifying them naturally. The same conditions have caused the fabrics placed with the bodies to be preserved also, and so it is from the graves and tombs that we obtain our earliest records of the textile skill of the Incas.

Photograph 1 shows six pieces of cloth that were recently found in mummy bundles excavated in Peru. The earliest textiles known to this region were those in the Tiahuanaco style, designs that were used by the Indians of Tiahuanacco City even before the coming of the Incas. It is thought that the four designs represented in these six pieces are among the earliest ever originated of such complexity. If you look closely you will observe that there are only four separate designs, although each is treated somewhat differently. The four emblems are the Man, Cat, Bird, and Fish. It is a curious, but well established fact, that the Incas used nearly all animal subjects in their weaving; for trees, flowers, etc., they had no use. The four symbols here shown were especial favorites, for almost always in the designs on ancient pieces of cloth, either one or more of them is in evidence. The Man particularly, is thoroughly typical, for seldom has the likeness of a man been woven other than in this grotesque fashion, with the out-turned toes and extended arms.

Photograph 2 shows a greatly enlarged section of the lower centre piece of cloth in Photograph 1. This is the Bird design, and in the enlargement, the manner in which it is built up is quite evident.

The fringes on some of these mummy cloths were termed "Quipu"; that is, a fringe of a main cord, with other cords of various colors, generally those of the warp threads themselves however, hanging from it. In the fringe, knots of different kinds were tied, or the fringe cords were twisted or plaited together in different ways. The ancient Peruvians, not having a written language, used this method to keep their accounts, or to record historic events for posterity. By the color of the cords, or the variety of the twists and plaits; the kind of knots, or the distance of the knots from each other, and from the main cord, many facts were recorded and preserved. Each maker of a "Quipu" however, had a system that was to a large extent original with himself, and which had to be explained when the "Quipu" was placed in the keeping of another.

Photograph 3 is of a modern poncho, and shows how carefully the ideas and methods of the Incas have been followed by each generation down to the present time. Here we find, with slight modifications, the same designs as those on the mummy cloths woven hundreds of years before. The two bottom rows of figures tell a complete story—in moving pictures as it were—of

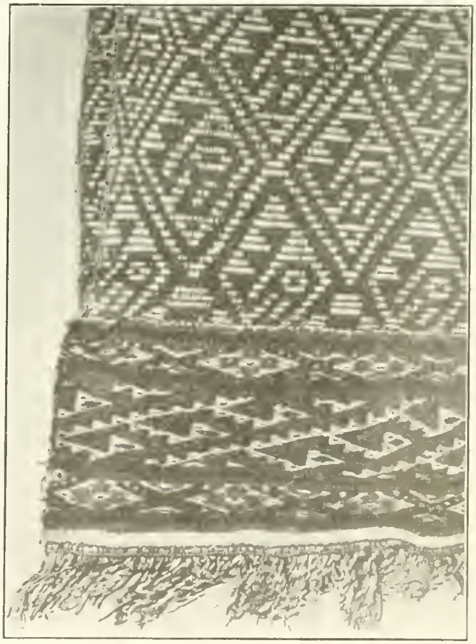


FIG. 2.

Section of a Piece of Cloth found wrapped around a Peruvian Mummy.

a triumphant bear hunt. This was, of course, not original with the maker of this particular garment, but has been undoubtedly used by many generations from its first designer before the Spanish conquest. How little do we realize in these days of modern machinery that to the ancients, each fabric became an individual human document, the recorded story of misery or of triumph.

If we can realize how wonderful were the designs achieved by these uncivilized people a thousand years ago—and by their primitive decendents to-day—how much more remarkable must it seem when we consider the appliances by which these results were accomplished.

no shearing appliances—it was generally washed. Llamas bear both black and white wool, and often it is only the white that is washed now—how the ancients did it we have no means of deciding.

When washed and dried, the wool is ready for the dyeing process, that is if it is to be dyed, which is frequently not the case. The Peruvians have many wonderful and curious dyes, a subject that space will not permit us to treat of in this article.

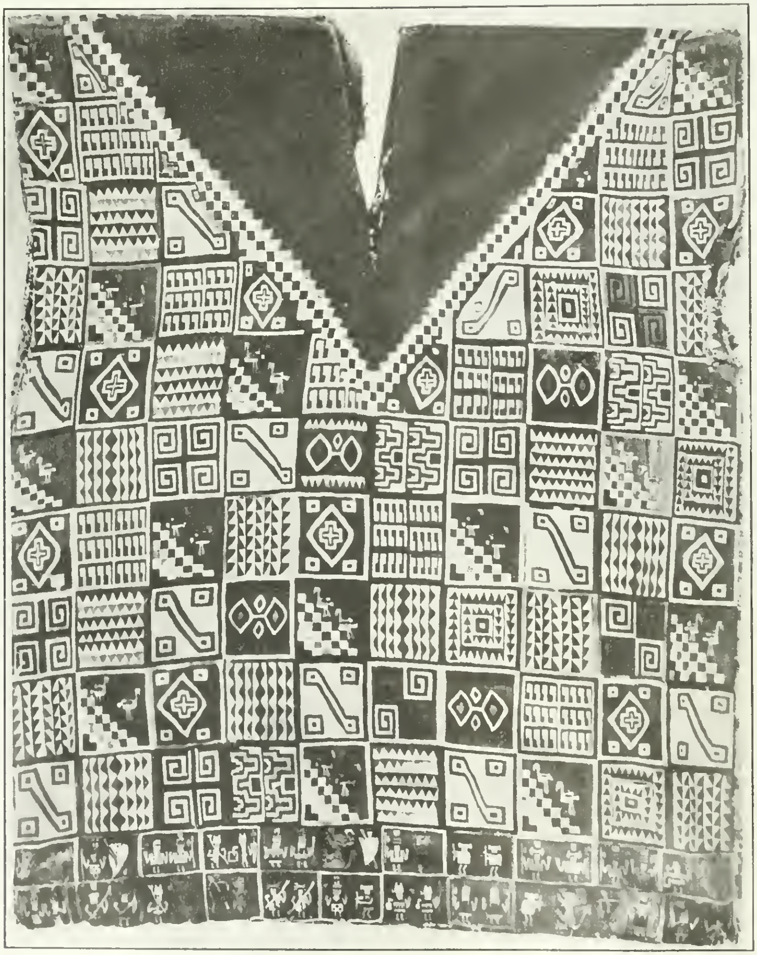


FIG. 3.

A Modern Peruvian Poncho, showing pictures of an Ancient Hunting Expedition woven into the Cloth.

The methods of spinning it is wool that is generally used by these Indians have changed little since the days of the Incas. The Llama is the great wool-bearing animal of South America, and it was from the Llamas that the wool was secured. After it was cut off the animal—not an easy process, as there were

When the work of dyeing is completed, or immediately after washing, if no dyeing has been done, the wool is ready to be carded.

Photograph 4 shows an Indian boy carding black wool. This pair of cards is made of hard wood, and each has its inside surface covered with leather, into which a number of points of thin steel wire have been very strongly and evenly fixed, similar to our familiar curry-comb. A small quantity of wool is spread as evenly as possible on the steel points of one card. This is then held by the handle, with the points upward, in the left hand, and the worker sits down and rests the card flat upon his knee. The other card he then takes in his right hand, and presses its points firmly down upon the wool to be carded. The hight hand is then drawn swiftly toward him, thus tearing the fibres apart, and smoothing them out. After repeating this action a few times the straightened fibres are found lightly attached to one edge of the lower card. They are then transferred to the smooth back of the other card, and with a few deft taps of the back edge of the one from which they were taken, may be made to assume a curled shape. When it has been worked into such a twisted curled shape, the carding is ready to be drawn out and twisted or spun into thread.

Photograph 5 shows the same boy spinning. In his left hand he holds the curled roll of carded wool, so that he does not need a distaff. His spindle cannot be seen in the photograph. Notice however, the supports

FIG. 4.
Guatemalan Indian Boy Carding Wool.

for the spindle rod, which are made out of the bottoms of a pair of shoes.

It must not be supposed that these processes of carding and spinning are in general use to-day among the Indians of Latin America, for that is not the case. Since the coming of the Spaniards the cards and spinning wheel were introduced, and by some natives are used. The majority, however, still card their wool by hand—that is by pulling the fibres apart, straightening them out with the finger nails as best they may, and then piling the wool on a distaff, or its equivalent. The spinning also is done with hand spindles. These are simply a slender metal or hardwood rod, from six to ten inches in length, having at one end, or sometimes

FIG. 5.
Guatemalan Indian Boy Spinning Wool with home-made spinning wheel—note the soles of a pair of shoes used to hold the spindle-rod.

in the centre, a round weight, and at the other end a hook, or notch, for the purpose of catching the thread so that it may not unwind when the spindle is rotated.

(To be Continued.)

TECHNICAL EDUCATION IN ONTARIO.

The Ontario Association for the promotion of technical education held a meeting of council recently, and adopted the plan of the special committee for popular lectures, and a campaign for technical education throughout Ontario by means of voluntary speakers who will be available in the cities and towns throughout the province. These speakers will be distinguished citizens and specialists, who have made a study of technical education, and in some cases the lectures will be illustrated with slides, the object being to stir up public interest in the question of industrial training. Preference will be given to towns and cities that at present are not doing anything in the way of evening classes. The lecturers are not charging anything for their services, and the cost will be merely nominal to the local branches of the association in the different localities.

Plain Loom Weaving Faults and Remedies

Banking-off, Breakdowns, etc., and How to Prevent It.

By PRACTICAL MANAGERS.

The trouble of fast reed looms banging-off so very frequently confronts a loom tackler, overlooker, or overseer, that an enumeration will be interesting and helpful to prospective overlookers, also perhaps assist experienced overlookers in more fully considering, than hitherto, the causes of banking-off and their effects. Some districts speak of looms banging-off, while other districts designate the same fault as knocking-up or knocking-off. Without doubt, this trouble is the principal of all loom faults, the remedying of which is part of the loom overlookers' duty. Banging-off can be defined as meaning that the loom is suddenly stopped with a characteristic bang, when the slay is moving forward, by reason of the stop rod blade engaging with the frog, instead of the former being adequately raised. The looms of some overlookers are subject to banking-off much more than looms for which another overlooker is responsible, and given equal conditions, the amount and quality of production from the looms of any certain overlooker renders it possible to estimate the approximate value of a loom overlooker.

All overlookers ought ever to strive to reduce banging-off to the very lowest minimum. By so doing, their loom will produce better quality of cloth and more of it, there will be fewer breakages, less loom supplies required, and the overlooker will save himself a deal of vexatious work afterwards. A loom maintained in good repair is always less subject to banking-off than looms in bad, rickety conditions. Some reputed poor overlookers appear to never understand why a good overlooker who continually plods steadily on in a methodical manner without moving about at a racehorse speed, but yet maintains his looms in the best condition, can produce infinitely better results with less work than an overlooker continually working pell mell in any haphazard manner, adopting all kinds of blustering tactics, content to allow looms to work in a gingerly condition, and having little regard as to whether two or three looms are waiting for his attention. Overlookers possessing a lengthy experience are occasionally baffled for some time in remedying banging-off, and even when the trouble has been prevented, it has, for the time being, not been very clear why a particular cause ought to have culminated in banging off. An overlooker can sometimes be pitied when in a vexatious state of mind owing to being directed to a certain loom several times in quick succession to prevent banging-off when the trouble has apparently been removed at each visit. Renewed poor weavers are generally conspicuous in often calling the overlooker to prevent banging-off.

There are very many causes which prevent the shuttle sufficiently passing into the shuttle box and causing banging-off. A loom can be easily unsteadily driven by using a driving belt which is too slack, thereby failing to regularly impart enough picking power to the shuttle. Dry, hard, very thick, or unpliable loom belts fail to be satisfactory for transmitting power to the loom owing to there being inadequate tenacity of the belt on the pulleys. Therefore, the strength of the pick is reduced and the loom runs very unsteady. In England, the flesh side of the belt is in contact with the pulleys, while in America the reverse or hair side of the belt generally makes contact with the pulleys. In England, banging-off has sometimes been prevented by reversing the pulley side of belt from grain side to hair side. A suitable dressing applied to loom belts proves very beneficial in some weaving sheds, subject to sudden fluctuations of heat and humidity.

When the atmosphere causes the belts to become dry and harden, it is the practice of some overlookers to dress the outside of the belt once weekly for a month with a mixture of tallow and neatsfoot oil. Then, a little of the dressing applied every second week will be sufficient. The dressing will gradually improve the grip of the belt on the pulleys, the driving side of the belt will be not too dry, and the durability of the belt will be considerably increased. Insufficient picking power being imparted to the shuttle has occasionally been traced to the loom pulley being very slightly loose; hence the shuttle fails to be picked across from box to box completely.

The shuttle can be impeded in its progress if the sheds of warp yarn do not "bottom" correctly in relation to the shuttle race. Thus, the shuttle is somewhat "checked," or it may be that the shuttle will be lifted sufficiently to completely fly out of the shed, or else come in contact with the spindle stud. Some weavers have a habit of not paying sufficient attention to the weights on the beam levers at the back of the loom. Too many weights on the levers, or the weights not near enough to the fulcrum, has often caused banging-off to occur by reason of the flight of the shuttle being retarded.

Picking either too early or too late can cause banging-off. If the pick is timed to operate too late, the closing shed will interfere with the speed of the shuttle, or may even trap the shuttle in the shed. On the other hand, a shuttle picked out of the box too early enters enters the shed previous to the latter being prepared to receive it, and some of the picking power is at once absorbed. The amount of opening, or size of shed, must of course be great enough to prevent the speed of the shuttle being impeded, but the tension exerted on the yarn must not be excessive, and hence too large a shed must be avoided. The removable point, or nose, of the picking cam sometimes becomes very badly worn and the amount of power which ought to be imparted to the shuttle is insufficient to drive it full up into the opposite box. The upright picking shaft must have adequate freedom of motion in its foot, step, or bottom cup, and also in the swan-neck or top collar, otherwise the strength of the pick will be reduced by reason of excessive power being necessary to actuate the picking shaft itself.

In some instances, banging-off has been caused by the picking stick being loose in its crab, or cockle, or by the two parts of the crab being loose and allowing the picking stick to have slipped back; in such cases the picker naturally fails to travel far enough on the spindle and the shuttle is not given the requisite picking force. It should be particularly noted whether the picking shell, and the picking cam, are secure. If not, the power of the pick will be weakened, and a false pick will sooner or later cause banging-off. If the picking stick is cracking, or breaking, it is a cause of the pick being too weak. Many weavers do not, unfortunately, pay sufficient attention to the cleaning of shuttle boxes. Shuttles making contact with dirt or sticky substances in the shuttle boxes will eventually impede the progress of the shuttle when passing into the box, or when leaving the same.

Looms attended by weavers careful enough to keep their shuttle boxes clean, are rarely troubled with banging-off owing to boxes being dirty. The occasional use of paraffin oil to thoroughly clean the boxes is often of assistance in removing any dirt from the shuttle boxes. It is also important that the shuttle be kept clean; especially does this apply to weavers, who are unfortunately troubled with hands that sweat very much. Some overlookers insist on their weavers applying a little clean loom oil to the shuttles every week-end, so that the lubricant can enter into the timber while the mill is stopped. This hint is of much assistance in maintaining shuttles sufficiently polished and smooth; oil must not be applied to that extent, however, as to cause the warp yarn to be stained. It must be noted, here, that by simply rubbing a small quantity of oil on the shuttle back and front, banging-off has often been cured. The condition of the picker ought also to be borne in mind, as a broken picker can easily be the cause of the shuttle not receiving sufficient picking power.

A broken picker is also cause of the shuttle being given an incorrect direction of flight, and thus causes cracking in the box, which is a clicking noise easily detected by any overlooker, caused by the shuttle not cleanly entering the box, but strikes the box sides. The important assistance of the check strap ought to be properly obtained. The shuttle will not sufficiently enter the box in the event of the check strap being too tight. The tension of the swell, or binder, springs must not be excessive, otherwise the picking power must be increased to deliver the shuttle at one, or perhaps both, sides of the loom to ensure the loom not banging-off, that the shuttle sufficiently enters the box in spite of increased pressure by the swell.

The flight of the shuttle can be erratic owing to the spindle working loose; hence not allowing the shuttle to be sufficiently boxed. A rebounding shuttle is a fairly prevalent cause of a loom banging-off. Excessive power of the pick ejects the shuttle from the box in such a "savage" manner that rebounding occurs in the opposite box, and on the next pick the picker has to travel some distance on the spindle before moving the shuttle, thus causing a weakened pick and the loom to bang-off. When the check strap is too slack to be of much use, the checking influences on the shuttle are thereby reduced, and rebounding is the result.

In the event of the shuttle having a direction as to strike the box front, owing to the pick being too strong, the swell may not be pressed back sufficiently, owing to the shuttle not entering the box full up. When the shuttle is in the correct position in the box, the stop rod blade must be adjusted to clear the frog by ⅛ to ¼ inch, otherwise the blade will engage with the frog occasionally, and the loom will bang-off.

Emphasis ought to be directed to the shuttles being equal in size and weight. Shuttles that are unequal in width may result in the smaller of them not raising the stop rod blade to prevent engagement with the frog. The smaller shuttle may also cause rebounding to occur. The finger on the stop rod must be maintained in its correct position, otherwise if it has slipped at all, the stop rod blade will not have sufficient lift. The shuttle will have an erratic course from box to box, and also not permit the shuttle to enter full up in the box, if the reed is set at an incorrect bevel, or by the race plate being badly worn, or if the spindle is not straight. It ought to be stated here, that an experienced loom overlooker can generally locate the cause of a loom banging-off by watching the loom as it is in motion, or by placing the hand on top of the reed cap with the loom in work. Rebounding will also occur when the swell spring is too weak, slack, or broken. The stop rod will have insufficient lift if the swell, or swell pin, is worn.

(To be Continued.)

Cotton Carding Points---III.

By WILLIAM SHAW

(Continued from last issue.)

Another important consideration is the distance between the feed-roll and the beater-blade. In some mills the distance or space is so small that one imagines that he is in a saw-mill instead of a cotton mill. When your picker is making such a noise it is over fed. To prove what I say, watch the feed-roll, and when you see it rise from a bulky sheet of lap, you will also notice that when this heavy portion of lap comes under the action of the beater blades, the noise increases, which proves that many mills are running their pickers with too narrow a space between the feed roll and the beater blades.

It is a most common thing to walk the streets of any cotton mill city, and hear the noise described above. It is vibration, and when there is vibration, there is something wrong.

I have always found the following setting to give satisfaction. When setting the beater blade to the feed-roll, use a closed two-foot rule.

By sliding the rule back and forth, the same distance at every point can be easily attained.

The reader will find the following suggestions valuable in the making of an even sheet of lap and also a fairly hard lap.

To enable a carder or picker-boss to make an even sheet of lap and also a firm lap, the picking machinery should consist of dampers that can be regulated on the side as well as in the middle. When the air-current is stronger on one side than on the other, the side having the weaker current is usually soft for the reason that less stock is carried forward at this point. The object of the air-current is to play through the newly-opened cotton, and carry away the dust and other foreign substances which adhere to it, and at the same time deposit only the cotton onto the cages. I would like the reader to stop here and think what is caused by a high speeded beater. Does it not destroy to a certain extent the draught of the fan? When you destroy the draught of the fan, much good fibre is lost.

On the other hand, if the beater is revolving too slowly, the draught of the fan becomes so strong that it takes with it all the heavier impurities which results in a dirty lap. I have already explained how the heavier impurities (of which a part consists of a hard nature) will dull the wire points on the cards. I have also given the proper speed of the beater fan, and also the blows to the inch, and if the reader will try what I have already suggested, he will find that the making of a well-made lap is an easy matter.

Sometimes it requires a little ingenuity to locate the real cause of a defective sheet of lap. Every carder should make at least four rounds per day around his room. He should, when going through the cards, examine every web. If the web is found to be lighter on one side than on the other, he should by the appearance of the lap be able to know on what machine the lap was made.

What I mean by the appearance of the lap, is the build of the lap. Every carder or picker-boss can in almost every case pick out the machine that has made a certain lap by the appearance of the lap on the sides. Therefore, when the defective web is discovered the carder should immediately call the picker-boss, and together go to the picker making defective laps. It requires no expert to ascertain which side to remedy, for any carder or picker-boss can, by pressing the hand on the presser roll, detect the thick or thin side of the sheet. Next, wipe the glass on the picker bonnet, and while watching the cotton arrested on the screen, turn the side damper slowly until the stock is properly distributed on the surface of both cages.

Another important consideration in connection with a strong current is that it prevents the stock being properly struck against every bar as it should be.

There is no other machine in a cotton mill that injures the stock more than the picking machinery. On this point carders agree to a man. We used to think that the card injured the stock most, but from several tests made by manufacturers and builders, it was proven beyond a doubt that the picking machinery injured the stock the most. Yarn made from a card having a series of licker-ins, is as strong if not stronger than the yarn made to pass only one licker-in. Roller cards make the strongest yarn.

Therefore, if the picking machinery injures the stock most, is it not a great mistake to rework laps weighing from standard?

As a rule, every carder is very strict in keeping the laps at standard weight, and orders every lap to be run over again from standard, but how many carders and spinners are suffering from such a strict rule. The reason is that a portion of the stock is made more fluffy by being re-worked.

The writer has had charge of some of the largest carding rooms in the United States, and always employed the following method in reworking laps weighing from the standard weight. When the standard weight was set at forty pounds, one-half pound was allowed on either side so that any laps weighing 39½ or 40½ pounds were counted as standard weight. All laps weighing over or under these weights were run on a certain number of cards. So many cards running all heavy laps and so many cards running light laps. The standard laps were marked, as also the light and heavy laps from standard. The light were worked on one end or side of the room, while the heavy laps were worked on the other. This was done so as to prevent any chance of mixing. A certain head of drawing was geared so as to make the weight of the slivers from this head the same as that of the other drawings running carded slivers from standard laps. That is, the draft of the drawing running the slivers from the light laps was shortened while the draft on the drawing running the heavy slivers was lengthened.

Many readers may say that this is too much trouble, but if it is put into practice it will be found very simple and very little trouble. Even if it is a little more trouble, is it not much better than to rework the stock over again and present to the card fluffy stock that should be more coherent?

On the sides of each cage there should be strips of thin leather, properly fitted, so as not to allow any stock being drawn down by the air currents to the flues and finally to the dust room. Although the cages revolve very slowly, in time these leather strips become worn, especially on the backside of the cages, where close inspection is necessary to discover their condition. It is surprising how much this important and costly matter is neglected in most mills. It takes but a very small space to allow the air-currents to rob a few fibres from the portion drawn on the sides of the cages. To prove this is true, go to your dust room and see how much good fibres you will find. If the leather strips are properly fitted around the sides of the cages, it is impossible for any good fibres to find their way to the dust room.

In the management of a picker room keeping the parts of the evener motion clean will give better results than anything else. They should be cleaned and oiled at least every two weeks. In many mills the evenier motion is not cleaned once in six months. However, if one in charge of the picker-room will clean the evener motion every two weeks the result obtained in the succeeding processes will be very convincing.

Go and ask your grinder why the fillet covering the licker-in is saw-tooth shape, and in almost every case you will get the answer, "I don't know." If most grinders did know, they would not sharpen a licker-in with a soft brick, which is a common practice in many cotton mills. Sharpening a licker-in with a soft brick should be branded as a crime in every cotton mill, as against the true principles of carding. The fillet covering the licker-in has that peculiar formation so that stock will not be taken around a second time. Now, sharpen your licker-in with a soft brick then when the card is in operation remove the door in the back of the card and look up at the licker-in and you will see thousands of fibres taken around a second time. When fibres are taken around a second time, they are rolled when passing the feed plate with the result that nebs are found in the web in front of the card. No card will make a web free from nebs when the licker-in is dull or in a poor condition. When a licker-in is making bad work, there is only one good remedy, and that is to take it out immediately and send it to a proper place to have it repaired.

There is not a trouble more annoying in a cotton mill than the trouble known to mill men as flaking. Flaking means clusters of fibres that have escaped the action of the licker-in and been conveyed to the cylinder in bunches. These bunches can be detected by the naked eye when they appear in the web. Flaking is bad in more ways than one. It causes the strand to have more fibres in its cross section where the flakes exist. It gives the strand a lumpy appearance and it often causes the wire on both the cylinder and flats to become charged in a short time.

If you wish to make a clean even web, set your feed plate as close as possible to the licker-in. Of course, great care should be taken that the teeth of the licker-in does not come in contact with the feed plate. I assure every reader of this journal, that if tried, this method will receive commendation. You will be surprised how much better it will improve the looks of the web. I assure every reader that such a close setting will not injure the stock. The reader is assured that such a close setting will not injure the stock. I have used it for twelve years with good results.

In the management of a cotton mill one is on dangerous ground every minute. For instance, how often you will hear the superintendent giving orders to the carder to change a certain number of cards from short stock to long stock, or vice versa. The length of the nose of the feed plate is never considered. The distance from the bite of the feed roll to the lower-end of the face of the feed plate is very important. To have good work this distance must be regulated, and the only way the distance can be regulated is by changing the feed plate to accommodate different kinds of stock. The face of the feed plate is so shaped that the entire length of the staple will be supported on its face, and receive the full benefit of the cleaning and combing action of the licker-in.

If the distance from the bite of the feed-roll to the lower end of the face is shorter than the staple being worked, a great amount of fibres will be broken, as it is necessary that the fibres should be free from the bite of the feed-roll before the action of the teeth exerts its greatest pull.

On the other hand, if the distance from the bite of the feed-roll to the lower end of the face is much greater than the length of the staple, the action will not be gradual and the licker-in teeth will cause what is known as plucking, which is the same as flaking. However, this can be somewhat remedied if the feed roll is more heavily weighted. The distance between the feed-roll and the lower end of the feed plate is just as important as the distance between the drawing rolls. There is not a carder or spinner that would have the distance between any pair of rolls shorter than the staple, and why? Because the front roll would be checked often and the staple broken. What is the difference and will not the same take place between the feed roll and the lower end of the feed plate? Is it not a fact that in most mills, cards are changed from short to long stock without changing the feed plate?

Warping Problems

By H. D. MARTIN

There are a great many things about warping which can make or break good running work through the remainder of a plant. This process, like spooling, appears simple, but it is much more complicated than spooling. Bad running work has often been directly traced to poor warping. It is a particular process, and requires skill both by operatives and in supervision to obtain best results. Of the many evils surrounding this process, none is quite so easily produced as those in connection with filling warper beams. It is strange that the bad filling of a beam should be so prevalent; the work being in plain sight, it would seem the easiest thing to avoid, yet no evil in connection with warping is so general. Almost every mill has some of this trouble.

There are many defects incident to filling of the beam, some of which may be catalogued as follows: Filling beam too full at one end; filling too full at both ends—that is, the yarn piling up or creeping against the beam head; filling not full enough at one end; filling not full enough at both ends. All of the above cause a great deal of trouble with selvages. There is also the beam filled tapered end to end; the pitted beam on account of the ends being left out here and there; raised or beaded places on account of coarse threads not being taken out; soft wound beams, over hard wound beams, over filled beams and too many pieces or partly filled beams; crossed ends, double ends, wrong number of ends, lapped ends, snarled ends, and kinky ends; knots too large, slip knots and long tail knots; warps made the wrong length; chafed yarn; oily spots and dirty places; spools run down too small, strained yarn on account of starting machine too suddenly; marking beams wrong when taken off; improperly protected beams when stacked, causing broken heads and broken yarn; filling beams when they have a broken head or when there are loose beam heads; weighing beams wrong; creeling when beam is partly filled, bringing too many knots into the work; warper at too high speed; warper too dirty; allowing lumps of waste to fall into the yarn while being wound on beam; loose threads left here and there when piecing ends; mixing yarns when creeling; uneven tensions on account of dirty creel steps or broken glass steps, or because some spools are unbalanced by broken heads and by using spools of different sizes, or skewers of different sizes, which will also do this; using beams with crooked journals; measuring roll out of commission; the stop-motion or drop wires may be cut by the yarn, causing chafing, uneven tension, and undue breakages; expansion combs not spreading evenly, causing a wavy, filled beam; insufficiently oiled rolls and other parts, causing undue straining of the yarns, besides wearing out the machine.

Warping is all that the name applies. It is the foundation of warp building. It is at this point that the ends coming from various parts of the mill are assembled, placed side by side, and tensions matched and equalised, and the good work should be accomplished here without destroying the elasticity of the yarn. The scheme of truly good warping must be to have all parts so set and minutely adjusted that everything moves in perfect unison from start to finish; that is, there should be no yanking, jerking motions, back lashings or undue friction. The creel should be perfectly set and evenly distributed in every detail, while its position is also of great importance. It may be set too close to the warper, or it may be spread too little or too much at the back and come together too much at the warper end. All these settings depend on the size of the yarns, number of ends in the creel, size of spools, space available, and other local conditions.

Careful observation by the local management can easily lead to the best results. Care should be taken that warper creels are not set on shaky floors. This causes jumping of spools from their moorings, which in turn causes excessive breakages. So important is this that an expert manufacturer in the South has found it to his advantage to raise the back of his warper creels about 1½ inches, so that the spools shall remain anchored at one side of the creel steps. He found the give-and-take caused by the freedom of the skewers roaming from one side of the step to the other affected the smooth laying of the yarn on the beam also that it caused uneven tensions to have spools rocking to and fro on the metallic steps in use at that time. He found that his work went down much better to have every end with smooth tension under perfect control at all times, giving no individual play for back lashings.

Another point about creels is that they may be too high. When creels are too high or too wide too much angle or spread is caused. The difference between ends pulling straight from spools and those pulling around an angle is, again, a matter of uneven tension. It is the same if the creels are very long. There is more strain on ends from the back of the creel than from those at the front. There is no trouble in ascertaining these variations of tension with a grain scale. The only safe remedy is to have a medium number of ends in a creel. It is better to run 400 to 500 ends on a beam, and have a more uniform tension, than to have 600 or more ends, and have larger variations in tensions. All of these scientific points count in the making of perfect work.

There is also an unsafe limit between the full and the empty spool. Better results are obtained from spools which are too small than from those which are too large for the work in hand. Many mills to-day are suffering from this evil, and are having uphill work on acount of the spools being too large for the work. It does not pay to have abnormal conditions at the various points mentioned. It would be better to turn the spools heads down or install smaller ones. The better running work with the smaller spools would pay the cost of the change many times over.

This is true of the length of the spool. A traverse of 4 inches to 5 inches would give much better work in many mills than that which 5 inches to 6½ inches gives. This is because the difference between the angle of drawing the end from the centre of the spool to the head causes a variation of the tension. The way to determine all these nice points is to put a question mark after every item mentioned and make a thorough examination of conditions. If there is any doubt about any particular point, or conditions are sufficiently at variance from the true course of things, it is best to take one machine by itself and experiment fully with it. Whatever is necessary to make every point mentioned absolutely right should be obtained without delay. Every motion should be carefully analysed, and then a set of beams from this machine tried against the test of a set from the other machines not having been overhauled. The results should be carefully observed and the difference in production noted, and the cost calculated. This is the only efficient way to determine the difference, if any; also to get at the true gain or loss of the two systems.

The matter of having a good light around these machines is also of prime importance. There is a plant of 2,000 looms that operated its warpers without a good light for many years. It was troubled a great deal with poor warping. Finally the warpers were rearranged to secure a better distribution of the light, and the work was improved at once. The mill man realises that there are very many things in connection with the warping process that may cause a great deal of bad running work for the weaving end of the trade. Warpers, like everything else, need to be very closely watched, and overhauled as often as necessary.

Good warping means good weaving. The two processes are closely related. To secure this there must be a good. It is a pity to have poor help on these machines, making poor work, when everything else about these machines is all right. If anybody thinks warping is easy, let him pause and consider well the problems which take up the attention of the men responsible for making good work under these uphill conditions. Take the matter of correctly weighing the beams as an example. The scales should be in perfect order, and the empty as well as the full beams should be accurately weighed. The mistake of a few pounds from correct weight is a serious matter, as it gives the impression that the work is too heavy or too light, when in all probability the work is practically all right. Likewise, every other item mentioned produces mischief peculiar to its place in the catalogue of errors.—"Textile Manufacturers' Journal."

Practical Tuning and Construction of Power Looms---VII.

(Continued.)

THHE OPERATION OF THE DOBCROSS DOBBY.

By BEAUMONT METTRICK.

Construction and Working of the Dobby. Diag. 33 illustrates various parts of this important section of a Dobcross Loom. The dobby head is fixed outside the loom frame at one end, and the two cylinders 1009 and 1002 are driven from the crank shaft L, by means of the two spur wheels 1026 and 1025. On the face of 1025 is cast a bevel wheel, which gears with its companion bevel 1028, this being at the bottom of the upright shaft 1020, the bottom of which is held in a pocket in the casting E. At the top of the shaft, two bevels 1022 and 1023, which are keyed fast to shaft, operate upon companion bevels 1011 and 1001, these be-

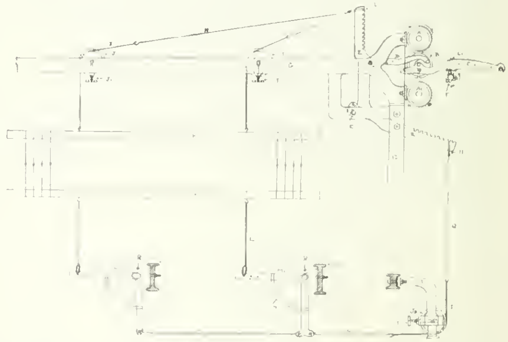


Diagram 31.

ing keyed to the cylniders or framework, cause the two cylinders to be turned in opposite directions. Owing to the position of 1022 and 1023, the cylinders, in turn operating upon the vibrator gear wheels and levers, cause the healds or boxes to be worked (see Diag. 31). The top cylinder chills, 1002 lift the healds, 1003 lifts the boxes and works the picking, and the bottom cylinder chills 1009 and 1010 lower the healds and boxes.

The Cylinder Chills. These chills or jackets of chilled iron fit over the top of the cylinder framework proper. The two small sections 1003 and 1010 which work upon the box and pick vibrators are always keyed to the frame, and to two larger ones 1002 and 1009 are fastened to the frame by small set screws, in order to allow for different setting of the timing of heald motion to the box motion. These cylinders have teeth on half their circumferences only, which allows half a revolution for change of healds and boxes, and half for pause or rest of healds and boxes during the picking and passage of shuttle across the shed formed.

Setting of the Chills. As the box sections are keyed fast to the cylinder, these should be set first from the crank shaft wheel 1026. Thus. Turn the going part forward until the reed or sley is at the edge of the cloth, then with the clutch pin A in gear, and the two set screws C and D on wheel 1026 loose, turn the cylinders by the hand wheel 521, until the box or picking vibrator gear wheel is half turned, and the boxes half changed. Then fasten up the wheel 1026 by the two set screws to shaft L; this will set the box section to the picking, and beating up, and allow plenty of time for boxes to settle before the pick takes place. After this section is set, the heald section can be fixed. Unscrew the set screw on heald cylinder then move chill to required position, which varies according to style of fabric woven.

As follows:—

Level to 3 teeth ahead of box section for loose cloths.
3 to 5 teeth ahead of box section for medium cloths
5 to 7 teeth ahead of box section for heavy cloths

When the sections are level, the healds commence to move at the same time as the boxes, when the sley is about $2\frac{1}{4}$ in. to $2\frac{1}{2}$ in. from the edge of cloth, as the going part is coming forward, and finish when about the same distance from the edge on the backward journey of the sley or going part.

With heald section 2 teeth ahead of box section, the healds move $3\frac{1}{2}$ in. before beat up and 2 in. after beat up. With heald section 4 teeth ahead of box section, the healds move $4\frac{1}{2}$ in. before and 1 in. after beat up. With heald section 7 teeth ahead of box section the healds move $7\frac{3}{8}$ in. before and $\frac{1}{4}$ in. after beat up.

As the top cylinder chills have all the lifting to do of both healds and boxes, they, of course, wear out much quicker than the bottom cylinder chills, the chief defect being the breaking off of the first and second rows of teeth, owing to the gearing not being set properly. This defect often causes late working of one particular vibrator lever and its corresponding heald shaft, box or picking, which would result in broken ends, late picking, bad boxing and shuttles, flying shuttles, etc. It is therefore necessary to watch this point carefully, and if any teeth are broken or badly worn at an important working part of the chill, it should be replaced by a new chill or exchanged with the chill on the bottom cylinder, which, not having any lifting, but only lowering to healds and boxes to work, does not have to overcome as much resistance as the top chills, and it therefore engages with the vibrator gear wheels more readily, without much slipping and breaking of teeth of either.

Timing of the Top Cylinder to the Bottom Cylinder. —The first tooth of the top and bottom cylinders of heald and box sections independently, should engage with the teeth of the vibrator gear wheels at the same time. This may be accomplished by setting the top cylinder to the bottom one, or by unfastening the bolts that hold the upright shaft in position. Then draw back the upright shaft, drawing the two bevel wheels 1022 and 1023 out of gear with the cylinder bevels, 1011 and 1001. Set the cylinders in position, then throw into gear, taking care that all plugged bevels and half teeth are gearing into each other, if present. Then fix up all bolts, etc.

Disconnecting the Dobby Head. This can be done by means of a clutch fixed at the bottom of the upright shaft 1020. This clutch is formed of 3 sections, the top part 1031 working loosely upon the shaft, and is controlled and moved vertically by means of a hand lever 1054, which is pivoted inside the framework loom.

A peg A is fitted to this section and is made to fit into a hole in the middle plate 1032 and into one in the bottom section 1028, which is a bevel gearing with 1025. The middle plate 1032 is keyed fast to the upright shaft 1020, and the bottom section is loose upon the shaft, so that when the pin is withdrawn from the hole in the bottom bevel 1028 by means of the lever 1054 lifting 1031, the bottom bevel is free to revolve loosely upon the shaft, without turning the middle and top plate of clutch (see Fig. B Diag. 33). The loom can thus be worked without the dobby if required, or the dobby to be turned by hand by means of the hand wheel 521, for reversing purposes, etc., without turning the heavy part of loom, as is done by power reversing on some types of looms. This clutch always allows for the dobby mechanism to be geared up with the rest of loom at the same point every time.

These gear wheels 1026, 1025 and 1028 should always be covered, as they are situated on the outside of

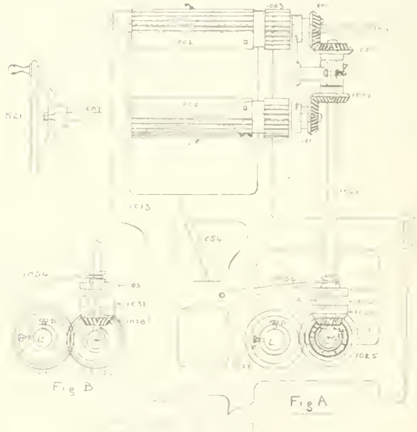


DIAGRAM 33

the loom frame, about level with the arms and hands of the operatives, and are therefore a source of danger.

The Lag Cylinder, etc., will be dealt with in the next article, also the Vibrator Levers and Gear Wheels. Timing and Setting of same.

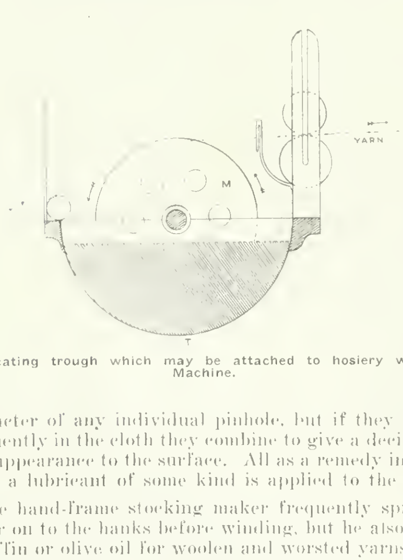
TREATING UNSHRINKABLE WOOLLENS.

English patent 29,512, 1913, of which A. E. Garrett of St. Albans, is the patentee, describes a treatment which is designed to restore the power of absorption, which woollen goods lose in the process for making them unshrinkable. After removal from the shrinking bath, the goods are rinsed and then immersed in a weak ammonia and soap bath. For 50 lb. woollen goods the bath should be composed of 6 lb. soap, 5 pints strong ammonia of .880 s.g., and 120 gallons water. After five minutes' immersion the goods are removed, scoured if necessary, rinsed and dried. The immersion may be extended to ten minutes if desired, or after the first removal the goods may be dried and re-immersed for five minutes longer. Generally speaking, however, the one immersion of five minutes' duration is sufficient.

The Lubrication of Knitting Yarns

The yarn employed for knitted goods is subjected to a considerable amount of bending, which differs entirely but that to which woven fabrics are liable. In the latter fabric, the threads retain their parallel relation to each other in warp and weft, only deviating from this a little up or down in intersecting, says a writer in "Knit Goods."

The warp threads are held firmly in their position by the aid of the weft and a compact cloth results. In the knitted texture the longitudinal and transverse elements are both obtained from the one yarn which requires to be forced into a curved form. The yarns in spinning are made with a minimum of twist and from elastic materials as far as possible, so as to ensure the perfect formation of the curved loops, but the manufacturer is obliged to employ many classes of yarn which do not possess the necessary plastic properties. Hard, brittle and unyielding yarns never make a perfect fabric if worked in their natural state. The loops in place of being nicely curved in form show straightened portions, producing minute defects known in the trade as "pinholes." It is difficult to state the



Lubricating trough which may be attached to hosiery winding Machine.

character of any individual pinhole, but if they occur frequently in the cloth they combine to give a decidedly raw appearance to the surface. All as a remedy in such cases a lubricant of some kind is applied to the yarn.

The hand-frame stocking maker frequently sprayed water on to the hanks before winding, but he also used paraffin or olive oil for woolen and worsted yarns. For the power-frame a more efficient method has to be adopted, and this is best attained by the lubricating trough attached to the modern hosiery winding machines. A side sketch of this trough is shown on this page, and consideration of its simple yet effective construction will demonstrate its superiority over the irregular methods formerly adopted. The trough T is constructed of metal and extends the full width of the winding machine. In front of each bobbin stand is placed a wheel M, with the circumference slightly hollow to allow the yarn to run on it. Those wheels are each fixed to a common axis which at the end of the machine is connected by a small belt to the main shaft. Thus, whenever the machine is set in work, the wheels are all made to revolve in the direction of the arrow, this is contrary to the direction of the yard for the majority of cases. If however, somewhat less lubrication is desired, the driving belt can be reversed so that the wheel and the yarn travel in the same direction.

The lubricant is added to the trough to the height shown, so that the roller continuously revolves in the substance. The composition of the liquid varies according to the material. For woolen and worsted yarns, an emulsion of soap and oil is almost universally employed. To obtain satisfactory results, the best soap and oil should be brought into service. Soft potash soap and olive oil are used where possible. The soap is boiled to form a solution and the oil is then added to form an emulsion. The proportion of soap and oil varies but the quantity of soap is greater than that of the oil; five-eighths soap and three-eighths oil would be a good working lubricant. But the lubricant does more than render the yarn pliant, it smoothes the surface of the thread, lays the projecting fibre and enables the yarn to be worked with a minimum of friction and wear and tear.

The process is largely employed for inferior yarns to strengthen them for the working. The increased strength may be regarded rather as due to the reduction of friction, for if lubricated yarns be tested on a machine for strength, they frequently register considerable loss of tensile strength, they pull less dead weight after lubrication than before. On the other hand, enormous addition is made to the quality of stretch.

Unlubricated cotton and mercerized cotton yarns are frequenly hard and unyielding and cause considerable breakage to the needles of the knitting frame, breaking off the springs or beards. When this takes place those needles are unable to knit their stitches and have to be replaced by new needles. As a lubricant for such yarns, mutton fat or lard are found most suitable. Cardboard is fixed over the face of the trough to cover it and the fat or lard is placed above in such a way that the yarn passes through it on its way to the bobbin. The winder has to close up the lard again whenever it wears into a groove. Silk yarns when worked dry show considerable antipathy to the needles and get caught on the slightest obstruction, thus causing imperfect loops. They can be treated in a manner similar to cotton with effective result in the fabric. By all those methods the lubricant has to be removed subsequently in scouring, and often for clean yarn in silk or cotton, parrafin wax is used as a softener. Two cakes are pressed together in front of the bobbin and the yarn is passed through them during winding.

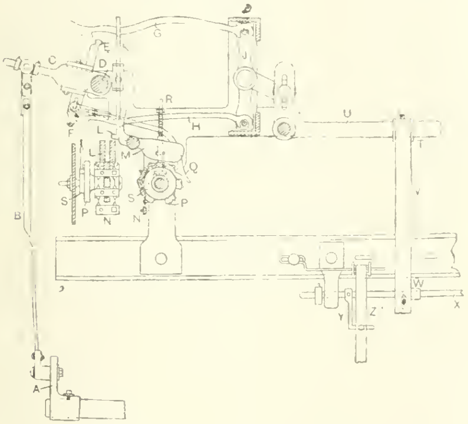
U. S. COTTON CENSUS REPORT.

The census report issued by the United States Government on October 14 showed cotton consumed during September, exclusive of linters, was 415,194 running bales, compared with 442,435 bales in September, 1913; in manufacturing establishments, 556,068 bales September 30, as compared to 614,581 September 30, 1913; in independent warehouses, 1,661,856. Imports were 15,315 equivalent 500 pound bales in 1914, and 7,449 in 1913; while exports, including linters, were 125,778 running bales in 1914, against 930,328 in 1913. Cotton spindles active in August, 1914, were 30,562,185 against 30, 631,381 in 1913.

New Selvage Motion

In certain classes of cotton goods, such as sateens and similar fabrics, there is a distinct call for material woven with fancy edges, as distinct from the ordinary plain selvage. Manufacturers of such cloths will therefore have a very real interest, says The Textile Manufacturer, in an improved selvage motion patented and manufactured by Mr. Irwin Walton, of Walverden Foundry, Nelson, England.

There are, of course, many other selvage motions on the market, most, if not all of which are deficient in one or more respects but Mr. Walton claims universal application for the "Walverden" selvage motion. He states that it is capable of weaving all kinds of selvage that is practical, and that entirely without regard to the weave in the body of the fabric. As will be seen from illustration, the motion is briefly in the form of a miniature dobby, but actually it takes up very little space on the loom, and is not a hindrance. The device is operated from the bottom shaft of the loom, on which is bolted an eccentric (a), which imports a



Details of "Walverdan" Selvage Motion.

rising and falling movement to the rod (b). By means of a small crosshead and an adjustable bracket, a similar movement is imported to the outer end of the rocking lever (c) fulcrumed at (d), while a horizontal sliding movement is given to the draw lugs (e) and (f). Two hooks (g), (h) are connected at one end to the baulk (j), while their hooked ends are normally held clear of the draw lugs (e), (f). Thus the hook (g) is held up by the needle (k) resting on the end of the feeler (l), while the hook (h) is held up by an extension of the feeler (m). The pattern is formed by an endless chain of small wood lags (n), provided with a double row of holes, in which pegs may be arranged in any desired order. The lags are carried on a cylinder with eight divisions, and provided with a rack-wheel (p) and hook (q), by which it is turned one-eighth of a revolutoin every two picks. A spring hammer (r) exerts a downward pressure upon a star wheel (s) in order to hold the cylinder in its correct position while the selection of hooks takes place.

Lags without pegs allow the hooks (g), (h) to remain in an inoperative position, but a peg on either side of the lags lifts up a feeler and allows the hooked end of its corresponding hook to fall into the path of the draw-lug. Thus a peg under the feeler (l) allows the outer end of that feeler to fall, which movement is followed by a corresponding movement of the needle (k), thus placing the hook (g) in the path of the draw lug (t). The downward movement of the connecting-rod (b) therefore carries the draw-lug (e) outward to the left, carrying with it the hook (g), thus lifting the bracket (t), which is fixed on the lifting lever (u). To the bracket (t) is fixed a leather band (v), the lower end of which is attached to a finger (w) set screwed to a rod (x) that extends a short distance beyond each selvage. Fixed to the same rod (x) is a lifter (y) that is attached to a tape (z), to which the selvage harness is secured in the ordinary fashion by means of a buckle. To prevent excessive wear of the tape (z) it is passed over a small flanged bobbin freely mounted on a spindle bolted to the top rail of the loom.

Changes from one weave to another may be made in a few minutes, the only alteration necessary being on the lattice, so that the motion is complete in itself, and the first cost provides a motion that meets all ordinary demands. We undersand also that the motion can readily be applied to all makes and styles of looms.

The Motor Drive for Knitting Mills

By G. L. CHAPIN

Rising costs of labor and materials, without an equivalent increase in prices received for finished product, have cut the manufacturer's margin of profit to such an extent that he must necessarily eliminate insufficient methods of production.

Electric motor drive is being adopted as the motive power in many branches of the textile industry because of the greater efficiency obtained from such power in addition to its general advantages of safety, neatness, simplicity and adaptability.

New mills are being laid out for electric service and old mills are being changed over from their former equipment. Many mills finding themselves without power for additional equipment which they plan to install, unless a new engine is provided, have found in the local electric company a means of quickly and economically obtaining the needed aditional power.

Overhead shafting and pulleys with possible projecting set screws; the myriads of belts which, under the best of conditions frequently require adjustment, and jack shafts on floors or walls, are all elements of danger and all are eliminated by the electric motor.

The longer the line shaft and the greater the number of belts required, the less efficient is the motive power. It is true that the modern steam engine and internal combustion engines have been brought to a high degree of perfection and efficiency in themselves, but the losses due to friction and belt slippage seriously decreased the net effiiciency—the power actually transmitted to the machine. One short belt or direct or geared shaft is all that lies between the electric motor and the machine to be driven.

The shutting down of the engine or trouble with the main power belt means the stoppage of the entire plant; trouble in line shaft, counter-shaft, or any of the belting operated thereby, means the stopping of from one machine to an entire floor. Interruptions in the continuity of electrical energy are so infrequent and of such short duration as to be negligible. A motor will run year after year with no further attention than necessary oiling.

The relative cost of operation of the two systems cannot be determined in a general way to cover all cases and all conditions. Each factory presents its own problem and this question must be settled by a study of each individual case.

The constant drip of oil from stuffing boxes keeps the floor of the mill unclean. The air currents created by large numbers of swiftly moving belts causes lint, dust and fine particles to be suspended in the air, and these are inhaled by the workmen or deposited upon all exposed surfaces from floor to ceiling.

General uncleaniness of a workroom induces employees to neglect the machines, allow rubbish to accumulate and merchandise in process of manufacture to be scattered promiscuously over the floor, obstructing the free movement of employees and reducing their efficiency. A clean, neat, light, cheerful work room means contented, efficient help.

Manufacturers of electrical apparatus have given the subject of motor drive in textile mills, exhaustive study, which has resulted in the production of a complete line of induction motors of both alternating and direct current types especially adapted for this service.

There are three methods of employing motors in plants of this class: first—each room or department may be operated by a single motor; second—the machines in each room or department are divided into groups, each group being driven by a single motor: and third—by applying an individual motor to each machine.

The first method is frequently employed in converting an old mill to electric drive, as it enables the manufacturer to utilize the old counter shafts and belts. It is open to some of the objections which apply to the engine as the source of power, but has many advantages in its favor.

The second method (group drive) is far more flexible and natural, since standard practice in knitting mills has been to connect from 10 to 50 machines by light belts to a common shaft. It has the further advantage that the required horsepower to operate a given group of machines can be closely ascertained, and a motor selected so that it will run at approximately full load efficiency.

The present tendency however, is towards the third method, which consists in direct connecting to each machine a motor of just sufficient capacity to operate it. Thus the motor becomes an integral part of the machine, and the maximum possible efficiency is attained. All belting, shafts and pulleys are eliminated. The foreman's view of the whole room is unobstructed. Only those machines which are producing are consuming current, and each is directly under the control of the operator at all times.

The electric motor has a perfectly uniform turning movement, and belt slippage, shaft friction, etc., being wholly eliminated, the machines are driven at absolutely constant speed. This item is of great importance in connection with ribbers and flat knitting machines where intermittent reductions and surges of power derange the adjustment of the dial, tucking or other cams, causing small holes, or "bird eyes" in the finished product: While the most frequent cause of needle breakage is undoubtedly inequality in the yarn, a jerky feed greatly increases the trouble from this cause, whether spring or latch needles are used.

In cases where change in the quality or size of yarn or different parts of a garment require higher or lower speeds, this is readily, instantly and accurately adjusted by the simple turning of a rheostat handle placed in such a position as to be easily accessible to the operator.

All auxiliary machines in a knitting mill lend themselves as readily to the motor drive; sewing machines, cone winders, elevators, presses and preparatory machines should be equipped with motors. They are small compact, dust and oil proof, and their general neatness of appearance, their simplicity and adaptability alone are sufficient to recommend their adoption—"Sweater News."

TIME CRIBBING IN LANCASHIRE.

(Special Correspondence.)

From the report of the Chief Inspector of Factories the number of time cribbing cases is shown to be the highest on record. The most remarkable feature is the great increase in the cases detected in Bolton, an area which has of late been regarded as immune in a more or less degree from this offence. In the Oldham and Stockport district the inspector refers to the difficulties he experiences owing to "scouts" being posted to give an alarm upon the appearance of an inspector. The phase of time cribbing, which consisted of stopping the carding rooms and running the mule rooms overtime, appears it is stated, to have died out. The following table gives an approximate idea of what Lancashire mill owners pay in fines, etc., for breaking the law as to the Factory Acts:—

District.	Informations.	Penalties.	Costs.
Blackburn	30	$122.50	$68.75
Burnley			—
Bolton	449	966.25	824.00
Manchester	70	600.00	180.00
Oldham	565	3,755.00	1,515.00
Preston	—	—	—
Rochdale	26	45.00	58.06
Stockport	89	30.00	270.00
Total	1,229	5,518.75	2,915.75

Meal time working in weaving sheds still remains unsatisfactory in spite of the efforts of the trade unions and inspectors. Being paid on piece work, the weavers are tempted, by the prospect of extra earnings, to do odd jobs during their meal times. This is very hard on the manufacturer who has often to keep a close look out to prevent workers doing this illegal work.

THE DYEING OF ARMY CLOTHS.

The Dyer and Calico Printer, last issue, states that the Association of Chambers of Commerce have received a communication from the War Office as to the standard exacted by the department in respect of the dyeing of Army cloth. This states that "owing to the probable exhaustion of the stock of dyeing stuffs which have hitherto been obtained from abroad, it has for some time past been decided to allow other coal-tar and vegetable dyestuffs in the production of drab mixture materials, provided that the dye is the fastest that can be obtained and approximates closely in color to the standard pattern."

SOME DYESTUFF SUGGESTIONS

"Old Dyer" to the Rescue

(Specially Contributed.)

We had immediate need of some cheap white paper for scribbling purposes and though certain that somewhere in the building were pads and sheets of it galore, we could find none. We were busy, the day was cold, and no one cared to go to the suburban store for a supply. Accordingly it was with real relief that upon opening a cupboard we descried a box of unused envelopes which had become sealed through moisture. Here was a hint which we were not slow to take advantage of. Though spoiled for all ordinary purposes, they might very well be used for this. Recalling a device of early schooldays, when paper was dear we slit open a lot of them at the ends and across the sealed flap, and resumed our work comforted not a little by the simple makeshift.

Thus in the present dyestuff dilemma it would seem possible for an old-timer to throw out a hint or two which may serve to ease the pressure and tide us over a crisis. A certain measure of relief can be obtained by dyes and methods of the past generation. At first thought, of course, this seems a retrograde movement, yet in reality it is not, and view the suggestion rather as a temporary makeshift to get us over an otherwise insurmountable difficulty.

There are limitations we admit. The demands for fastness against this, that, and the other destructive influence in textile processes have increased and multiplied till they have become almost unreasonable. These demands can be made for the moment a little less exacting. The emergency which has been thrust upon us unprepared should beget in us an adequate patience. ("Old men for counsel," you remember, if "young men for war.") If ever we have faced an hour in which to bear and forbear in business and social relations it is surely now. Let us heed the call. Worse things are yet ahead before the golden age for our national industries shall dawn.

Then there's the diminished supply of dyes other than artificial now procurable. Coal tar products for coloring purposes had no existence when numbers of us were born. Coal tar was then employed only as an outdoor paint and preservative. It is not much over thirty years ago that coal tar derivatives began to make a place for themselves in the dye-room. Now they are almost alone in the field. There are mills in plenty where not an ounce of anything else enters their drugroom. As an inevitable consequence of this feeble demand for their predecessors, the old natural dyestuffs market cannot be found for them. Such as survive are produced in ever lessening quantities, with the possible exception of logwood. Heavy cargoes of madder, indigo, cochineal, archil, lac dye, the redwoods and yellow woods used to be imported, the preparation of which afforded means of livelihood for multitudes of our fellows in other lands, and now when we would be glad to use them they are not to be had. Instead we have all these years been thoughtlessly putting ourselves more and more at the mercy of a power with which we are now at war, and our principal source of supply is cut off. No wonder they jeeringly tell us, "England is asleep."

But we must awaken; and we shall. An old natural coloring matter is yet to be had. Our old blue friends, indigo, and logwood (bois de bleu), are ready to help. They are of service in the dyeing of animal and vegetable fibres alike; and are susceptible of a variety of methods of use. No colorings on wool have in appearance ever surpassed, and few equalled a well dyed logwood black or indigo blue. We can have them yet. The best grades of the dyes are to be obtained from oversea in "the right little, tight little Isle," and Mother England will send us all we want. Personally, we have colored large quantities of government goods with indigo and logwood, and they were highly satisfactory.

We might say the same of cochineal, though red coats for "sodgers" are rather out of date. Some cochineal is still to be had but whether in sufficient quantities to be of much account we are unable to state. It is used in coloring confectionery in preference to anilines. The sanitary red flannel of our druggist trade, professedly dyed with cochineal as it is, more often obtains its color from scarlet ponceaus. To the wool dyer, cochineal is of value in the event of his being debarred from access to the fastest of the coal tar colors which have replaced it. Besides scarlets, crimsons, and pinks may be obtained with it. Formerly very good reds were dyed with madder and cochineal together. The redwoods are gone for good probably. They were so dirty and hard on the stock. Sometimes we used them for topping or bottoming indigo dyed cloths in order to secure intensity and bloom. Extracts of a few were in use at one time for different compound cotton shades. Probably these are not made any longer. For the fancy wool and silk dyer archil (orchil) used to be one of the old standbys. A moderate amount of archil extract is still on the market, and might be used to advantage on goods which do not require rough washing, and exposure to sunlight. Archil works very evenly and cleanly along with all acid coloring matters. It requires no effort to remember when many shades on hosiery and knit goods and wool yarns and worsted for these and upholstery goods were dyed exclusively with archil and indigo extracts. For fast browns on cotton we were largely restricted to cutch (catechu) and gambier. Hemlock and chestnut extracts helped out and were also employed on leather. It would be interesting to discover how much of these are yet available. One of the hardest lines of artificial coloring matters to do without will be the sulphur and other dyes for cotton to stand milling and we can replace these with some of the old dyes named. Fisherman's nets, sailcloths, tarpaulins, awnings, and carpet yarns were once dyed largely with cutch and gambier. The extract forms are most economical.

Of the natural yellows fustic was always of greatest practical importance. It is still considerably employed, mostly in the dry powdered extract form. For combination shades it has ever been difficult to find an equal substitute. In fact it has never really been superseded for wool dyeing, while on cotton it works well for compound colors. Flavine, a concentrated preparation of Quercitron Bark was our mainstay for bright yellows on wool, and for shading cochineal scarlets. We judge that it may still be obtained in quantity sufficient to be of service if necessary. It was always used directly, and in connection with "tin spirits" of different sorts. Weld has still its uses for silk shades, as have also others of the oldtime "dyewares," we are reviewing. Arnato and turmeric are too fugitive to bother about—like safflower among the reds. Sumac, and more particularly sumac extract, has extensive uses up to the present. As a "bottoming" agent for many aniline dyes, and in connection with cutch, logwood, and various metal salts it has had wide application in the production of slates, drabs, olives, browns, etc., on cotton. The employment of sumac and "iron liquor" for covering burrs and vegetable matter in piece goods was once world wide. We might be obliged to fall back on them again for a while.

Neither must we overlook the old mineral dyes and the possibility of having to take up with them anew. There were yellows and oranges on cotton evolved from chrome (bichromate of potash) and lead salts, and iron buffs, and manganese browns which still survive for light-fast dyeings on window shade cloths and curtains. Time was when all the "Royal Blues" and most of the bright navys in our country were colored on all fibres with red and yellow prussiate of potash (potassium ferricyanide, and potassium ferrocyanide). Amongst our first distinct recollections were the sight and smell—of our own father dyeing "Prussiate Blues" on woollen cloths. These were frequently topped off with logwood on the heavier shades to any desired depth and tone. They were not to be despised, and take note that they can be repeated without either the assistance or permission of German dyestuffs.

Now in this cursory survey of old-fashioned coloring matters and methods, we may have omitted an odd one that may occur to someone else. This, then, is the time for some one of our grey-headed friends to make their patriotic contribution to the settlement of the country's textile trade. We have mentioned only the best of the old timers, saying nothing specially anent the influence of mordants of different sorts, nor the "stuffing and saddening," processes of other days. Our little dyeroom retrospect ought, however, to afford suggestions wherewith to meet the present distress.—"Old Dyer."

Khaki and Field Grey

By C. M. WHITTAKER, B.Sc.

In the Dyer and Calico Printer, October 20, 1914.

One can hardly pick up a newspaper nowadays without finding some reference to khaki or field grey or green. It is claimed in many quarters that the field grey or green of the German troops is more invisible than the khaki of the British troops. There will no doubt be an authoritative settlement of this question in due course by the military authorities, meanwhile it had better be left an open one. One can conceive that it all depends on the actual surroundings, which must vary from time to time. Surely if the troops are operating in corn or ploughed fields, or in woods with a carpet of fallen leaves, then the British khaki must be the less visible. It may be asserted with equal confidence that the German field grey will be the less visible in grass meadows.

At the present rate of progress of the war it is fairly evident that both colors will be thoroughly tested under active service conditions in all surroundings during all seasons of the year, after which the military authorities will have ample data from which to arrive at a decision.

It will, therefore, be of interest to discuss the two colors from the dyeing point of view. Those who follow German dyeing literature are quite familiar with the field grey question, because it has been frequently discussed during recent years, owing to the fact that the German military authorities have not yet succeeded in getting a permanent color. It has also been vitiated by the action of the various color interests who have been trying to get their own particular types adopted to the detriment of the types of the competitors. However, they have not been successful, and the German military authorities have refused to specify any particular colors, but have compromised by announcing that they would accept cloth dyed by any of the four following methods:

1. Chrome colors on top of indigo.
2. Helindone colors.
3. Indianthrene colors.
4. The dyeing of part of the blend by the Cassella process of boiling the wool with bichrome, copper sulphate, and formic acid, the other part with chrome colors.

The first process consists in bottoming the wool with indigo, then topping with small quantities of chrome-yellow and chrome-brown. This method is not satisfactory, because a shade so dyed does not fade in its own tone. This is due to the fact that a chrome-yellow does not exist which will stand exposure—particularly in small percentages—to the same extent as indigo, so that the field grey fades blue, which defeats the very object of the shade, that is, the masking of the movements of the troops. It is the cheapest and oldest established method, and one is safe in saying that the majority of the cloth is dyed this way since it meets the specification of the German military authorities.

The second and third processes may be discussed together because the principle involved is the same. The shade obtained this way is extremely fast, but the cost is very high; moreover, the colors are extremely difficult to dye owing to the fact that the individual colors do not work well in combination. Since, however, a military order usually involves a large amount of wool, this is not a point to labor too much, because if one batch is off shade is may be worked off with another batch dyed to carry it through the blend. Again, these colors have to be dyed in an alkaline bath, and the least excess of alkali in the bath is liable to tender the wool, a vital point in military cloth which has to stand specified breaking strains. These two colors make the average dyer fight shy of these colors for wool.

The fourth process admittedly gives a very fast result which is due to the following fact. According to the Cassella patent, if wool is boiled with bichrome, copper sulphate, and sufficient formic acid completely to exhaust the bath, the green oxides of chromium and copper are precipitated on the fibre in an absolutely permanent form, similarly to the metallic oxide khaki on cotton. The shade obtained, even with a large amount of bichrome, is relatively pale, but it enables the manufacturer to blend with this for his field grey a much heavier bronze-olive than is possible in the first process. It follows that the shade being heavier is relatively faster. There are two objections advanced against this process: it is conjectured that there may be danger in putting a wool heavily loaded with metallic oxides into a bath which is so liable to come in contact with wounds, and it is also said that the boiling with large quantities of metallic salts and acid will not tend to improve the strength and handle of the cloth. I merely state these objections without endorsing them in any way. The first objection must be settled by the army doctors, whilst the second is a point on which there has been heated discussion from time to time in the technical journals. My own opinion is that it entirely depends on the skill of the dyer in charge of the wool as to whether it is tendered or not; the personal equation is a great factor in these cases.

Since the German military authorities do not allow any higher price for the cloth dyed with vat colors it naturally follows that the dyers adhere to the first process for two excellent reasons: it is old established—a great point with dyers—and it is the cheapest. It appears to be the irony of fate that the German military authorities have not been able to evolve a fast shade for their military cloth, despite the great strength of the German coal tar color industry.

Turning to the British khaki, the military authorities have specified it to be dyed on a chrome mordant with fustic extract, anthracene brown, and on alizarine blue, and it has to stand several definite and severe tests which have successfully prevented the substitution of other dye-stuffs. Alizarine Red, Blue Black B, and Cyanine Green are also used in some of the shades which are used in the blend. Spotting with nitric acid is one of the tests employed, and British khaki dyed to specification gives a yellow spot which cannot be obtained if Mordant Yellow or Brown is used in place of fustic extract and Anthracene Brown. The unprecedented demand for khaki for clothing the new army now being equipped and the imperious demands for quick delivery have swept the dyeing specifications by the board. The insistent demand for quick deliveries has naturally caused the dyers to look to the quickest method of dyeing, and that is the addition of bichrome at the start of the process. This however, demands the use of Mordant Yellow, which has caused all the outcry about the supply of yellow, which has temporarily broken down. The dyers have been driven, owing to the shortage of yellow, to use fustic extract, so that this color is experiencing a boom reminiscent of its palmiest days, and some firms are having temporary difficulty in obtaining supplies. In the present rush dyers are reluctant to use fustic extract because this involves chrome mordanting which materially diminishes the volume of production—to the extent of forty per cent. In fact, the huge demand for khaki has upset the calculations of everybody concerned, the dyers, the dyewood manufacturers, and the coal-tar color manufacturers; hence all this wailing and gnashing of teeth by people who have plenty of orders and nothing to dye with. Brown has fortunately been no difficulty, thanks to Read Holliday and Sons, LtLd., of Huddersfield, who have been able to maintain a continuous and ample supply of Khaki Brown W. This product may be dyed on a chrome mordant by the addition of bichrome at the start process or by the top-chroming process. It not only gives practically the same shade as Anthracene Brown W., but works beautifully level on mixed wools and is equally as fast to light and milling. True, it does not give a yellow spot with nitric acid, but that is a test which has had to go by the board since the exhaustion of the supply of Anthracene Brown. One is justified in saying that Khaki Brown W. has saved the situation as regards the dyeing of the huge quantities of khaki which it would have been impossible to dye without this dyestuff.

One may reasonably speculate the War Office, after their present experience and difficulties, will consider the advisability of altering their dyeing specifications, so as to enable dyers to use the single bath process instead of the chrome mordant. This would bring khaki dyeing in line with the tendency of modern dyehouse practice, and enable dyers to cope more quickly with demands like that at present being experienced.

Where We Get Our Dyes

By YOUNG HICKORY.

Specially Contributed.

One of the nettling, yet amusing features of this war time is the endless babbling of a government liar whom Kaiser Wilhelm keeps among our Yankee cousins down in Washington. His systematic mendacity would be ridiculous were it not that there is method in his officious madness, and organized impudence behind it. In fact he is but one of the minions of that widespread and penetrative, and as yet vaguely located spy system and epionage department of the German military authorities. It is repeatedly remarked that in furtherance of their plans they will stop at nothing. On all hands they are seeking to attack us through the press. We were handed recently an illustrated periodical from Buffalo, whose pictures and letterpress fairly astounded us. But that was done in the open. We do well to be on guard ceaselessly against the artful and misleading press notices which are bent on our national undoing. They may appear in journals we have no reason to discredit; they may even be written by men we trust; but because of the untiring activity and deceits of their sources of information they may influence us altogether erroneously.

It is observable that this sort of thing is being used among our Canadian mill men to their hurt, and it is time some warning voice was raised. Two definite objects are plainly apparent. One is to create the impression that Germany has so overwhelming a superiority of merchandise and such a wealth of facilities for supplying it in any quantity at prices so beyond competition that we are absolutely dependent upon her. If all this is true, isn't it about time to sit up and take notice? Her other wily ambition is to foster a false sympathy with her industries to the utter neglect of our own and to make every needful arrangement to resume her trade with us, "when this cruel war is over," just as if she were fully entitled to our esteem and confidence. Is that then our outlook? Are we going to fall into her selfish schemes as innocently as all that? If she succeeds with these ruses it is quite evident that our position of dependence on her for all coal tar products will be more humiliating than ever and our growth out of babyhood, our release from servitude to an arrogant and conscienceless power correspondingly retarded. Were she decent and neighborly like some of the German folks who live and toil with us every day, we might waive protest, but rather it comes to the matter of aiding and abetting a set of inhuman bullies in their rapine and ruffianism. There are good and plenty of us who will never again buy or use an article, "Made in Germany," until she repents and mends her ways. It is the nation, and above all the "War Lord," control of the nation in its consuming greed and not the individual we are having to deal with. These are sober days, though in our safe quiet here we find it difficult to realize them. We must awake, however, and grip things amid the ambushments of trickery all about us; and keep alert.

Articles have lately appeared on both sides the "Line" which make discerning dyers hot with indignation, so manifestly are these effusions inspired by false Prussian conspirators. They keep steadily to the two courses we have indicated. It is a fact too that some readers credit arguments. What is the actual state of affairs?

There is German machinery and apparatus in our mills undeniably; but is there need that it should be? Can't we get every piece of it just as good either in Canada, the British Isles, or the U.S. Maybe we bought the German things a trifle cheaper or the German salesmen got in ahead of the other fellows. That was all. We get drugs and chemicals from Germany. Is there any real need in that line in our mills which cannot be met nearer home? Every dyer and finisher in the Dominion knows that he can get all he can use within the Empire or in the United States and more besides. We need be under no obligation.

We consume a lot of German dyes, but do we use these dyes because we can't get them elsewhere? Indeed no. Let no agent of Count Bernstoff delude you into thinking so. Canada up to date is not so full of dyeing establishments that it takes a great amount of dyes to keep her going. England has at least three aniline factories that ship us excellent goods right along through these war days. Switzerland has a couple more, with a splendid output in quality and quantity. She ships now via Genoa since Antwerp was destroyed. France has one or two more of old established repute. Our paper mills, and trades other than textile, can be supplied in great measure from two aniline plants in New York State; and still leave other coloring matters on hand for wool and cotton or silk dyeing. How many aniline factories is it going to take to keep us going in Canada anyway? These friendly firms are abundantly able to supply us with all our actual present dyehouse necessities, and now is the time to encourage them. We can do without German goods in the mills nowadays, just as well as we did before we first saw them. At the outset it may take a little patience, ingenuity, and real patriotism in order to do so, but verily it is a matter of grave concern to us, and must be done. Objection may be urged that the three larger German aniline firms at least turn out dyes which are not made elsewhere. They are in a position to do so because we have helped to build up their immense business for them. We can get along for a while in a pinch without these exclusive products and turn around to help build up our own national industries.

It isn't that the German salesmen have been more free-handed with graft for dyers and superintendents perhaps, nor more oily tongued. Their unfailing and accommodating courtesy has told. The liberal supply of technical information furnished by their firms to the mills and profession has strongly influenced. But behind all has been noticeable their painstaking attention to system in their work, and their knowledge that the resources of their Government were backing them in their business.

In the seventies Brooke, Simpson and Spiller, of London supplied Canada with all the artificial dyes she used, and but for English conservatism and bullheadedness on the one hand, and Dutch pertinacity and a "paternal" Reichstag on the other, every package in our drug rooms to-day might have a British label on it instead of a German one. Many of you older men can fully bear out this assertion. In a normal condition of trade some twelve to fifteen dyestuff salesmen travel up and don our wide but sparsely settled Dominion regularly. These comprise representatives of the principal factories themselves, together with agents of jobbers in England, Scotland, Canada, and the United States. The only excuse for half of them is their readiness to cut one another's prices, or to do worse in order to get trade. If the Germans are eliminated there will be none too much still to go around amongst the others.

As human beings we are necessarily dependent on each other, individual upon individual and community on community, and all of us individually and collectively upon the beneficent Deity whose name is constantly in the public utterances of this European despot. We are not dependent, however, upon any organized tyranny, and if Germany and her exports were wiped off the map to-morrow, the rest of the earth would survive quite robustly. This is no time of day in which to uphold braggards or to yield to the underhand scheming of wily and unscrupulous demagogues. Neither is it a time for believing all one reads in the press or for forgetting our duty to our own.

We have no feelings save of respect and friendly comradeship toward the German people. We have admired their enterprise and attainments. Our relations towards their representatives in Canada and the States have been of the best; for some of them we have the most kindly esteem. We counsel no retaliation against even their evil government, no spite against their successful business ventures. Notwithstanding, now that plots have been unmasked and we have made discovery that we were asleep over a mine, we must give more attention to things we have been careless about. This will include the shaking ourselves free from all reliance upon the output of a State that would crush us into abject serfdom if she could. We are not dependent upon her, and decline to become so.

SIXTH SERIES COLONIAL WOOL AUCTIONS.

The sixth series of London Colonial Wool Auctions opened with a strong market on Nov. 3, the offerings consisting of about 7000 bales. The majority of all descriptions were sold, except carbonizing scoureds, which declined 10 per cent.

Medium crossbreds, in the grease, advanced 10 per cent and low crossbreds, 10 to 12½ per cent. All slipes were 7½ per cent higher.

Good greasy merino wools were quoted at an advance of 10 per cent, while scoureds were 5 per cent higher. A few French houses bought scoureds. Ordinary Bradford 40s. in the grease made 14½d; 44s. 15d. and 48s., 15½d. Latest reports indicate that opening rates are firmly maintained.

The final series of the year will be held Dec. 8, including arrivals up to Nov. 30. The first series in 1915 are scheduled to open Jan. 19, no limit having been set. The dates of further sales have not yet been decided.

Dark Days Threatening in British Cotton Industry

(By Our London Representative.)

London, October 25.

A gloomy forecast of the probable condition of the British cotton trade by next Christmas is made by a large cotton manufacturer in Lancashire, and certainly up to the present time his words do not seem out of place. He says that by the time mentioned it is estimated that there will be nearly 400,000 cotton operatives out of employment. "We are within measurable distance," he says, "of the almost total stoppage of the cotton industry in Lancashire. There are many mills now closed indefinitely. Others will soon follow with the same result, and by the end of November or December, it is probable that over nine-tenths of the looms in Lancashire will be stopped with no immediate prospect of re-starting." Such a catastrophe in the cotton trade, on which so many hundreds of thousands of workpeople depend for their living, will tell untold damage, not to speak of the misery and distress that will follow in its train. On the other hand the woollen mills are running day and night, most with government orders, and khaki cloth is not supplied quick enough to meet the requirements of troops, a portion of whom are clad in blue serge to tide over the temporary difficulties.

The Position of Cotton.

During September the price of middling American was reduced from 6.20d to 5.30d and that of fully good fair Egyptian from 8.15d to 7.10d. Up to the middle of October prices show little change, if any, and there is a hue and cry for lower values since the end of August. There is no doubt the cotton problem is as great as, if not a greater matter than, England has had ever before to face. Some men on this side estimate that for one-third of the raw cotton of the world there are no buyers. England has 40 per cent of the cotton machinery of the world and is also responsible for the cotton crop of India and Egypt. America has about 20 to 25 per cent of the machinery, yet, although America is not at war like Great Britain, she is actually—at least it is believed here—in a much worse position than England. If things are allowed to take their course, no one can conjecture to what level the price of cotton would go, because the present crisis in the raw material supply is one that may affect the future of industry. Sir Charles W. Macara says: "My statement from the very beginning was that it was imperative that the industrial, commercial, financial, transport and labor interests should co-operate in every way to assist the government in the trying ordeal through which they are now passing and unless all those interests do co-operate in a broad-minded, statesmanlike manner, I am afraid their efforts will not attain the success which all hope they will achieve. If it was possible to devise some means of putting about one-third of the cotton crop of the world away, it would mean the saving of the great Lancashire industry. This was a great order. It meant £60,000,000 or £70,000,000 or more, or the Government guaranteeing the trade, as it had successfully done others." These are some of the views of Sir Charles Macara, one of the best known men in Lancashire, who has supported the scheme for the establishment of cotton reserves and has cabled Col. Thompson in the States that he has been urging the British and American governments to take up the scheme. The stable price of 9 cents would do this, and the cotton of the whole world must be embraced in it. Manchester men say that from a financial point of view the Government may not assist and they also mention that no cotton reserve needs establishing as the cotton is in existence, and there is bound to be a surplus, or reserve, at the end of the season. The practical question seems to be whether it is desirable to have a share of it here in Lancashire, under English control, and whether it would be a dead-weight or a steadying influence upon prices as long as it lasted. There is also a doubt about Lancashire spinners paying 9 cents. There is a great fear, no doubt, of the consequences of heavy depreciation in stocks, but those who are not exposed to that danger will certainly clamour for cheap cotton and will resist the use of a big sum of government money to defeat their object. When the British and American Treasury representatives meet and have exchanged ideas no doubt they will make the way clearer.

The Depression in Lancashire.

Needless to say, cotton spinners and manufacturers are agreed that the time is fast approaching when there will be a very extensive closing of the cotton mills of Lancashire. It is agreed, too, that a main cause of the absence of new business is the belief, which is shared by buyers all over the world, that prices are now bolstered up and that a fall is inevitable. On one side there is a fear and on the other an expectation of depreciation. Everybody is waiting to see what will happen. Mr. Marsland, the secretary of the Operative Spinners' Association, points out that buying directly from the cotton growers in the Southern States of America should be engaged in. "Many of us," he says, "have been advocating it for years. A freer cotton market, free from the speculator, is what we need in Lancashire. The gamble has gone the wrong way and the operative must starve until it suits the purpose of these men to open the doors to unrestricted trade." It is generally agreed that one advantage about having cotton at a safe price would be that every mill and every shed would be able to go on making a little to stock and thus keep machinery running. At present some spinners, manufacturers and merchants had stocks made out of the dear material and, of course, the dropping of prices would materially affect them. owever, the fact of holding up a thing by artificial means will never help them out of difficulties. According to reports that reach me in Bury, 9,200 looms have been stopped in a week, and 24,100 are on short time, leaving 2,700 looms and 720 operatives in full work. The spinning trade is in a better position. At Ashton-under-Lyne half the looms are on short time, and a quarter of the remainder are idle. In Blackburn the number of looms is 87,389 and spindles 1,146,400, and during a normal week 37,952 workpeople are employed. Contracts are now being finished up, and it is not too much to say that by the beginning of November about half the looms may be stopped. What is wanted in Blackburn is cotton at bottom prices to keep the looms going. In Darwen, 14,00 0looms are idle, and the depression is becoming more and more serious, I am told. The outlook is not of the brightest. In Oldham there is also great depression. An official of the Bury cotton manufacturers association says that one of the worst features of the present position is that though cloth already manufactured and in the warehouses had all been sold and deliveries could not be effected. In many cases merchants had bought the cloth, but they had not paid for it and the explanation is that the stuff cannot be sent abroad in case it might not be paid for by the Continental buyer. He agreed that there should be a fixed price for cotton this year, in addition to a "spot" cotton market in Manchester. Of course, Lancashire mill owners have been suffering financially, owing to the Germans not being able to pay up and many the exportation proclamations have also debarred them from doing any business. India, which takes 40 per cent of the Lancashire business, is also not buying, whilst other countries are merely looking on. It is, therefore, feared that England may prepare for widespread unemployment in her staple industry.

Trade Notes

SIEMENS CO. AND WAR.

Extract from "Engineering" Sept. 18, 1914

The employees of Siemens Brothers Dynamo Works have responded with great enthusiasm to the call to arms. A large number of men from their works and offices at Stafford, amounting in all to about 400, have already joined the forces, and, together with the reservists and volunteers from their office, branch offices and other departments, the total amounts to over 520. The firm is arranging to keep the posts of all these men open, and ample provision is being made for all the dependents of those who have gone to serve.

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NEW MACHINE FOR SEAMING SELVAGE EDGE UNDERWEAR AND SWEATERS.

A large amount of ingenuity and energy has been expended in trying to make a perfect machine for seaming full fashioned underwear and sweaters. This operation has heretofore been attended with considerable difficulty for the reason that the material is extremely elastic, thus making it very difficult to seam the selvage edges of the garment together and have the fabric lie out flat after the garment is finished. More objection, perhaps, has been aimed at the puckering of the fabric during the operation of seaming than at any other one point. Another valid objection has been that at the finishing end of the seam the two pieces of fabric do not end evenly. This is perhaps largely due to the fact that the feeding device did not move the two pieces of fabric forward evenly. The trouble might also arise from the carelessness of the operator in holding one piece of material back more than the other. Another objection has been to the ridge formed by the seam.

All of these objections have been overcome in a new machine, Style 41200 B, manufactured by the Union Special Machine Company., of Chicago, which is manufactured in the shape of what is technically known as a cup feed machine, the outer cup of which is power operated and suspended from a point above the machine, leaving the necessary room in front of the machine for the handling of the material while it is being sewed.

This machine is the highest development of this particular type and is noted for its high speed. The design of the machine is excellent, the experts being able to avoid the numerous cams and gears usually found in this class of machines. The seam made upon the machine is perfectly flat and elastic and is made at a high rate of speed. We are quite sure that the sweater manufacturers in this country are going to be interested in a machine to do this work in the best possible manner.

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DEMAND FOR AUTOMATIC MACHINERY.

The September number of "Cotton Chats," issued by the Draper Company, of Hopedale, Mass., says: Wars and rumors of wars have for the past two months held the attention of the civilized world to the exclusion of everything else.

The scare headlines of the daily papers on other subjects as recent as the middle of July have faded from memory as completely as last year's rainbows. Everything is overshadowed by the seriousness of the European war and its far reaching consequences.

This country is fortunate in being geographically free from what might lead to complications involving United States in possible war, even against her wishes.

Meanwhile our nation with all other nations of the world must contribute either directly or indirectly towards the enormous expense resulting from the loss of life and property.

For the time being our industries are crippled; markets for our manufacturers and other products must be re-adjusted: credits are scrutinized and rates for money high.

As regards cotton manufacturing, our mills will be called upon to supply their legitimate home market with millions of dollars worth of fabrics which have until within a few months been imported.

The number of cotton spindles in use prior to this war in the large cotton manufacturing countries was divided about as follows:

Great Britain	55,300,000
United States	30,300,000
Germany	10,700,000
Russia	8,800,000
France	7,400,000
India	6,100,000
Austria	4,800,000
Italy	4,500,000
Spain	2,200,000
Japan	2,200,000
Switzerland	1,400,000
Belgium	1,400,000
All other Countries	5,400,000
Total	140,500,000

Of this number Great Britain, Germany, Russia, France, Austria and Belgium represent about 88,400,000.

Included a share of the spindles of Italy, Switzerland and other countries which are more or less affected, it will be seen that fully nine-fourteenths of the cotton fabric production of the world is for the present practically at a standstill. The market formerly supplied by these spindles must now be supplied by the balance of the world, as far as it is supplied at all.

Meantime hundreds of thousands of the most efficient men of the countries at war are being killed or crippled, so that the world's productive labor capacity is being seriously reduced.

The latest reports of the United States Census bureau show approximately 1,500,000 unnaturalized foreigners in this country owing allegiance largely to the countries at war. Many of these men will answer the call to arms of their native countries and never return.

It is a well known fact that there was a serious shortage of labor in the cotton mills of the United States during the prosperous times of 1906 and up to the panic of 1907.

There is every reason to believe that there will be a still greater shortage when the tide again turns and our manufactories are busy. To prepare for that condition the only logical course in case of the cotton mills is the continued introduction of automatic machinery.

* * * * *

A NEW MORRIS CRANE.

An interesting new standard overhead crane has been introduced to the Canadian market by the Herbert Morris Crane and Hoist Company, Limited. A description of this crane is embodied in bulletin B9 of which a copy has just reached us.

Instead of running on the top of a rail, as is usual in overhead traveling cranes, the type "S6" is designed to run on the lower flange of two parallel I beams. These may be existing roof beams, or special beams simply attached to the roof trusses. What will immediately strike every practical man is the reduction of first-cost made possible by the elimination of the usual brackets.

Another feature is that the stresses on the structure itself are very much simplified. Sometimes the wall of a building would carry the crane, crane runway and load vertically, but it is too weak to resist the over-turning effect of an ordinary crane carried on wall brackets.

Still another great advantage possessed by the type "S6" crane is to be found in its ability to connect up with a Morris Overhead Runway. The combination is a source of much time-economy as it eliminates many useless re-handlings of the load.

DOMINION LINENS LIMITED POSITION.

A prospectus issued by the Dominion Linens, Limited, of Guelph, Ont., in connection with an offering of the company's preferred stock, gives some interesting facts and figures regarding the company and its prospects. The company has an authorized capital of $300,000, of which $175,000 is 7 per cent cumulative preference participating shares. Of this amount $125,000 preferred and $125,000 common stock will be issued; $50,000 preferred is reserved for treasury purposes.

Of the common stock issued $20,000 will be deposited with a trustee as fully paid and non-assessable, to be sold with the preferred treasury shares.

The Balance Sheet.

The balance sheet as written at August 18, 1914, makes the following showing:—

ASSETS.

	Guelph.	Tillsonburg.	Together.
Real Estate	$10,000	$2,000	$12,000
Buildings	54,078	16,708	70,786
Do. additions	710	366	1,077
Machinery and equipment	90,085	21,767	111,852
Additions	3,314	1,144	4,459
Do. since app.	478	....	478
Cards & designs	5,979	....	5,979
Inventory	....	....	31,469
Accounts receivable	....	....	7,071
Cash on hand	....	....	529
Insurance unexpired	....	....	745
Appraisal expenses			866
Supplies			366
Goodwill, etc.			20,000
			$267,683

LIABILITIES.

Accounts payable	$3,545
	$264,138
Capital stock issued	250,000
Surplus over liabilities	250,000

Board of Directors.

The directors of the company are as follows:—Messrs. G. D. Forbes, Hespeler, president R. Forbes Company, Limited, manufacturers of worsted goods, etc.; R. Dodds, Guelph, Ont., president and managing director of Guelph Carpet Mills, Limited, Guelph Cotton Mills Company, Limited and Guelph Worsted Company; G. D. Perry, Toronto, vice-president the Toronto Carpet Manufacturing Company and manager Great Northwest Telegraph Company, Toronto; W. H. Bennett, M.D., Tillsonburg, Ont., president Tillsonburg Electric Car Company; D. M. Sanson, Toronto, vice-president William Neilson, Limited, member firm, Ferguson and Sanson, investment bankers; Alex. Simmers, Guelph, Ont., president board of trade, Guelph, and president and managing director Stewart Sheaf Loader Company; and J. B. Ferguson, Toronto, Ont., president Western Canada Securities Company, Limited.

SCROGGIES IN LIQUIDATION.

Following the placing of accountants on the books of W. H. Scroggie, Limited, Montreal, to ascertain the exact condition of the business, a winding up order was issued on November 3. John J. Robson was appointed provisional liquidator, acting for the time being in the capacity of trustee until some reorganization plan can be effected with the assistance of the larger creditors.

The petition was filed by Steward and MacDonald Export, Ltd., a creditor, on a promissory not for $354, date, Sept. 28. Allan S. Bain, manager of Steward and MacDonald Export, Ltd., filled an affidavit to the effect that the claims of his house against the alleged embarrassed business total $18,354, of which the protested note is a part.

W. H. Scroggie, Ltd., waived all delays by consenting to the petition. Liquidator Robson will continue the business and the Royal Bank of Canada was designated as a depository. No list of liabilities or assets have been filed, but the former are believed to be large. The company is said to have transacted a business during the last year of about $4,000,000.

The difficulties of the company are attributed in part to unexpected expenses incurred during the removal to new quarters, together with a largely over-stocked condition resulting from heavy buying on the part of the concern at the time war was declared, in the belief that there would be a scarcity of goods. It is also stated that there has not been entire harmony between the Scroggie interests and the American directors in the business. Wright & Kingan are the chartered accountants making an audit and it is understood that larger creditors have agreed not to take any definite action until the figures are available.

W. H. Scroggie, Ltd., which is an old established business, have an authorized capital of $2,000,000, of which it is understood $750,000 was paid in. W. H. Scroggie is president; L. W. Rosskopf, vice-president, and F. A. Scroggie, secretary-treasurer and managing director. W. K. Bigelow, president of Almy, Bigelow & Washburn, of Salem and Beverly, Mass., is a director of the company. Among the shareholders are J. Dives, of Dives, Pomeroy & Stewart, of Reading, Pa.; George G. Pomeroy; George S. Gay, of the Brown Thomson Co., Hartford, Conn.; W. B. Strong; William Crawford, and H. H. Proctor.

THE DEATH OF MR. PETER SCOTT.

The death of Mr. Peter Scott, one of the pioneers of the woollen industry in Canada occurred at the home of his son-in-law, Mr. Andrew Haydon, in Ottawa, on October 12th. He had been poorly for some time, and had taken suddenly ill at his daughter's home, where he was visiting early in the summer.

The late Peter Scott was one of the best known figures in the woollen industry in Eastern Ontario. Coming out from Scotland over forty years ago, he had been continuously engaged in woollen mills in that district until some half dozen years ago, holding responsible positions and helping greatly to build up the reputation for which the district is noted. Most of his life in Canada was spent in Lanark County. For many years he was Superintendent of the Caldwell Mills at Lanark and later of the Canada Woollen Mills at Carleton Place, settling in Ottawa a few years after the failure of that concern. He had gained an enviable reputation as a woollen manufacturer and in the various mills under his direction was always most popular and respected.

The late Mr. Scott was a typical, conscientious Scotchman. He always retained the broad Scotch dialect and the other mannerisms typical of his race. As an exponent of the "roarin' game" he had few betters, and throughout Eastern Ontario his rinks were always high up in the race for the honors. He was interested in other branches of sport, and took a keen interest in business and fraternal organizations in the towns in which he was engaged.

He is survived by a family of six girls and two boys, being Mrs. Andrew Haydon and Miss Christina Scott of Ottawa, Mrs. John Herron, Jr., Lanark, Ontario, and the Misses Agnes, Mary and Hazel at home, William, of Springfield, Mass., and Walter of Rochester, N.Y. Both sons are engaged in the woollen business.

MILL AND GENERAL TEXTILE NEWS

R. J. Reeves, of Providence, R. I., reports that he will start the erection of a mill with a capacity of 1200 spindles and 100 looms for the manufacture of towelling at Massueville, Que., the concern to be known as the Canadian Crash Company. The previous report that he would manufacture felt was incorrect.

A recent report from Colonel Pelletier, Agent General for Quebec in London, states that Belgium interests are negotiating with a view toward establishing a cotton spinning plant in Canada. Some time ago advertisements appeared in Canadian papers asking for a suitable site and several offers were received. The report says that an agent of the Belgium interests is about to visit Canada to look over these sites and the prospects.

Mr. C. W. Bates, of Bates and Innes, Limited, Carleton Place, Ont., has taken over, temporarily, the Hawthorne mill there. The plant is now in full operation manufacturing military blankets.

Stanfields, Limited, has decided to pass the dividend on the $500,000 common stock of the company for the present year. The dividend has been at the rate of 4 per cent., being paid quarterly.

Of a total of 1,552 stockholders registered on the books of the Dom. Textile Co., as of June 30, 1914, 173 were European, holding amounting to $536,-900 of a total outstanding stock of $6,925,975. On June 30, 1913, there were 1,104 stockholders, of which 159 were European, holdings amounting to $642,200. Number of women stockholders, June 30, 1914, 609, against 540 on June 30, 1913. Total number of stockholders, June 30, 1906, 455.

John H. Burgess, formerly overseer of twisting with the Hamilton Cotton Company, Hamilton, Ont., is now in charge of the cotton department with the Slingsby Manufacturing Company, of Brantford, Ont.

The Western Canada Cordage Company, Limited will commence work this fall on their new factory and office building in Manchester, a suburb of Calgary. It is estimated to cost $150,000.

Messrs. Joseph Simpsons Sons, Toronto are enlarging the plant and have installed five sets Plat Condenser Cards. T. Astbury, of New Bedford, Mass. is overseeing the installation.

The Regent Knitting Company, Montreal has latly installed three Harley-Kay Sleevers. This mill is now very busy on sweater coats for the Overseas Continent.

J. V. Jackson, formerly superintendent of the Moncton Branch, Dominion Textile Company, which is now closed, has given up mill work and is now farming in New Brunswick. Mr. Jackson is making a specialty of chicken raising which has been a hobby with him for years, and from reports is making a big success. The Moncton Mill is closed indifinately.

The Brantford, Ont., branch of the Niagara Silk Mills of North Tonowanda, N. Y. is now in operation. The building is three-storey, 165 feet by 52 feet, and has an excellent location. Silk underwear, gloves and hosiery is being manufactured.

J. W. Westaway, manufacturers agent, 28 Victoria Street, Montreal is now manager in charge of the Shawinigan Knitting Company, Shawinigan Falls, Que. and the Oxford Knitting Company., Woodstock, Ont.

W. H. Wyman, former manager of the Corticelli Silk Company is organizing a new silk company and it is probable that a factory will be erected in Kingston, Ont.

Bondholders of the Dominion Linen Mills, meeting at Guelph, Ont., last week agreed to a redemption of the company's bonds as follows:—25 per cent. within ten days, 25 per cent. on January 1st, and the balance of 5 per cent. on six months. The meeting reappointed a committee which has been acting for the bond holders to carry out the arrangement.

J. H. Prescott, formerly with the Kingston Hosiery Company, Kingston, Ont., is now boss knitter with the Chittenham Knitting Company, of Germantown, Pa.

Wm. Boyle, formerly with Boyd, Caldwell and Co., Appleton, Ont., is now in charge of the weave room in the Hawthorne Mill, Carleton Place, Ont.

CANADIAN TEXTILE JOURNAL

A Monthly Journal devoted to Textile Manufacturing with an up-to-date review of what is going on in the industry.

E. S. BATES, Editor

Published by The Industrial and Educational Press, Limited
Read Building, 45 St. Alexander St., Montreal. Phone Main 2662

Toronto Office, 44-46 Lombard Street. Phone Main 6764.

Published on the seventh of each month. Changes of advertisements should be in the publisher's hands ten days before that date. Cuts should be sent by mail, not by express. Readers are cordially invited to send to the Editor items of Textile news, also articles on subjects of practical interest. If suitable for publication these will be paid for at our regular rates.

Subscription: Canada, Great Britain and United States, $2.00; Elsewhere, $2.50, payable in advance.

Vol. XXXI MONTREAL, DECEMBER, 1914 No. 12

Our Trade with the West Indies

Trade relations between Canada and the West Indies have been brought very close during the past few years. The West Indies looks to Canada as its natural market and through the efforts of the two countries trade barriers have been cut to a minimum. There is a good field for Canadian manufacturers, more so now than ever, since German imports have been cut off. These amounted annually to about one million dollars and a good portion should now be captured by manufacturers and exporters in this country.

The annual imports of dry goods into the West Indies are valued at about six million dollars. Those imported direct from Germany and Austria are valued at about $60,000, but a good portion of the imports from Great Britain during the last few years have been German goods. Germany practically supplies the demand for cotton hosiery, underclothing (cotton and silk), millinery and haberdashery, while she has had a big share of the trade in dress goods, buttons, knitting wools, artificial silk scarfs and handkerchiefs, fancy tweed suitings, ribbons, laces and braids, dress trimmings, boot laces and specialties, either direct or through British commission houses. On the other hand our total exports of dry goods to the British West Indies have been very small, as pointed out in another column.

The present is an admirable opportunity for our manufacturers to extend their trade. Direct shipping arrangements are now in operation and the West Indian people are most favorably disposed toward our goods. Writing from Barbadoes, under date of October 29, Trade Commissioner E. H. C. Flood says, in part:—

"There is a feeling generally throughout the West Indies that their natural market is Canada, and that whenever it is possible to obtain goods that are suitable, Canadian firms should have a preference. This feeling may be observed with respect to Canadian tweeds. For some length of time tweeds of Canadian manufacture were imported and found easy sale and are still called for, but for some reason the supply has diminished, and inquiries have been received from time to time as to the reason why samples of these tweeds are not still shown the trade. Underwear of light wool and cotton mesh of Canadian manufacture are now stocked by some of the principal firms in Barbados. There is a large field open to Canadians in cotton prints, as there is an extensive sale for these goods. In every stock is found a large number of patterns of prints made in the United States. Of cotton dress goods, rattines of English manufacture are stocked and are in demand."

Except in the case of cordage we have no preference over other countries in so far as custom duties are concerned, but the means for direct communication and the disposition of the West Indian peoples toward Canadian products is much in our favor. Latin America offers a large field; what we have to do is adjust our business methods to suit Latin Americans and supply them with what they want. If the mountain won't come to Mahommed, then Mahommed must go to the mountain.

The New Sulphur Dyes

The new dyeing process, referred to in another column, which has been invented by two Huddersfield dyers who have been quietly experimenting at the Technical College there for some time, has attracted a good deal of attention from manufacturers and users of dyewares in Great Britain. From what information we have been able to gather the process is thoroughly practicable and will do much to relieve any scarcity of aniline dyes and, therefore, a situation such as exists at the present time. The new system is to utilize sulphur dyes for fabrics other than cotton. So far sulphur dyes have been used only in the cotton trade, and it has been regarded as impracticable to dye wool with them. The experiments that have been made, however, show not only that wool, silk, artificial silk, hemp and other fabrics can be dyed by means of sulphur dyes, but that these goods can be successfully treated either separately or in any form of combination. Furthermore, it is claimed for the process that these sulphur dyes can be used either for loose raw material, tops, yarns, or cloth in the piece. The cost is said to work out at considerably less than that entailed by the use of aniline or alizarine colors. Sulphur dyes are the cheapest on the market, and it is thought that a large supply is available owing to the depression which exists in the Lancashire cotton trade. Under the new process the milling properties of cloth will be increased, whereas the effect of aniline dyes is to injure those properties rather than otherwise. Wool, silk, artificial silk and hemp can be dyed together in one bath, thereby saving the cost of separate dyeing and the cost of dyeing by the present process.

The Embargo on United States Wools

Woollen manufacturers in Canada have a bit more to worry about at present than there appears to be any cause for. Not only are they exerting every possible effort to get out the equipment for the Oversea's Contingents and the British War Office, but they also have to scurry around for wool supplies, simply because the Government officials who have to do with the importation of wool into this country found evidences of foot and mouth disease among sheep in certain parts of the United States, and ordered a wholesale prohibition of imports of wool from that country.

The order that wools imported into the United States and re-exported to Canada without the original package being opened would be allowed entry has relieved the situation to some extent, but the prohibition of United States pulled wools places Canadian mills at a disadvantage, in view of the fact that suitable wools for the manufacture of army clothing are scarce and in much demand. Shipments from Great Britain are hard to get, and therefore uncertain, due to the demand over there, so that operations have been restricted to some extent.

Of course, it may be necessary to go to extreme measures to prevent the appearance of foot and mouth disease in this country, but we feel that the present embargo has been placed without due warning. The Government is interested in keeping our industries busy and the woollen trade is one of the few that can hope to be kept busy at this time. Such an order should have received the widest publicity and most thorough investigation before being put into effect, so that all possibility of tying up operations in the industry could have been forestalled. As it is, the order goes through. The mills are doing their best and will likely get the necessary raw material, but they are paying through the nose for it, and are finding difficulty in the matter of placing their tenders. All things can't be perfect, but subsequent difficulties can be minimized if properly considered.

Co-operation for Extension of German Commerce

Morgan Schuster, late financial adviser to the Shah of Persia, writing a few years ago on the possibilities of entending the trade of the United States with the West Indies, gave a number of instances showing the manner in which German commerce had become established in the islands. German business men have a strangle hold on the commerce of those parts and have succeeded in placing German goods much in evidence. One of the many illustrations of the methods used was the way in which German financial brokers and German banks located in the Islands worked in conjunction with German commerce. United States firms doing business with merchants in Domingo, or Cuba, or elsewhere, place their drafts, along with bills of lading and invoices, with these German brokers and banks for collection, in the absence of United States branch banks or brokers in those districts. These German houses made duplicate copies of the invoices which were delivered over to the German consul or to the Boards of Trade in Germany and thence into the hands of German firms capable of delivering the goods mentioned on the invoice. The names of the merchants and the prices paid for the goods, terms, etc., were therefore available. All the German manufacturer or commission house had to do was to offer slightly better terms or slightly better prices. That has been a common and effective method with German firms all over the world. It has worked well in Canada, as well as in the West Indies. It shows the co-operation between all Germans for the furtherance of German commerce. That spirit of co-operation should also exist between all Canadians if we can hope for the proper extension of our trade.

Delay in Payments on Government Contracts

We hear some complaints of delay in payment on goods manufactured for the First Oversea's Contingent. These goods were delivered before September 20th, but in many cases they are yet unpaid for, in spite of the fact that the mills tendered as low as possible and were put to much extra expense in turning out the contracts in so short a period. They made commendable sacrifices and this delay on the part of the Government is to be deplored. There was enough bungling in the placing of the contracts without having any now. Although large quantities of materials were required the manufacturers were treated like salesmen trying to put a patent medicine on the market. Instead of the contracts being placed direct, they were, in many cases, given to jobbers and wholesalers, having a good stand on the patronage list, who had to go to the mills for the material to fill the orders. In several cases mills that had submitted samples to the Government and were turned down secured the contracts from these middlemen on exactly the same sample and at exactly the same price as had been quoted the Government and, of course, the middleman lined his own pocket to good advantage. The delay has perhaps been caused, in some cases, by these wholesalers taking their thirty, sixty or ninety days, as the case may be, but they alone are not responsible. Goods received for the French Government on contracts given out two months ago are yet unpaid for. Ready money is what the mills most require just at present, and the distribution of real coin throughout the country is what will keep business going. Those in authority should see to it that the Government contracts are paid for promptly.

Made-in-Canada

There is no mistaking the fact that the Made-in-Canada campaign is bringing good results to the textile mills in Canada and it is surprising what a little education along this line has done. Heretofore very few manufacturers in this country realized the necessity. They acknowledged the fact that "imported" was a good selling term, but did not stop to think the reason why until it was pushed under their nose. Importers, backed up by the firms they represented, have worked for years, and worked hard, to bring their products before the public and keep them there. They worked on the retailer and through him on the consumer and in the case of textiles, especially, their efforts have met with much success. The word "imported" tacked on a piece of cloth has done more to give Canadian-made cloth a black-eye in the mind of the Canadian public during the past decade and a half than all the quality arguments, all the selling terms and other inducements that have been offered. It is to be hoped that the mills will keep up the good work. Made-in-Canada is a slogan, of which every Canadian can well be proud. The quality is there, all it takes is a little education and intelligent advertising.

Editorial Briefs

Rumor has it that more orders for underwear, sweaters, hosiery, mitts and other lines of knit goods for the Allied armies are about to be distributed, through the Dominion Government, and the purchasing agent for the British Government, Mr. Fred Stobart. The sweaters, hosiery and blanket mills are very busy just at present on the orders given out a month ago, but underwear mills are beginning to slacken up. There has been a fair repeat business on winter lines, in the ordinary course of trade this past few weeks, but business in this way is not nearly enough to keep the mills busy so that further Government contracts will be welcomed. The demand for blankets and socks is most pressing just at the moment, and all available supplies are being eargerly taken up.

The combination of the shirt manufacturers in this country formed to secure a more even distribution of the army contracts has elicited some adverse comment and, perhaps, has been rather hard on a few of the smaller concerns who did not get in, but it appears to have been most effective. There has surely been less delay and less politics in the granting of the contracts and the co-operation evinced in making for much more efficiency in the manufacture and delivery of the goods. Perhaps some of the textile manufacturers who have opposed the formation of a textile association or did not recognize its value are now more favorably disposed toward such an organization.

Canadian manufacturers do not appear to be in any hurry to take up the German patents held in this country, all of which are now subject to suspension. Only a half-dozen or so applications have been received to date. There may not be many of the patents suitable for use by Canadian firms, but in the case of textile machinery alone there should be a good opportunity. We are hopelessly behind in the manufacture of such machinery, that is in regard to quantity. There are a good many machines and improvements of German make widely used in Canada and this trade might easily be taken up by domestic firms. This is no time for the standing-still process. Made-in-Canada means go ahead.

Textile manufacturers throughout Canada have been most liberal in their appropriations to the Patriotic and Belgian Relief Funds, the equipping of Canada's Overseas Contingents, and other worthy causes, in both money and materials. A number of them have enrolled for active service, while the response from among the employees has been most encouraging.

Business Economics

PARTNERSHIPS AND STOCK COMPANIES.

Fifth of a Series of Articles Dealing With the Economics of Modern Business and Commercial Enterprise.

By PROFESSOR W. W. SWANSON.

The question of business control is one of the most important features of modern industry.

There are a number of methods under which business control may be vested in different authorities. But, fundamentally, the form which ownership assumes is not so important as the organization which owners determine to adopt in their particular industry. Ownership may be vested in an individual, a partnership or a corporation of stockholders; but whatever form it assumes, it is the organization that makes for business success. The essential fact in ownership is that it constitutes the head of all business organization. Subardinate to this authority, however it may be vested, are ranged the three great departments of production, distribution and accounting.

Such an organization is characteristic of every business, whatever the figures of the yearly volume of trade. The corner grocer may perform all the functions of the great department store. He produces when he buys his goods from the wholesaler and prepares them for his shelves. He performs the functions of the sales department when he writes a price card for his window or when he hands his goods over the counter to his customers. He becomes the accounting division when he goes to his desk and makes an entry of the sales in his cash book. All these are productive processes of course, but at the same time so important for purposes of business organization that they should be considered separately.

We may place these simple, but important, facts in tabular form, as follows:—

I.—Control through ownership by the
 1. Individual.
 2. Partnership.
 3. Corporation.

II.—Production by
 1. Original production.
 2. Manufacturing.
 3. Purchase from other producers.

III.—Accounting Division.
 Includes all records and systems for conducting the business.

IV.—Selling.
 Direct and indirect methods of bringing product to public notice and placing it in the hands of the consumer.

How a Partnership is Formed.

In a partnership two or more individuals assume the powers of ownership by means of a legal agreement. This agreement should be of the most exact, detailed and binding character. Only so can misunderstandings and difficulties be avoided. The legal partnership involves, in reality, the control of ownership in itself, as the members of the firm are bound to carry out its provisions. The agreement defies the share that each member of the firm shall have in the conduct of the business, his duties, and also the extent to which he shall have control of business policy. It determines the division of business profits; the proportion in which assessments shall be made for losses that may occur; and the methods under which the business shall be conducted. The agreement may also provide for a receivership, or sale of the respective interests, in case of vital disagreement among the partners. It is frequently the case that some member of the firm is a ''silent' partner, known to the world under the title ''and company.'' The common methods of business control through a partnership are as follows:—

Method I.—Firm of Smith, Jones and Brown.
 A. Smith, manager of production division.
 B. Jones, manager office division.
 C. Brown, manager selling division.

Method II.—In this partnership agreement, two members of the firm are not actively engaged in the business. By general agreement, the third member is placed in entire charge, with authority to appoint assistants at the head of the three branches of the work.
 A. Brown, general manager.
 B. Production manager.
 C. Office manager.
 D. Sales Manager.

Method III.—In this partnership scheme, one or more silent partners are represented by the word ''Company.' The members of the firm exercise general appointing power and oversight, while delegating everyday control to their chosen managers.
 O. Smith, Jones and Company by partnership agreement compose the
 B. Executive committee, which appoints
 C. Production, office, and sales managers.

Owing to the very great advantage of the corporate form of enterprise, however, such a form of ownership is best adapted to meet modern business conditions. Among the many advantages of the corporate form of enterprise are the following:

1.—Limited liability.
2.—Large-scale production facilitated.
3.—New investments promoted.
4.—Stock system divides risks of ownership and risks from investment of capital.
5.—Those unfitted to control their own capital may place it under the corporate system in the hands of men of great ability.
6.—The corporation can sue, and be sued, in its own name.
7.—The life of a corporation does not depend upon the life of the individual who owns an interest in it.

In a corporate organization, ownership is invested in stockholders of record. The stockholders are bound to meet the conditions of the stock subscription list, the articles of incorporation, and the constitution and by-laws. These documents provide for the election of a board of directors, an executive committee and various officials to whom the administration of business is delegated by vote of the stockholders.

Formation of an Incorporated Stock Company.

The formation of an incorporated stock company is somewhat complex and the practice varies with the different provinces. In some cases the Dominion Parliament alone has the right to grant a charter, notably in the case of banks, trust companies, and insurance companies, railway companies, and insurance corporations can be chartered by parliament alone, whether aplication is made for provincial or federal charters.

All other corporations come under the provisions of the Companies Act, whether provincial or federal charters are desired. In these cases, the charter is granted by the Secretary, when the necessary conditions of the Act are met.

The general plan of company formation is based upon a stock subscription list to which those who wish to become stockholders attach their signature, specifying the number of shares to which they subscribe.

Heading this subscription list is form agreement stating the purposes of the organization, its name, the amount of capital stock, and the par value of each share. After the required amount of capital has been subscribed a stockholders' meeting is held, at which a constitution and by-laws are adopted. The directors are also elected, and these subsequently choose the executive officers. The amounts subscribed having been paid in, in whole or in part, the provincial charter of incorporation may then be obtained and the company may commence business.

The board of directors may arrange the further details of organization as it sees fit. It frequently transfers its authority largely to the president, who may become the general manager. Any director, however, or any outside individual may be appointed by the directors as general manager, and given full authority, subject to the board. The board may elect an executive committee to which its authority is delegated. In some cases another committe is chosen in an advisory capacity, at the head of which stands the general manager. This advisory committee may be made up of the general manager, the treasurer, the legal adviser, and in many instances some officer of the bank, which conducts its financial work. We have, then, the following simple form of corporate organization:

1. The Stockholders, bound by articles of incorporation, constitution and by-laws.
2. Board of Directors.
3. Executive Committee.
4. President.
5. General manager (appointed or elected).
6. Office manager, or business manager.
7.—Production manager, or superintendent.
8. Sales manager.

This is, of course, the simplest outline of corporate management and administration. The forms become more complex and intricate as we pass from the small joint-stock company to the big merger or combine, such as the Canada Cement Corporation or the vast organization known as the United States Steel Corporation.

Ontario Workman's Compensation Act

An Impartial Analysis.

By N. A. KEYS, B.A.

It bears no small testimony to the interest which this subject has evoked, and is evoking, that you, tired after your day's work in the shop, are willing to be here in such large numbers to participate in a discussion of the new Ontario Workmen's Compensation Act. This Act is probably the most important legislation which the Ontario Government has ever enacted. The subject of workmen's compensation is an unusually difficult one involving as it does, social, economic, legal and actuarial technicalities. One who has given the subject much study, therefore, is very apt to lose sight of the forest in the examination of the trees. I must ask your indulgence if I should infringe in this respect.

Workmen's compensation may be defined as the method of paying insurance to workmen for accidents which occur to them in the course of their industrial employment. In dealing with the subject it will be my endeavor, first, to review briefly the present law, secondly to explain the essential features of the new Workmen's Compensation Act, particularly those which are of significance to you, thirdly to deal briefly with the question of accident prevention, a question which is just as important, if not more so, than the compensation of workmen itself.

Damages Under the Old Law.

At common law a workman is only entitled to receive damages from his employer if he can prove that the later was negligent. In the course of time the employer became possessed of three defences which cut down very materially the workman's chances of securing a verdict. The first of these was that of contributory negligence; a second defence was that of common employment. The employer, if he could prove that Tom Jones had been injured through John Brown, a fellow servant, was entitled to receive a verdict in his favor. A third defence which is very vague of definition, and left open the door very wide for a clever lawyer, was that of inherent risk. In this defence the employer put in the plea that the accident was due entirely to an inherent risk in his industry, a risk of which the workman was aware when he entered the employer's employ. Well, under this state of the law the workman, as you can readily see, would recover damages in very few cases. I think the actual percentage of cases in which a workman did receive a verdict in his favor was about sixteen per cent.

The large growth of the population in recent years, the rapid march of invention and the vast organization of industry has rendered some more equitable method of compensating workmen imperative.

This former system of compensating workmen was enormously wasteful. Statistics show that of every dollar the workman paid in insurance only 25 cents ultimately reached the pocket of the injured workman. About thirty cents of this would be absorbed by insurance agents, another 20 cents would be used up by the insurance company in overhead expenses and the other 25 cents would be eaten up in meeting the fees of lawyers. The problem of workmen's compensation then was to substitute for this wasteful and inefficient method of indemnifying workmen an economic and efficient method which would ensure every workman who received injury in the course of his employment without his negligence, receiving a fair and adequate compensation.

Settling Claims Under German Law.

In most countries the problem was approached by way of removing one by one the common law defences of employers. This method of attacking the problem, however, was only partially successful. The insurance agent and the legal adviser continued to play the game as before and just as extravagantly. While more verdicts were recovered than formerly, a large proportion of industrial accidents still remained uncompensated. In one country only, that of Germany, was the problem dealt with in a thoroughly scientific way.

(Address delivered before a meeting of the managers and foremen of the Canadian General Electric Co., at Oshawa, Ont.)

The Germans, as you know, are the most scientific people in the world. Well, in that country they decided to eliminate the insurance agent and the legal adviser. Accident claims were automatically paid out of funds to which workmen, employers and the State contributed. These funds are controlled by the State. Claims are settled by arbitration boards of employers, workmen and Government appointees. Such a system has one great advantage which is entirely lacking in all other systems—it enables the payment of compensation on a periodical, instead of a lump sum, basis. In other words, it introduces the pension system. Now there are workmen who would rather receive $1,500 at once than $3,000 say, spread over ten years, on the principle, I suppose, that a bird in the hand is worth two in the bush. But this principle so far as compensation is concerned is a dangerous one, for the reason that few of us know how to look after our own money—most of us are far more competent to deal with and look after the money of other people. Hence when a workman receives an accident award of $1,500, he finds himself grown extremely popular over night. Numerous friends suggest numerous ways in which they can duplicate and triplicate his capital in a marvellously short time. The inevitable result, of course, is that the money which is meant to furnish relief is lost either in speculation or dissipated in a blow-out in a very short period and the workman is then in want.

Under the pension system a workman only handles his monthly or weekly pension as the case may be, and rash investment or dissipation is rendered impossible.

In Ontario, the German system above briefly outlined was to a certain extent followed drafting the Act.

Divisions of Employers.

In turning to an examination of the Ontario Workmen's Compensation Act, I am reminded of the story of the Scotchman who drank a queer mixture every night before going to bed. This mixture consisted of whiskey and beer in equal proportions. When asked by an inquisitive friend why he did this he said: "Whenever I drink whiskey alone I get drunk without getting full; whenever I drink beer I get full without getting drunk, and as I wish to get drunk and full both at the same time I mix my drinks." Well, my case is the reverse of that of the Scotchman in this story. The Act has some very fine whiskey in it and a large amount of very weak beer. I shall endeavor to extract the whiskey. The Act proposes to deal with three large divisions of employers in three different ways: Employers coming in division (1) which, roughly speaking, applies to all manufacturing industries, are compelled to insure their employees in a provincial insurance fund. Accident claims are submitted to, and decided by, a provincial insurance Board.

Division number 2, is applicable to certain corporations such as railways, telephone companies, telegraph companies and certain classes of navigation. Such employers insure their own workmen but the claims are passed upon by the aforesaid Board.

Division number 3 is a residuary division applicable to all employers such as farmers, professional men, etc., who do not come under the first two divisions. Employers in this division remain liable to a common law action by their injured workmen with their defences removed.

We are concerned with division number 1. All the larger manufacturers of the country are to be grouped into classes, assessed premiums and subjected to the supervision of a provincial insurance Board for workmen's compensation purposes. This Board is to consist of three members or Commsisioners who will be quartered in the Parliament Buildings in the Queen's Park at Toronto. This Board will assess, levy and collect premiums from individual employers according to the class and hazard of their industry. With the premiums which they collect an accident fund will be formed out of which all workmen in the insured industries will be automatically compensated.

Who are workmen under the Act? Every person engaged in industrial employment and subject to the hazards of the industry is deemed a workman. Two large classes of employees only are excepted, namely, casuals, or those who do piecework in their own homes and such of the clerical staff who are not ordinarily subject to the dangers of the industry.

What injuries are compensated? All injuries by accidents arising out of and in the course of the workman's employment are to be compensated, provided that they last for seven days. If an injury last for less than seven days no compensation will be given to the workman. If it lasts for more than seven days the compensation reverts back to the time of the occurrence of the accident, that is, it is paid from the first day.

Who are dependents under the Act? The following are dependents—wife, husband, father, mother, grandfather, grandmother, stepfather, stepmother, son, daughter, grandson, grand-daughter, stepson, stepdaughter, brother, sister, half-brother, half-sister and those who stood in relation of parent to the injured workman or to whom the injured workman stood in relation of parent.

You see that the Act is very broad and far-reaching, covering practically all workmen, extending to all industrial accidents and making provision for all dependents.

The Schedule of Benefits.

We come now to the schedule of benefits, or scale of compensation to which a workman or his dependents is entitled in case of an industrial accident. I shall first deal with the death benefits. If a workman is killed while engaged in industrial employment his dependents are to receive expenses of his burial up to $75. His widow will receive a pension of $20 per month for life, or $240 a year. His widow, if there are children, will receive in addition $5 per month for each child up to a maximum of $20 so that the total compensation received by a widow with four or more children will be $40 per month or $480 per year. If the children are rendered orphans by the accident they will receive $10 each per month as a pension, but not more than a maximum of $40 per month. If the workman at the time of his death was under 21 years of age his parents, if dependent on him, are entitled to receive compensation of $20 per month until such time as the deceased workman would have attained the age of 21 years. If there are other dependents they shall receive compensation not more than $40 per month only so long as their dependency would have endured. If a widow in receopt of a pension should marry she would cease to be a beneficiary on the pension fund, but would receive a marriage settlement of two years' pensions, or $480. Children cease to obtain pensions when they attain the age of sixteen years.

It may be of interest to note just what amounts this pension will reach in certain periods of time. A pension to a widow of $20 per month would in ten years reach the total sum of $2,400, in twenty years $4,800, in thirty years $7,200, in forty years $9,600 and in fifty years the large amount of $12,000. In Washington for a smaller scale of benefits than in Ontario they have estimated that the average maximum will be $4,000. The average in this province, therefore, would be somewhat higher. These then are the death benefits.

Permanent or Partial Disability.

Let us now examine the benefits which a workman who is seriously injured will receive. These benefits depend on the amount of the earnings. If a workman receive what is known as a permanent total disability, as for instance, the loss of both legs, he would receive a pension equivalent to 55 per cent. of his annual earnings of the rest of his life, but his earnings must not be calculated on a larger sum than $2,000. A workman meeting with a permanent partial disability, such as the loss of a hand, is to receive a pension equal to 55 per cent of the impairment of his earnings capacity. In other words, if a workman earning $20 per week loses his hand and upon returning to work finds that he can only earn $10 per week he would be entitled to a pension corresponding to 55 per cent of the impairment, that is $5.50 per week. Temporary total disability, such as a sprained back, is also compensated on 55 per cent of the impairment basis. Accidents which result in temporary partial disability, shall receive no compensation unless the impairment is more than 10 per cent of the earning capacity.

What exactly does a serious injury to a workman mean to the employer, or rather group of employers? If the workman should be in receipt of a salary of $2,000 or more and met with a total disability accident he would receive as a pension $1,100 a year. Total pensions would accumulate in ten years to $11,000, twenty years $22,000, thirty years $33,000, forty years $44,000 and fifty years $55,000.

Methods of Procedure.

Another feature of the Act which is of considerable importance to you is the procedure to which you have to conform when an accident has occurred in your shop. A return has to be made by the employer of the accident, notifying the Board by registered post of the accident. This report should contain the following information: First, the nature of the accident; second, the time of its occurrence; third, the name and address of the workman; fourth, the place where the accident happened, and fifth, the name and address of the physician or surgeon (if any) by whom the workman was or is attended. The responsibility of submitting these returns will very largely devolve upon you as representing your employer. The penalty for failure to observe this regulation is $50.

Prevention of Accidents.

We come now to the third and last branch of our subject, namely, that of accident prevention. In former times when employer, workman and apprentice worked side by side in the same little shop it was possible for an employer to exercise such minute and careful supervision over his fellow-workmen that accidents were few and far between. Such as did occur were attended to as a rule by the employer himself. Under modern conditions where organization and centralization are ever on the increase, an intimate relationship between employer and employee is impossible. This in itself is perhaps unfortunate. Employers, however, still have that wide and humanitarian interest in their workmen which makes them feel acutely any misfortune which befalls one of their employees, even though that employee be not personally known to him. You as foremen now take the place and act in the stead of the employer. It is you who are, and will be made responsible for the number of accidents which occur in your part of the shop.

The "Safety First" Movement.

Of late we have been hearing a good deal of the "Safety First" movement. Of this movement you are going to hear more and more from now on. It is one of the healthiest movements of the times. The annual accident roll of industries when examined in statisties is simply appalling. In the United States of America, which has a population roughly speaking of some 100,000,000 inhabitants, there are every year 35,000 persons killed in industries, or one person every fifteen minutes. There are also 2,000,000 injured, or one person every sixteen seconds. No further comment is required to show the tremendous need for preventing these accidents—and they can be prevented. Certain firms who have specialized in accident prevention have cut their accident rate in half in one, two and three years. And this has been done not by the employer alone. True, he furnishes the safeguards and printed danger notices, but the real work is done by the workman and foreman. The unthinking person is only too apt to believe that accidents are all due to the hazard of the industry. This is not so. German statistics, and I may say these statistics are compiled by employers, workmen and arbitrators in collaboration, prove that only 43 per cent of all industrial accidents are due to the hazard of the industry; 29 2-3 per cent are the result of carelessness on the part of the workman; 18 1-3 per cent are due to the employer's fault, and the remaining 10 per cent are caused by workman and employer together. From these figures you can deduce the possibilities of checking the accident rate.

You, holding positions of responsibility in one of the largest plants in this country have a splendid opportunity of doing a humane work. By exercising that personal control over your men which was formerly exercised by the employer himself, by never failing to instill in your men the "safety first" habit, by constantly pointing out the foolishness of taking chances—a habit which is only too strongly embedded in our national life—you have indeed a rare opportunity of showing an example not only to plants similar to yours, but to the other plants of this province.

U. S. COTTON GINNING REPORT.

The cotton ginning report issued by the United States Government on November 21, the fifth of the season, showed that 11,624,708 bales of cotton, counting round bales as half bales, of the growth of 1914, has been ginned prior to November 14. This compared with 10,444,529 bales or 74.7 per cent of the entire crop, ginned prior to November 14 last year. Included in the ginnings were 32,454 round bales compared with 74,167 last year. Sea Island cotton included 53,875 bales, compared with 51,950 bales last year.

The next ginning report of the census bureau will be issued Tuesday, December 8, and will show the quantity of cotton ginned prior to November 30.

In a recent article R. E. Simpson, of the Travelers' Insurance Company, estimates that 25 per cent of all industrial accidents in the United States are due to inadequate or poor lighting.

The Textile Arts Among the Indians of Latin America

By JANET M. CUMMINGS.

(Concluded from Last Issue.)

Photograph 6 shows an Ecuadorian woman spinning white wool. Her tripod of sticks holds the wool to be used, which has been straightened out a little in lieu of carding, and is piled in a heap. A small portion of this she puts on top of the tripod, which is thus used as a distaff. Her spindle is of metal, with the round weight near the end; this is the commonest form.

It is astonishing with what skill these Indians handle the spindle. When the distaff is fitted up, a few filaments are drawn out, and these are gradually twisted into an even thread without detaching them from the distaff. When a sufficient length of thread is twisted it is attached to the spindle, which is revolved with astonishing speed and dexterity. As it

6. Ecuadorian Woman Spinning White Wool.

spins, it assists in evenly twisting the gradually drawn out thread. As the length of thread increases, the twisted yarn is wound upon the spindle from time to time, until it is conveniently fully. In this photograph the woman is just at the point of winding the thread upon the spindle.

In some instances a different procedure from either of those previously described is used to prepare the wool for spinning. After carding, in which process the fibres are made to lie in the same general direction, the wool is worked into a finished piece of uniform thickness, and forming a strip about four inches wide and seven inches in length. These strips are then lengthened and twisted together as they are wound upon a distaff. After much manipulation, and many unwinds and rewinds, the result is a fluffy piece of cord.

Photograph 7 shows this clearly. From the basket to the girl's hand we can plainly see the fluffy strip of wool, which is comparatively easily spun into a finer thread, in the way already described.

Sometimes when the wool has been worked into this strip form it is dyed. Photograph 8 shows a number of these strips hanging on a framework to dry after having been dyed.

After the spinning process the loom is constructed, and the warp is wound. Most of the looms now in use have not advanced at all since ancient times, yet

7. A Mexican Girl Spinning.

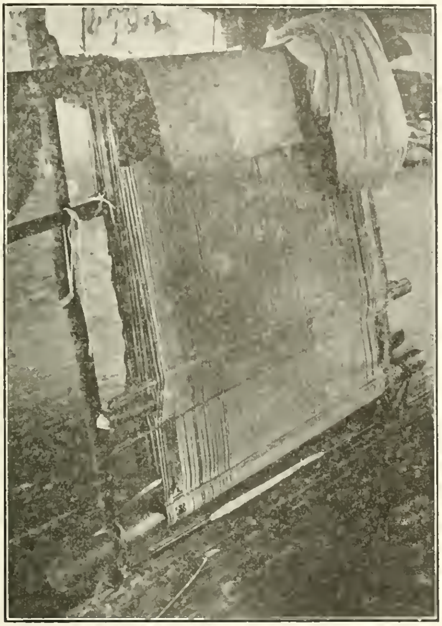
the most exquisite fabrics and elaborate designs are woven on them.

Photograph 9 shows the type of loom frequently used. Two small poles are cut. These are laid upon the ground and to these two, other longer poles are tied, forming a rectangular space. The warp-strand is next strung from pole to pole across the rectangular space, until enough has been strung for the width of the fabric that is to be woven. In this particular loom the length of warp desired was longer than could be conveniently handled, so that the upper end-pole holding the warp is not at the top, but has been thrown over another pole and has come about a third

8. Strips of Wool Hanging in a Framework to dry—Peru.

way down the back, where it can be seen lashed firmly to the uprights. This loom was not in use at the time it was photographed. The cloth and piece of bark thrown over the top are generally used to cover the loom so as to protect its partially woven fabric from injury.

As most of the fabrics woven are a combination of designs, there is frequently very little use for the shuttle. For determining the length of the different figures in the more simple designs, a cord is sometimes tied across the warp, and marks the warp-strands to be



9. An Old Peruvian Loom.

included. Very often from five to ten threads will be built up on one side before the other is worked, so that one may readily see that a uniform length on both sides is not always easy to obtain. The photograph also show this, where at the bottom on each side a narrow strip of design has been worked, with the cord connecting the tops of the woven portions.

Very often, instead of bracing up the loom and standing or sitting by it, the women hold it as they weave. This is shown in photograph 10. In this case, after the warp is wound, the upper pole is tied with rope to a tre or other immovable object, at about four feet from the ground. The pole at the other end is secured around the worker's waist by a stout leather thong, and the weight of her body leaning backwards holds the warp-strands at sufficient tension. In this particular case only a simple design is being woven, as can be seen by the finished cloth she has rolled from time to time upon the lower pole. As the design is so simple, consisting of nothing but the insertion of different colored warp threads when the warp was wound, she weaves by merely throwing the shuttle from side to side between the sheds, and beating down the woof with a smooth flat stick. It is astonishing with what speed the shuttle can be thrown through the shed and caught in the other hand. Quite frequently the sheds are separated merely by the same flat stock used to press down the woof, which is turned edgewise to make sufficient space for the passage of the shuttle-the other set of warp-strands of course have to be raised one by one with the fingers—a laborious process, even when one is very expert. Some weavers use a headle-rod for raising the lower set of threads.

In the present instance, however, this loom is fitted with two headle-rods, one attached to each set of warp-strands, so that by raising the headle-rods alternately the shuttle can be thrown through both ways. You may think it would need three hands at least to perform this operation successfully. Not so, for the entire loom is sustained by the woman merely leaning back upon the leather strap around her waist. Then whichever hand has the shuttle, the other is left free to raise the proper headle-rod. After the shuttle is thrown, there is plenty of time to drop the headle-rod and catch the shuttle—if you do it quickly enough.

Of recent years the encroachments of civilization upon the primitive peoples of Latin America has been gradually forcing them to adopt more modern methods in their arts. If we care nothing for primitive work; if we prefer fabrics of mathematical design rather than the human elements—the real life-story of the individual appearing in his work—why, the sooner modern methods are adopted the better.

Let us hope fervently that such a day may never dawn, for in the fabrics of the Latin American Indians and in those of the descendants of the Incas in particular, is woven the history and romance of a race whose skill in the textile arts, and whose culture, uncivilized and primitive as it was, is a miracle to look back upon.

Because the silk grown in Burma is coarse and inferior, Chinese silk is imported. The handsome damask skirts of tameins worn by the women are woven

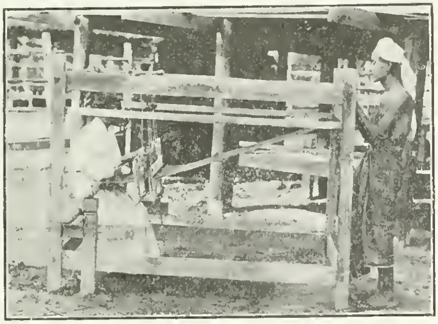
10. A Mexican Woman Weaving a Blanket on Hand

on hand looms and these looms may be seen outside almost every house in the country. The damask effect is obtained by the use of a multitude of smal shuttles; some times a hundred or more are used on a piece of cloth only a few inches square.

The best work is done by the Manipurians, but their earnings are very meagre. A woman who works all day every day can rarely earn more than four rupees a month. Because of the intricate designs that prevail only a hands-breadth of silk can be woven in a week. In spite of this they live neatly and cleanly and are a happy people, carying on their industry under pleasant conditions.

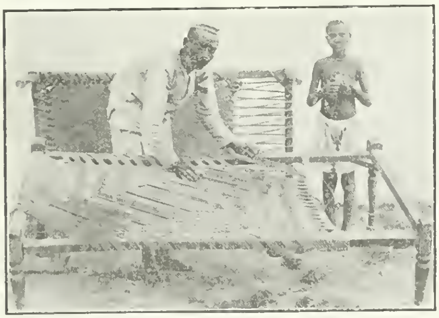
Weaving Matting in India.

Matting has many uses in India among which are floor coverings and bottoms of bedsteads. The native shown here is making one of the latter. A com-



Primitive Burmese Loom in Operation.

pleted bed stands behind him. Instead of placing the strands of his material across the frame and weaving back and forth through them as we would expect, the method employed here is entirely different. The only strands he places before the weaving begins are those that form the cross-piece at the right hand end of the bed. He then stretches his fibre from the nearer (right hand) corner to the further (left hand) cor-



Weaving Matting in India.

ner and back, and then starts his design immediately by drawing the fibre under and over the two strands thus formed. He pulls the strands tight as he works, and builds them up from one corner diagonally across to the other, around the wooden frame, over and under the fibre in place then around the frame and back to the first corner. He has worked along the sides of the frame and has nearly reached the opposite corner from which he started. When he has done this the weaving is complete. All that there remains to be done is to wind rope from the loose end of the matting to the bed so that the slack can be pulled up. This type of bed is very cool to sleep on.

Plain Loom Weaving Faults and Remedies

Banking-off, Breakdowns, etc., and How to Prevent ItI.

By PRACTICAL MANAGERS

(Continued from last issue)

Boat shaped shuttles, that is, shuttles worn distinctly round at the bottom, will crack in the box, notably at the off-side of the loom, and result in the loom banging-off. The loom overlooker can quickly detect any such faulty shuttles by testing the bottom of the shuttle with a steel ruler. It must be specially remembered that both shuttles used at a loom must be trued up in case one of them is boat-shaped, as while the remedying of boat shaped shuttles will not alter the clearance of the stop rod blade, the truing up of one shuttle only would prevent both shuttles having the same height as regards the shuttle tip and the hole in the picker. Therefore, the depth and width of one shuttle must be equal to the other shuttle used at the same loom if good working is to follow. Rebounding can result by allowing the loom to work with the box plates a trifle loose. Insufficient lift of the stop rod blade will be caused if the slay sword or rocking rail have worked slightly loose, as the shaking of the stop rod may cause occasional banging-off.

Weavers themselves can reduce the amount of banging-off by giving the loom a fair chance to re-start after being stopped for any cause. Some thoughtless weavers even expect the loom to start up, without banging-off, by having the crank on the top centre, and even with the reed near to the fell of the cloth when the loom belt is being placed on the fast pulley. The stop rod blade will be deprived of some of its lift if the swell pin brackets are loose, even when the shuttle is full up in the box. Neither will the frog be sufficiently cleared if the stop rod brackets are loose, as when the loom is in motion the stop rod will vibrate or dance. The various makers of looms do not all adopt the same bevel of the reed in relation to the race, but in any case, the bevel of the shuttle back must be the same as the reed bevel and shuttle box bevel. It may be mentioned that the bevel is generally about 88 deg.

Some overlookers have at some time or other been somewhat baffled as to the reason why banging off has occurred when a new stop rod, or a new frog, or when both these parts have been just placed in position on the loom. A little thought will make it clear that those two new parts must of necessity engage earlier than previously, when the stop rod blade is not raised sufficiently, and as there will be greater shuttle room, or distance from the cloth fell to the reed at the time when the blade engages with the frog, the pick will probably not be smart enough to eject the shuttle from one box to the other before the blade and frog have engaged. It will be obvious that banging-off will then occur, as also when the connecting rod from frog to brake is not long enough. It is easy to ascertain whether there is sufficient shuttle room by turning the loom over, with the shuttle in the shed; the loom ought to bang-off when the sheds are not very tight on the shuttle.

This adjustment is, of course, very essential when a new frog, or a new stop rod is being fitted to the loom. A frog should be allowed that freedom to ensure it being worked backward and forward, a tilting frog must be avoided. The frog must be allowed sufficient forward movement nearer the front of the loom so that when the loom bangs off the back brake will be acting propertly. The backward movement of the frog, caused by the T bolt fitted in the starting handle making contact with the frog as the handle is pushed into its retaining notch, must be adequate to remove the back brake from the brake wheel. Hence, to assist in properly reducing the concussion, due to banging-off, the bolt must not be excessively tightened when securing the frog to its companion part of the loom frame. The important point to remember is, that the moving of the frog relative to the loom frame must be backwards and forwards only. If a frog is too loosely fitted to the frame, the former will naturally tilt and such a frog will easily cause banging-off. A loose frog, the outside of which is the heaviest (owing to the projection which comes into contact with the starting handle T bolt being solid), tilts in the direction of the outside of the loom. Therefore, while one side of the frog drops as far as permissible, the inside portion or dove-tailed lip part, of the frog will be higher, thus preventing the stop rod blade having sufficient clearance; especially noting that the vibration of the loom increases the danger of a loose frog. Stop rod blades, when case hardened, enables them to wear much longer before the front edge of the blade is worn round.

Many "traps" or the shuttle being caught in the shed and large quantities of warp yarn broken owing to the stop rod blade having jumped over the frog, have been caused by the dove-tailed lip of the frog, or the extreme edge of the stop rod blade having worn round. Apropos of traps, the cause has often been the swell spring having broken, or the spring being too slack or too weak. The adjusting of the picking bowl too low is dictinctly dangerous, there being several other adjustments that can be made to increase the power of the pick, as the shuttle will probably be slightly lifted when passing from box to box; hence the shuttle comes into contact with the under part of the spindle stud sufficient to cause banging-off. The use of an excessively strong pick at the off-side of the loom, or if the check strap is too slack at the starting side of the loom, rebounding of the shuttle would naturally occur at the starting side of the loom, and the loom may either bang off on the same or next pick, or the pick of weft on the rebounding pick may be too slack to raise the weft fork and in this case the loom will be stopped previous to the weft having broken or run out. The fixing of a slay to the slay swords is a very important matter, as also is the attaching of the slay swords to the rocking rail.

Incorrectness of attaching these parts of the loom results in the slay being twisted, and a loom in such a condition will never produce good results. If the picking band is too long, or has stretched, banging-off will result, but may be easily remedied by the weaver tightening the picking band so that when the loom is turned over with the picker at its most forward point on the spindle, the distance between the buffer and the picker should be the breadth of two or three fingers.

Banging-off always causes wear and tear to various parts of the loom, and it should be the aim of all tacklers to maintain such parts as the frog and the stop rod in very good condition so that when the loom does bang off, breakage of yarn will not be caused. Constant banging-off will easily cause brand new driv-

(Continued on Page 343.)

Cotton Carding Points--IV.

By WILLIAM SHAW.

No reader will deny that thousands of fibres are injured by running long stock with a short nose feed plate. This is a common mistake in many cotton mills.

This is more for the young carder, as I know that many young carders have found themselves in hot water, so to speak, by changing from short stock to long without changing the feed plate. The superintendent may be a weaver or master mechanic, and may not give the feed plate any consideration. As a rule, this is up to th carder. If the superintendent orders you to make a change whether it is in the speed of the machinery in the stock or type of flyer, point out the results before making the change, then it is up to him to shoulder the responsibility.

For instance, it will be remembered that a great many mills tried out a few "Dunn Flyers" and in almost each case they were pronounced a failure. Simply because a mistake was made by the company by sending out a few sample flyers without pointing out how the intermediate speeds with the "Dunn Flyer" differed from the Bodden Flyer. In other words, with "Dunn Flyers" the bottom cone must have straight outlines instead of being converged. Many carders pronounced the "Dunn Flyer" a failure, and many never understood why the end on each flyer would run slacker than on all others. Most carders that reported againt tshe "Dunn Flyer" know better now, they know that it was the heavy presser rod at the upper end that condensed the diameter of the bobbin which, of course, caused the end to run slack.

How often will the superintendent order the carder to speed up the fly frames? And in almost every case the carder wil do so without a protest? Speeding up fly frames over a speed for which they were designed is as great a mistake as running "Dunn Flyers" along side of "Bodden Flyers," and with a convexed bottom cone. In fact the result is exactly the same. The faster you run a fly frame over the speed for which the cones were designed, the more you destroy the relationship of the surface speed of the front roll and bobbin, and you have trouble. The faster you run the frame, the more you increase the pressure of the paddle on the surface of the bobbin, which, of course, reduces the diameter of the bobbins which is slightly greater than the outline of the cones can govern.

So the same argument holds good with the stock so if you are ordered to make a change, let these suggestions steal over you and point out to your superintendent the mistakes in the change or changes. He will think more of you by doing so. He will feel that he has a man that understands his business.

With a proper nose feed plate, the licker-in should be set almost to touch with the feed plate. With such a setting, picture in your mind if you can the fringe of cotton hanging downward and the teeth of the licker-in playing through this hanging fringe. Does it seem reasonable to believe that the stock is injured by such a setting? The action at this point becomes the same as the action between the drawing rolls, and if the distance between the bite of the licker-in and the bite of the feed roll exceds the average length of the staple, how can the stock be injured. On the other hand, by setting the licker-in as close as possible to the feed plate, the foreign matter is forced between the spirals and thrown out to the floor by the centrifugal force of the licker-in.

Another important consideration is that with the above setting the trouble known as flaking is entirely eliminated. The reader should see clearly that with such a setting the feeding action is only gradual, and no plucking occurs as in case when the licker-in is set at 10-1000 gauge. In all fine goods mills you will find a light sheet of lap in the majority of cases, less than nine ounces to the yard, and why?

The reader can answer the above question best by taking hold of a large tuft of cotton and also a small tuft and let him ask himself how much easier it is to extract the foreign matter from the small tuft than from the large tuft.

The same efficiency can be applied to the card or any other machine, that is, the smaller the tuft the easier the foreign matter can be removed. That is why a light lap is run in all fine goods mills, and also the reason why all builders advocate running a light feed and run the stock through more rapidly.

I wish to point out that the mote knives are not such a cleaning agent as many may believe. After many tests I have discovered that they are almost useless if the back of the card is fully protected from air-currents. Pack the back of every card as tight as possible if you want clean carding.

The surface velocity of the cylinders has a tendency always to draw the undesirable matter to its surface and the only way to destroy such air-currents is to set the licker-in as outlined above and pack the back of the card as tight as possible.

To prove this, weight your droppings when using both mote knives, and next remove one knife and again weigh your droppings. You will notice little, if any, difference in the amount of droppings. I have often removed both mote-knives and found very little difference in the droppings, and in some cases not any.

These facts are pointed out simply to show young carders that they should not depend too much on the mote-knives to clean the stock. What I point out can be tried by any reader in charge of carding, and I am sure that if the settings are tried this article will receive commendation. It is not guess work, but was discovered after many tests.

Another good point in favor of setting the licker-in as close to the feed plate as posible is the amount of saving it insures to the fillet on the cylinder, flats and doffer. Let a lap run out with such a setting, and the licker-in will stop. Every reader will admit that when a lap runs out when the licker-in is set to $\frac{10}{1000}$ to $\frac{12}{1000}$ gauge, the large tufts of cotton will find their way to the cylinder and flats. We all have heard the flats shake and in some cases broken by these large tufts passing through the card.

I have often stated that allowing a lap to run out should be branded as a crime. I believe more, however, in an ounce of prevention than in a pound of cure. You can have a licker-in covered for about \$7, while to recover a card the cost in most cases passes \$50.

I have often heard carders say that the mote-knives were only useful in preventing large tufts from reaching the cylinder. True, the mote-knives if set almost to touch will also prevent large tufts from reaching the cylinder, but in nearly every case they become bent and it is very difficult to straighten them as before. For this reason, I set the feed plate almost to touch, and both mote-knives at $\frac{12}{1000}$ gauge. I have a small piece of steel $\frac{1}{8}$ of an inch in thickness to set the nose of the licker-in screen. I have tried many other settings, but this seems to give the best results. The back of the licker-in screen is not a very important setting like some writers would have us believe, as in most cases the grinder is helpless, owing to the poor construction of the joint between the licker and cylinder screen. The back of the cylinder screen should be set at $\frac{11}{1000}$ gauge. More benefit would result if a closer setting was possible without taking chances of the cylinder fillet becoming injured by it receiving outward pressure from any large tufts that may escape the action of the licker-in. However, if the licker-in is set to almost touch the feed plate, the cylinder screen should be set $\frac{7}{1000}$ gauge. The reason for such a close setting at this point is that more air-currents are destroyed at this point, more than anywhere else, because it is called on first to meet the air-currents created by the surface speed of the cylinder.

In order to have good carding every point of wire of the licker-in, cylinder, flats and doffer must be as sharp as possible, so as to be able to grip instantly any cotton fibres coming under their action. Therefore, the heavier impurities must be extracted by destroying as much as possible any air-currents at the back of the card. With all points of wire in order and sharpened properly, the stock is conveyed from one surface to another without air-currents. On the othe rhand, if no air-currents exist, the heavier impurities fall to the floor or in other words, only air-currents carry the heavier impurities forward.

There is nothing that makes a man in charge of a department appear so weak, as when he states that a certain setting is best, but at the same time unable to explain why. My chief aim in these articles is to enable the young carder to explain every setting and at the same time give the proper reason for such a setting. You no doubt have heard a carder say that progressive setting is a very good thing, but in many cases you will find that he is unable to explain what takes place between the flats and cylnider with such a setting. There is only one reason advanced for progressive setting, and that is, that it gives the fibres a better opportunity to disentangle themselves by coming more gradually under the combing action of the flats and that such a setting save them from injury. Let me ask the reader again how this is possible when the licker-in is set almost to a touch. Flats should be set ta $\frac{10}{1000}$ in. gauge from the cylinder at the heel of the flat. If the wires on both the cylinder and flats are as sharp as they should be, it will be found that every fibre will be acted upon with this setting. The setting between the licker-in and cylinder is given as $\frac{8}{1000}$ gauge in most text books. No doubt many Canadian carders use this setting. But what would you say if any one should ask you why you set so close at this point?

In the majority of mills I have visited, I have found the carders in favor of setting all the flats at $\frac{10}{1000}$ gauge at every point, and at the same time I found they were in favor of setting the licker-in to the cylinder to $\frac{8}{1000}$ gauge. In no case was the carder able to explain why he set closed at this point than between the flats and the cylinder. Let us reason together. In the first place, there is no combing action at this point. At this point the licker-in simply conveys the stock to the cylinder. Now, consider the surface speed of the cylinder, which is about 2,200 feet per minute against the surface speed of the licker-in, which is about 1,000 feet per minute, and consider also the points of wire to the square inch, and the construction of the wire. There can only be one conclusion, and that is, that the cylinder has every opportunity of stripping the licker-in of every fibre at every revolution.

No matter ho wtight you may check a nut, there is always danger of it working loose, which is due to vibration. Therefore, no matter at what distance you set the licker-in from the feed plate, there is always dangers of a lump going through which is liable to disturb the setting of the licker-in and allow the teeth to come into contact with those of the cylinder, by setting at $\frac{12}{1000}$ gauge at this point the danger is not as great.

In the second place, study the direction in which both the cylinder and licker-in revolve and at once you will be convinced what a mistake it is to have a close setting at this point.

Why is it that some carders believe in having such a close setting where there is no combing action, and at the same time believe in progressive setting? Some have the following setting for flats. At the first setting point $\frac{11}{1000}$, at the second $\frac{10}{1000}$, at the third $\frac{9}{1000}$, and $\frac{8}{1000}$ at the two next setting points. When you set the first setting point at $\frac{11}{1000}$ you reduce the working surface of the cylinder some carders never stop to reason how $\frac{1}{1000}$ gauge at the first setting reduces the working surface of the cylinder. If the reader is a carder, let him set the first setting point at $\frac{11}{1000}$ gauge, next let him examine the space under the flats entering the card.

Another point against progressive setting is the distance found between the heel of one flat to the heel of the next flat. In the majority of cases the distance will be found to be one and three-quarter inches, in some cases more. Granted that the fibres are tangled, how are they injured, when the distance between each flat exceeds the length of the staple?

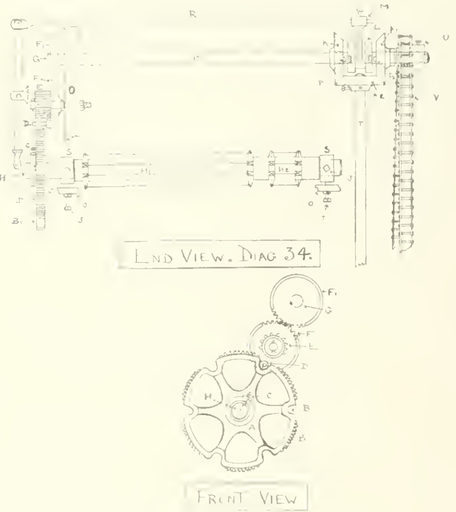
But there is only one way to determine the best setting and that is by test. Let the reader first set a card with a difference of $\frac{1}{1000}$ at each point beginning with $\frac{11}{1000}$ at first setting point, and next let him set a card at $\frac{10}{1000}$ gauge at every point. Weigh the sliver from both for a week or two, and I am sure that he will reject progressive setting. You will find that the card set at $\frac{10}{1000}$ gauge at every point will turn out a sliver that will vary in weight from one to four grains, while from the card set progressive it will vary from one to ten grains, and in some cases more.

Practical Tuning and Construction of Power Looms---VIII.

The Working of the Lag Cylinder and Vibrator Levers.

By B. METTRICK.

The Lag Cylinder.—This cylinder is driven from the upright shaft T, Diag. 34, and can be turned in both directions, that is forward or backward, according to whether the picks are being inserted into the fabric or taken out.

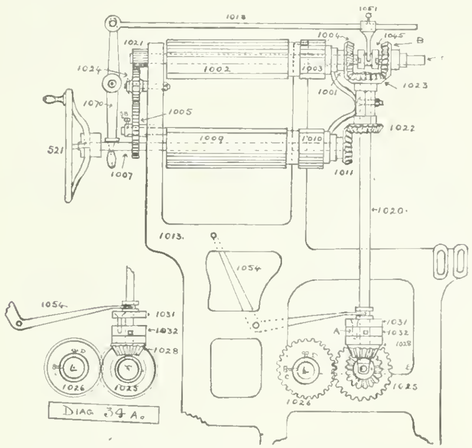


End View. Diag 34.

Front View

Working of the Cylinder.—The two movements of the lags or vibrator lever indicators (which consist of rods covered with pulleys and bushes, a pulley indicating the lifting of its corresponding heald or box, and a blank or bush the lowering of the same), work as follows:—The upright shaft T (Diag. 34) always revolves in one direction, and at the top of this shaft is fixed a bevel wheel K_1, which is in gear with two companion bevels K & K_2, K being used to turn the top chill, also to turn lag cylinder forward, and K_1, revolving loosely upon the shaft G (which passes loosely through the top chill) operates the backward movement of cylinder.

Forward Movement.—When picks or shots are being put into the cloth, the lags are carried forward over



Diag 34 A.

the top of the cylinders H_1 & H_2, and under the vibrator levers thus: The handle W is pressed inwards towards the loom frame; this causes the rod R and the finger M to press the moveable clutch L (which is free to slide horizontally along a key bed on the shaft G) over the top of a small projection or tongue P, which is cast on to the body of the bevel K, thus causing the shaft G and clutch L to be turned in the direction in which the bevel K is revolving. At the other end of the shaft is fixed a small pinion F_1 with 35 teeth; this gears with a double stud wheel F with 35 teeth and E with 9 teeth, which are fixed in a slot on framework. This slot alows for variation in position of lag cylinder. This double stud wheel is made so as to give an eccentric motion to the lag cylinder wheel A. On the wheel F is fixed a pin D, the wheel E which is fixed to

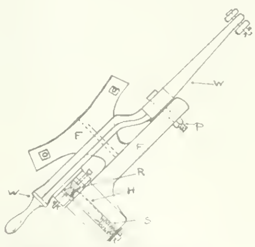


Diagram 35

F having only 9 teeth and a blank, is made to gear with A. The teeth of E gearing at B, and the pin D, gearing at B_1 turn the wheel A and the lag cylinders at an irregular speed. That is, when the pin D gears with A at B, the circumference of the driver is enlarged, and the circumference of the follower lessened, therefore the speed of the follower is increased at this point; this takes place, when the lags are changing, to form a new shed. The reverse takes place, when E gears with B, that is the speed of lag cylinders is reduced, and this occurs when sheds are forming, therefore this arrangement causes the lags to change quickly from one to the other, and allows more time for the changing of position of the healds and boxes by the heald cylinder. The wheel A is connected to the lag cylinder by a soft-nosed set screw C, the nose of which fits into a hole H on the end of cylinder; this set screw provides an efficient escape motion, and prevents many breakages of the cylinder blades, warp threads, etc.

The work of this escape motion is as follows: IF the lags or box chain double or buckle up, for any reason, such as waste or a broken bobbin being entangled with the lags, they will not rise correctly over the cylin-

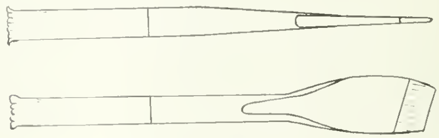


Diagram No 36.

der, but bind between the cylinder and the vibrator levers, this binding causing the soft nose of the screw to be sheared off and allowing the gear wheels to revolve without any further turning of the lag cylinder.

The cylinder is held in position by two collars S, and regulating screws J. It should be held firmly with just sufficient room to revolve withou binding with the collars at the sides. It allows for six or more lags, each lag being separated by a blade of steel. H_1 shows the heald section and H_2 the box and picking section of cylinder. The steel blades between each lag should be kept perfectly straight, and fittingly in the cylinder bed. For the purpose of removing broken cylinder blades, a special shaped drift can be made (Fig. 36) the blade of which when inserted

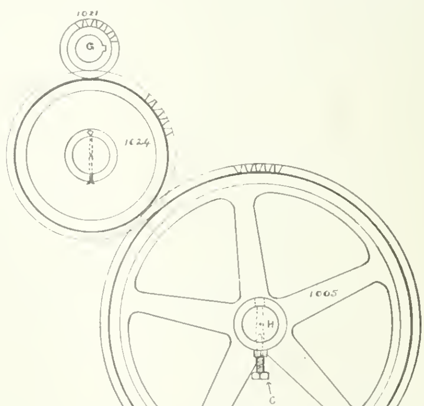


Diagram No 37.

at the end of cylinder blade lifts or levers it out of its bed without damage to the cylinder bed.

Plain Gearing to Lag Cylinder.—Fig. 37 shows another type of gearing between top shaft G and the lag cylinder. A small pinion 1021 with 16 teeth gears with an intermediate wheel 1024 with 52 teeth, and this gears with lag cylinder wheel 1005 with 96 teeth, therefore one revolution of top shaft which equals the time of 1 pick equals 1-6 revolution of lag cylinder.

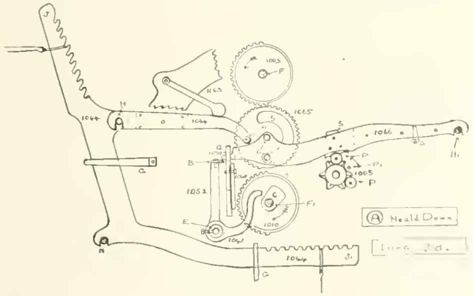
Backward Movement. For taking out the picks or picking back, the clutch L is pressed over the tongue P_2 on loose bevel K_1, this action causing the shaft G and lag cylinder to revolve in the opposite direction, to the one turned, when the loom is in full motion.

The dobby is first disengaged from the rest of loom, clutch L transferred from K to K_1, and the top and bottom cylinders and lag cylinders can then be turned by hand, and the picks taken out one at a time, as each shed of warp is re-formed.

Timing and Setting of Lag Cylinder. The lag cylinder should be very carefully timed, to work in conjunction with other parts of the dobby, that is with the lock knife B and the top and bottom chills 1003 and 1010, and vibrator levers (see Diag. 33).

Setting.—The lag cylinder should first be set for working the lags forward. On looms fitted with peg motion, this must be done by means of the top spur wheel F_1 and shaft G, however, this is a rather clumsy method which is a disadvantage of this type of gearing. (See Diag. 34, 37, 38, & 39.)

Looms on which the ordinary 3 wheel gearing is used can be set easily and quickly, by the intermediate wheel 1024, which is an advantage that appeals to the tuner and saves times. First draw out the wheel 1024, then turn the handle wheel, until the lock knife finger 1041 is in the centre of the swell on the cam C, then turn the lag eylinder wheel 1005, until the teeth of the crossing vibrator levers are level with each other, then gear up the pinion 1021 and wheel 1005 by the intermediate wheel 1024. This setting causes the knife to be held away from the teeth of vibrator levers during the time the lags are moving the vibrator lever ready for the next shed, and allows the knife to be in gear between the teeth that are lifted and those that are lowered, during the turning of the gear wheels 1065 by the top and bottom chills 1003 and 1010. After the



forward movement of the lags has been set the reverse movement should be attended to. This really consists in setting the bevel wheel K_1 to the bevel K. With the finger 1041 in contact with the centre of swell on cam C, place bevel K on the shaft G, so that the tongues P and P_2 are opposite to each other, and the clutch L may be geared with either bevel directly as shown in Diag. 34.

When set see that the knife B clears both top and bottom teeth when engaging. If the top vibrator teeth do not lift sufficiently to allow the knife to enter between the teeth, before the chill commences to turn the gear wheel, the knife may be pressed out, and a false shed be formd, and vibrator or clutch damaged.

Diag. 35 illustrates the front view of the handle that controls the clutch L, its chief feature being the pin H, which is fitted into an opening in Frame F, and is held in position by a stout spring S. The handle is pivoted at the pivot P, and near the end W is fixed a small fluted roller R. When the handle is moved, this roller passes over the pin H, the spring S allowing it to be pressed down and to spring back, after the

roller has passed over the point, the pin H holding the lever and clutch L in gear with one of the two bevels K or K_1.

Diag. 34a shows the method of passing the lag cylinder conecting shaft through the top Chill 1002, and also end view of plain setting wheels, as shown in Fig. 37 (front view).

The Vibrator Levers.—This important part of the dobby is shown in Diags. 38 and 39.

Diag. 38 shows positions of gear wheels and levers, when the heald is helping to form the bottom part of the shed, and the other, 39, the positions when the heald is at top of shed. These levers and gear wheels form a link between the cylinders and the healds or boxes. The work of this gearing is to turn a rotary motion of the cylinders 1003 and 1010 into a vertical motion, and also to impart a certain amount of eccentricity to the motion of healds and boxes.

(To be Continued.)

The Wool Embargo a Century Ago

Commenting on the embargo placed on wool by the British War Office, the Journal of the Royal Society of Arts, says:—

"The occasion of the present war is by no means the first on which the exportation of English wool has been prohibited. Centuries ago the stoppage of supplies of wool was the regular rejoinder to Dutch refusals to import English cloth. The exportation of wool and yarn, forbidden by Charles I. in 1630, remained illegal up to a date so recent as 1825. The business was illicit, but it was done, and through the romantic agency of those who brought brandy, wines and silks ashore on the Kentish and Sussex coasts. The transactions were not insignificant, for from a little place like seventeenth century Rye the shipments were computed to reach a value of £100,000 a year.

"The methods were unwholesome at least, involving the demoralization of the countryside, the corruption of officers in the Army, Navy, and Customs, the purchase of magistrates favor, crimes of violence, and the frustration of all authority. It will not be professed that modern efforts in trading with the enemy are likely to take quite the same shape. The packing of wool with 'Scrues and other unlawful engines into butts, pipes, hogsheads, chests, or other casks and vessels,' and the laying of the cargo on board sloops by night, may be neither the best nor the cheapest mode of transit in modern conditions. However, were the profits to remain on the traditional scale of 60 per cent net, some perverted ingenuity might still be anticipated."

Bleaching of Wool Fibre

By A. F. MUSGRAVE, in the Textile Colorist.

Wool, unlike cotton, may be bleached either by oxidation or reduction methods. The oxidizing agents in use for the bleaching of wool comprises peroxides, perborates and permanganates. Reduction bleaches are carried out by the use of the unstable sulphur compounds such as sodium bisulphite and sulphur dioxide. Sulphur dioxide is of course the active bleaching agent in bisulphite of soda.

It is well known that sulphur blacks are not permanent for the reason that the coloring matter of the wool is not destroyed, but is simply reduced to a colorless compound by the loss of its oxygen. This colorless compound is very gradually oxidized back to its original color by the oxygen of the air. The color may be brought back at once by immersing in a peroxide bath. With peroxides or in fact any oxidizing bleaching agent there is a complete destruction of the color. This can not now be brought back by a reducing agent.

The peroxides, either sodium or hydrogen, are used much more extensively to-day than either of the other oxidizing agents. Perborate of soda is however, largely used for feathers and seems in some way particularly adapted for that line of work.

Whichever agent is used, either sodium or hydrogen, depends on individual likes and dislikes as both methods have many advantages. Peroxide of soda, being a powder is much less bulky to handle and store than the liquid hydrogen peroxide. It is also less dangerous to store; as barrels of hydrogen peroxide have a great tendency to explode or expand in summer or hot weather and to freeze in cold weather.

Sodium peroxide Na_2O_2 develops 20 per cent of its weight of oxygen while hydrogen peroxide H_2O_2 only develops 1½ per cent of free oxygen. Thus pound for pound soda peroxide devlops approximately 13 times as much available oxygen as th hydrogen peroxide. The stability of the sodium peroxide is also much better than the hydrogen. Hldrogen peroxide is fairly stable when acid and at low temperatures, but in contact with organic matter undergoes a rapid decomposition.

In the labor involved in the making up of bleach baths, the advantage is all in favor of the liquid peroxide. When using sodium peroxide it is necessary to carefully neutralize the acid with the peroxide and to make up a large bath, is a tedious job. When using hydrogen peroxide it is simply added to the bath and made alkaline with the desired alkali.

Thus it can readily be seen that in all ways except cast of manipulation the sodium compound is superior to the liquid bleach.

When making up the bath with sodium peroxide care must be taken that the peroxide is all neutralized. Sodium peroxide reacts with water to form caustic soda. If sufficient acid is present it will react to form sulphate of soda which is, of course harmless.

Solvent tubs are best. The bath should be heated by an open lead pipe so arranged that it may be taken out when the bath is heated. When the desired heat is obtained remove the pipe and enter the goods. Where the bath is heated after the goods are entered all parts of the liquor are not heated to the same degree, with a consequent uneven blaching. By the addition of soap to the bleach bath it is possible to scour and bleach at the same time. Such a method is as follows:

To 200 gals. cold water add 5 lbs. sulphuric acid and 1 lb. phosphate of soda dissolved in warm water.

Add carefully to bath, 4 lbs. peroxide of soda or to neutral point.

Dissolve and add to bath in the following order: 2 lbs. carbonate of potash, 2 lbs. Turkey red oil, 4 lbs. soap.

Stir well, heat to 120 deg., enter goods and bleach for three hours. Wash and soap lightly.

Grey, blue and pink mixes on underwear are much produced at present by a mixture of a dyed wool (fast or peroxide) with white coton and wool and the finished fabric bleached with peroxide. For the coloring of the wool the following dyestuffs are of interest owing to their fastness to peroxide:—

Salicine Alizarine Black conc.	Topchromed
Biebrich Alizarine Blue B	Acid Method
Naphtamine Yellow BN	Acetic Acid Method
Naphtamine Pink 7B	Acetic Acid Method

The colored wool must be a long stapled wool otherwise the fabric will appear specky.

Reduction bleaches as before mentioned are carried out either in the wet way, by immersing the wool in a solution of bisulphite of soda or by subjecting the moist wool to the fumes of burning sulphur.

Better bleaches with less labor and trouble are secured by the gas method. In this method it is only necessary to subject the wool, in an air-tight chamber, to the fumes of burning sulphur. Wool should be damp, not wringing wet. Extracted wool contains about the proper degree of moisture. An excess of sulphur may cause yellow spots. An excess of water in the goods will cause them to feel harsh. No rinsing is needed after the sulphur bleach but some mills consider it an advantage to give a rinse in a very weak soap bath. A white neutral soap must be used, and only enough used to give a slight cloudiness to the water. The small amount of sulphuric acid present in the wool will cause a precipitation of the soap thus giving a glossy appearance.

The double bleach is carried out by first bleaching with peroxide and then giving a gaseous sulphur bleach. She sulphur bleach causes a considerable whitening of the wool. For reasons before mentioned the peroxide bleach is always given first. In the sulphur bleach house care must be taken that no iron nails are in the roof as they are apt to cause rust spots on the material.

In general coal tar colors are much more stable to sulphur bleaching than to the peroxides. Many colors such as the Rhodamines, etc., are frequently stoved to develop their full brightness.

In regard to the quality of water used in the bleach works, it, of course, must be as pure as possible. Hard water is not objectionable except in the scouring, but water containing iron must be avoided. The quality of the chemicals should be looked into carefully. Silicate of soda for instance, frequently contains a considerable quantity of iron. Silicate of soda is on the market in two forms, liquid and solid. The solid is very hard to dissolve and much better satisfaction will be obtained by using the liquid silicate.

Cloth Scouring

Methods and Materials.

When a fabric leaves the loom it is raw, thready, and more or less dirty. It also lacks the lustre and brightness common to worsted cloths and the fullness of handle associated with fabrics made from wool or woollen materials. The object of scouring is to cleanse the fabric, brighten the colors, remove the rawness, and improve the handle of the cloth. The process of scouring is the first in the series of finishing operations, and the degree of success attained in it materially affects other processes and the final result. If the fabric is not thoroughly cleansed, the colors will look dull and the fabric will rub dirty; dyeing may be uneven, and the general appearance and handle will be impaired.

Impurities in fabrics which are to be removed by scouring vary to some extent in quantity and quality, according to the type and quality of fabric. Worsted fabrics as a class contain much less oil than woollen fabrics, as in making worsted yarns less oil is necessary to facilitate working than is required in woollen yarn manufacture. Solid worsted fabrics usually lose from about 5 to 7 per cent in scouring, while the loss in scouring woollens varies considerably. The better class of woollen fabrics lose, on an average, about 14 to 20 per cent in scouring; but low woollens, in which much "pulled" stuff is employed, frequently lose from 20 to 30 per cent. Variations in the quality of oil employed in yarn making have an important bearing on cloth scouring. Olive oil is frequently employed for oiling the material for worsted and the better class of woollen yarns. It is easily removed by emulsification in scouring the cloth with soap.

Oileines and Mineral Oil.

Oileines, which are used largely for oiling woollen materials, vary in quality according to the price paid. Those with a large percentage of saponifiable matter prove most economical eventually, as the cloths can be more easily scoured by the use of carbonated alkalies; the lower qualities contain more unsaponifiable matter and not infrequently more or less mineral oil. The latter is particularly objectionable, as it is difficult to get a fabric clean which contains much mineral oil, and any left in the piece will set up resistance to the penetration of the dye. The result will be an uneven and shady piece.

The process of scouring has also to remove from fabrics any grease which may have got on to them during manufacture, size, or other substances added to facilitate working, and the dirt collected during the earlier processes. Grease marks, if of fair size, are sometimes difficult to remove in the ordinary process of scouring, but if they are treated freely with oileine before scouring they will generally be removed. In som cases where the grease is thick in the fabric, scouring may not be completely effectual; in such cases local treatment with benzene, petrol, etc., will remove it.

Water for Scouring.

In the operation of scouring water plays a large part, and indirectly it may be the cause of faults which, though not noticeable immediately after scouring, may be developed in later processes. Water is used for getting the detergents into solution before their employment in scouring, as a means of carrying them into the fabric, and, finally, for washing the fabric free from the dirty matter extracted from the cloth. The quality of water used in scouring is a matter of some importance, as impurities present in it may have a deleterious action on the cloth. The impurities present in water consist chiefly of calcium and magnesium salts, in addition to suspended matter. The latter can be removed easily by filtration or settling, but the former can only be removed commercially by chemical treatment. Calcium and magnesium compounds dissolved in water cause it to be more or less "hard," according to the quantity present. For cloth scouring purposes and all other purposes in manufacturing fabrics "soft" water—i.e., from 0 to 3 deg. of hardness—is to be desired—preferably the former. Hard water is liable to produce defects in scouring fabrics when used along with soap.

The calcium and magnesium in the water break up the soap, combining with the fatty acids and producing insoluble lime soaps. A water of 5 deg. of hardness will destroy about 1 oz. of soap per 44 gallons, which means so much waste, as lime and magnesium soaps are ineffectual as scouring agents. Further, the compounds produced are insoluble in water, and therefore difficult to remove from the fabric. Pieces scoured with hard water are difficult to dye, as the insoluble soaps precipitated on the fibres act as a "resist," the result being uneven and flecked pieces. Most factories to-day are fitted up with water softening plants of the lime-soda type permuted, or the two combined. Such plants if carefully controlled result in a saving of soap, a reduction of faults, and better handling fabrics; and as water softening plants of modern construction can be easily, cheaply, and effectively operated their use should become general.

Soaps and Alkalis.

For scouring purposes soap and alkali are freely employed. Soaps may be divided broadly into two classes—namely, hard and soft. In a chemical sense soaps are salts of fatty acids. Hard soaps are made with sodium as a base, and for soft soaps potassium is employed. It does not follow that because soaps are soft that they contain more water than hard soaps; frequently the moisture is in excess in hard soaps, but it is the nature of soda and potassium to produce soaps of different kinds. Both kinds are used in cloth scouring, but potassium soaps only are employed on better goods, as it is claimed to produce better handling cloths. Soaps should be preferably neutral—that is, without excess of alkali, but most scouring soaps contain at least a little free alkali, which is usually in the form of caustic. Caustic alkalis have a very destructive action on wool, and in small quantities they tend to make wool harsh and affect the colors. If the caustic alkali in the free state present in soap exceeds 5 per cent it should be used very cautiously.

The carbonated alkalis of soda and potash are largely employed for scouring purposes, particularly the former. They can be obtained at various prices containing more or less "waters of crystallisation." Some well-known brands are of guaranteed purity, and these generall work out cheapest in the end. Some of the lower-priced soda ash contains caustic soda as an impurity. Pieces which have been made from yarn spun with oileines as the lubricant may be scoured by the use of carbonates alone, as the saponifiable matter in the oleine combines more or less with the alkali. Compared with soap, the tendency of carbonated alkalis is to give woollen fabrics a sharper and harsher handle. The comonn khaki serge being made in such large quantities to-day is not remarkable for its soft handling features, but recent experiments have shown that soap scoured pieces yield a softer and better handling fabric than can be obtained with alkali scouring.

Ammonia, though an ideal scouring agent, is not nesd in quantity because its cost is prohibitive, and ammonium compounds are not largely employed for the same reason. However, it finds a useful place in scouring fabrics which have to be dyed in the piece. After the fabrics have been cleansed in the ordinary way, if a little ammonia is added to the last wash water any soap left in the fabric will be brought out, and the piece will be in better condition for dyeing. Substances are put on the market with specious names and with claims of various advantages, but these should only be purchased on the results of an independent analysis. In many cases they will be found to contain ingredients which are quite useless from the point of view of scouring, yet they make weight, and scouring materials are bought by weight.

Strength of Solutions.

It will be obvious that the strength of scouring solutions must be determined by the type and quality of cloth. It would not be wise to use the same strength of solution in scouring a good quality fancy worsted as may be employed for a low plain cloth. In all cases the strength of solution should be such as to remove the oil and dirt effectively, and the lower the strength necessary the better for the fabric provided the scouring is not prolonged. Soap solutions should be of such a strength as to run out of the can easily at a temperature of about 60 deg. Fahrenheit, and alkali solutions usually run about 5-6 deg. Twaddell for worsteds, and 8-12 degrees Twaddell for woollens, the strength varying according to colors. Yarns which have been lubricated with vegetable oils will require some soap to scour them. Those made with oleine may may be scoured with alkali alone, but are frequently finished off with a soap scour. In scouring, the temperature should not exceed 100 deg. Fahrenheit, which is a safe standard.

It is most important that extremes of heat and cold should be avoided. A piece suddenly chilled by the rise of cold water in washing off may cause the soap to set in the fibre, so that there will be a difficulty in removing it, and the fabric will be dull and dirty. On the other hand, carelessness in operating the valves may cause a piece to be submitted to a high temperature and the soap may be split up and deposited on the cloth, causing faults which will be developed in later processes. To secure satisfactory results, the temperature should be gradually raised to the limit, and quite as gradually lowered. Then the above-mentioned faults will be avoided.

Types of Machinery.

It has already been indicated that cloth scouring is partly a chemical and partly a mechanical process. The machinery employed is comparatively simple in construction. There are two types of machines—viz., the "rope" or "dolly" washer, and the "open width" machine. The "rope" machine is most largely employed. It consists of a large trough forming the lower portion of the machine, inside which the cloth is placed along with the scouring liquor. A pair of large rollers for nipping out the sud are placed immediately over a smaller trough, the bottom of which is fitted with gates which can be opened and closed at will. During the early part of the scouring process the gates are open to allow the sud to run back on to the piece, but when it has run for some time and raised the dirt, the gates are closed and the dirty sud nipped out pasess into the drain from an outlet in the side of the machine. In washing off, the water passes out at the bottom of the machine, and also from the box as indicated. Behind the rollers is a draft board through which the pieces pass to separate them before passing into the rollers, and after passing through the rollers they pass over a small guide roller before dropping into the bottom of the machine.

In some cases the pieces are stitched "end to end" and run in rope form occupying a space in the rollers about 12-18 inches. It is therefore obvious that the pieces will be creased, and it is from this point of view that this type of machine is not satisfactory for certain types of goods, particularly crossbred worsteds. A method sometimes employed to avoid creases to some extent is to stitch the ends of adjacent pieces together os that an endless chain is formed of two pieces. After falling down at the front at one side they come up at the back at the other side, and this crossing tends to change the position of the creases and reduce faults. This type of machine is particularly useful for heavy greasy goods, as a "good nip" is essential to force the scouring liquor into the cloth and to squeeze out the dirt. It is not desirable to flood pieces in scouring. Sufficient liquor must be used to secure that the piece is thoroughly wetted and that the scour is effective; excess is unnecessary and undesirable.

Scouring Faults.

The "open" washer is similar in principle but rather different in detail. The important feature of the machine is that the cloth is kept out at full width by a simple mechanical arrangement which avoids creases and faults of that kind, and for certain types of goods it is very useful and effective. For crossbred serges and worsted goods which are not very dirty or greasy this machine will answer, but goods which require a heavy squeeze to get the dirt out can be more effectively scoured on the dolly washer.

The chief faults which may be directly attributed to scouring are lack of cleanliness and creases. The former causes fabrics to appear dull, and sometimes to smell. Creases are due to the fact that pieces have run without opening out, and slight local milling may be the result. Some fabrics, either because of the construction or quality of the materials employed, are particulary subject to this defect, and need to be opened out in scouring. Pieces which have been hard scoured have a rough, harsh handle, the colors may have run, and the cloth will look dull and lack lustre. Good scouring lays the foundation of a good handling fabric; it is a subject which deserves much more attention than it usually receives.

PLAIN LOOM FAULTS AND REMEDIES.

(Continued from Page 334.)

ing wheels on the crank and bottom shafts to break in a few days time by reason of the repeated banging-off and backlash. A wedge shaped shuttle box should be guarded against. If the box mouth end of the box front be fixed too far inwards, as is the practice of some overlookers in order to have the stop rod clearing the frog sufficiently, the shuttle is somewhat wedged in the box, and to eject the shuttle more picking power will be required. If the box mouth is set too wide, the shuttle will tend to rattle when passing into the opposite box which will again require increased picking power. If a shuttle box as a whole is too slack, that is, the shuttle too free in the box, either the stop rod blade will not be raised sufficiently when the shuttle enters that box, or the shuttle will rebound. The crank and bottom shafts should not be allowed to work when the cannons are badly worn, otherwise an occasional false pick followed by banging-off will result. The nuts and keys that secure the top and bottom shaft wheels must not permit the wheels to have even only a slight amount of play on the shafts if banging-off is to be prevented.

Banging-off has sometimes been traced to shuttles being made from timber not properly seasoned, causing the shuttle to develop an incorrect shape. The course of the shuttle will be interfered with if the race board has sprung a trifle when nailing down has been resorted to, rather than employing screws and counter sunk holes in the race board. Pickers must be adequately bored or gouged out to receive and control the shuttle tip, otherwise the shuttle will rebound, provided that the checking of the shuttle by some other part of the loom is not increased. The reed must be firmly held by the slay and slay cap grooves, otherwise if these grooves are too large there will be a tendency for the back of the shuttle to wear rough and the loom to bang-off. A picking stick acting in a slight bouncing manner will cause an occasional false pick and banging-off. By using shuttles which are worn very thin at the back they will either rebound slightly, or not raise the stop rod sufficiently owing to the swell not being moved outwards to the desired extent. The use of damp weft will sometimes cause the shuttles to depart from their proper shape, and as such shuttles have a zig-zag flight from box to box, the shuttle either does not pass far enough into the box, or fails to arrive at the box at the correct time. The strength of the pick necessary for properly driving the shuttle from box to box is a very important matter for the overlooker to consider. An experienced overlooker can generally determine on any particular loom whether the strength of pick to drive the shuttle full up into the box is excessive or otherwise by manually pushing the shuttle in and out of the shuttle box. The strengthening of the picking power ought to be the very last remedy to prevent banging-off. Especially is the lowering of the picking bowl disadvantageous. Looms working with a harsh pick increase the wear and tear of several parts of the loom and hence more work for the overlooker is subsequently necessary. The overlooker ought to aim at using the minimum power of picking strength to satisfactorily box the shuttle, and thus it becomes imperative to ensure that the matter of shuttle checking is given every attention to guard against jamming the shuttle in the box, nor applying any superfluous checking forces by the swell, box plates, check strap, otherwise the power of the pick must be greater.

In conclusion, banging-off may be caused by even only one of the reasons previously stated, or it may result owing to the deleterious effects of two or more causes. Therefore the overlooker cannot be too diligent in maintaining his looms in the very best condition to reduce banging-off to a minimum.

SULPHUR DYES FOR WOOLLEN FABRICS.

A New Process Discovered.

A new dyeing process has been discovered in Huddersgeld, and if it proves to be all that is claimed for it, the industry is on the eve of revolution, says the Yorkshire Observer in a recent issue. It is the invention of two Huddersfield dyers, who have been quietly experimenting at the Technical College for some time. If put into general operation the complaints of a scarcity of aniline dyes will disappear, as these products, most of which have come from Germany, will not longer be required for dyeing woollen and silk fabrics. The invention is very opportune, as the supply of khaki dyewares is now very small, and the War Office have been compelled to relax their tests so far as the exact shade of color of this cloth is concerned.

The new system is to utilise sulphur dyes for fabrics other than cotton. So far sulphur dyes have been used only in the cotton trade, and it has been regarded as impracticable to dye wool with them. The experiments that have been made, however, show not only that wool, silk, artificial silk, hemp, and other fabrics can be dyed by means of sulphur dyes, but that these goods can be successfully treated either separately or in any form of combination. Furthermore, it is claimed for the process that these sulphur dyes can be used either for loose raw material, tops, yarns, or cloth in the piece.

The cost is said to work out at considerably less than that entailed by the use of aniline or alizarine colors. Sulphur dyes are the cheapest on the market, and it is thought that a large supply is available owing to the depression which exists in the Lancashire cotton trade. Under the new process the milling properties of cloth will be increased, whereas the effect of aniline dyes is to injure those properties rather than otherwise.

Machinery now in use can be adapted to the new process with very few, if any, alterations. Copper machines, or machines with copper fittings, cannot be used, however, as these would set up chemical reaction. At the same time it is claimed that comparatively cheap machinery only would be required. Severel other economies are effected by the new process, which, it is said, can be thoroughly mastered by any competent dyer with less than half a day's tuition. Wool, silk, artificial silk and hemp can be dyed together one one bath, thereby saving the cost of separate dyeing and the cost of dyeing by the present two-bath process. Steam would also be saved, as wools can be dyed at a temperature of about 100 degrees F. instead of at boiling point as under the present method. Severe tests have been made, and it is said that the technical effectiveness of the new process has been proved beyond doubt.

Some offers have been made with a view to the purchase of the monopoly rights of the patent, but those offers have not been entertained. It is understood that the process is to be placed at the disposal of dyers and manufacturers on the same terms to all, the only condition being the payment of a small royalty on the amount of the material dyed.

Emergency Dyeing

By OLD DYER.

Since we wrote last month, the situation in dyes has not altered much. German color branches here in Canada are obtaining no further imports. The larger agencies in the U.S. helped them out at first; and shipments were sent forward like mail matter, through them. This, however, is no longer possible. Among the first things to fail were the sulphur dyes. Then the alizarines gave out and now the storehouses contain little outside of a few obsolete dyes long in stock. It is certainly a constant marvel to us to notice the faithfulness of many mills in our country to everything "made in Germany," so long as it is to be had. The Canadian manager of an English firm states that he is getting over the Atlantic quite a lot of British coal tar products, and hopes to continue doing so. Now is their opportunity. Let the British and colonial governments and people see that they are encouraged. English manufactures are plenty good enough for Britishers. A well known agent for a large house in Switzerland assures us that up to date he has been able to supply customers here with what they needed in most instances, but difficulties in importing dyes are increasing and his confreres in the States are not always able to share with him when they get a little cargo.

Several dealers with whom we have spoken within the past few days confess that artificial coloring matters are becoming scarcer surely as times goes on, and are making efforts along the lines of counsel proffered in our former contribution. Three of them inform us that they can supply considerable quantities of high grade dyewood extracts such as logwood, fustic, and hypernic. Could we reach our Hamilton acquaintance he would surely make a fourth. Another is in a position to bring on lac dye whenever called for, and still another gives out the cheery news that he can supply "any quantity," of alizarine red as well. All of them appear to believe that archil, indigo, flavine, with possibly cudbear, are readily obtainable; so to quote an old Scotch dyer, "things micht weel be waur"—matters might well be worse. Have we not then much to be thankful for? Let us roll up our sleeves, and make the best of it. And shall we not be warned for the future to place reliance on something higher and more stable than human science and commerce.

It is noticeable, but none the less inevitable, that as a result of present war conditions the severity of trade and government tests for colorings have been appreciably relaxed. This if sensibly adhered to will assist not a little in tiding over this time of confusion. Especially should the concession relieve somewhat the carpet dyer. Exactions have been multiplying for him of late. If the public will but permit, he may now be allowed to return on sufferance for a while to old time methods.

For sky blue, and peacock blue shades, etc., he may revert to his old friend, "indigo paste," alias indigo extract, indigo carmine, indigo sulphate. It works with sulphuric acid and glaubersalt, with or without alum. Should he fail to securing enough fast aniline to swing the shades redder or greener he can have recourse to archil and turmeric, picric acid and cudbear, formerly in extensive everyday use, cannot perhaps be had. Heavy navy blues were sometimes colored with red prussiate of potash and sulphuric acid and topped in the same bath with logwood and muriate of tin—the old and variable, "tin spirits." Carpet yarn greens were dyed with picric acid and indigo extract almost entirely and the universal mordants for this class of colors were the combination of "salts (glaubersalt), alum, and (oil of) vitriol." These are all level dyeing stuffs, but withstand alkalies rather poorly. Ecrus, creams, and buckskin shades were generally dyed with fustic, or turmeric for the yellow substratum, and madders, with possibly a pinch of indigo paste for the rest. The mordant additions were "salts (glaubersalt), alum, and tartar"—cream of tartar crystals. Madder, cultivated in large quantity in Holland, is no longer grown so far as we are aware. It was difficult to replace with alizarines and anthracenes when they came along. What to suggest now we know not.

Archil, picric acid and extract of indigo used to form the staple dyes for browns and olives of all kinds on carpet yarns. Dark jacket browns, seal browns, chocolates, and the like were produced from these along with alum, red argols, or crude tartars, and sulphuric acid. Later we employed aniline oranges to replace picric acid, using always the familiar glaubersalts, alum, and sulphuric acid to level, and "make them bite," according to the old phrase. Archil is a most useful dye, working either with or without acid. Acids bring up the red on it; alkalies yield the blue reaction. It goes on at a temperature below boiling point, and is readily stripped in clean boiling water when an overdose is given. The one trying feature about it is that hot and rapid drying materially deepens the shade colored with it, and one has to become somewhat accustomed to this so as to allow for it. It is very sensitive to sulphur fumes.

Tans of all kinds can be dyed from archil and fustic and if oxalic acid and muriate of tin be added as mordants fairly fast colors may be produced. Fustic alone with these mordants produces a fine range of creamy yellows. Old Golds of good quality are obtained from fustic and alum, afterwards saddening with some two per cent of sulphate of copper bluestone. Deeper and redder tones of yellow may be colored with fustic on a chrome bottom in the usual modern way. Lilacs are procured from archil, roses, pinks, scarlets and crimsons from cochineal. Lac comes in for duller shades, as also do aditions of cudbear and the like. Lac—imported chiefly from India—is insoluble in water and we were wont to treat its first with muriatic acid in order to remove the base and to liberate the coloring matter. Cochineal when wanted for extra bluish pinks and crimsons used to be cooked with liquid ammonia into, "ammoniacal cochineal." It is useless to refer to the old safflower, peachwood, and limawood dyestuffs, formerly employer for pinkish reds because they seem to be no longer in the market. Like harwood, carnwood, and sanderswood, they are doubtless gone for good.

Some mention must be made of blacks, and deep blues. For these there still remains logwood, the "bois de bleu"—or blue wood—of the French; roundly abused in Elizabeth's day, but during the years since our standby in many an adversity. Our supply as yet exhibits on diminution. The best way to use it for yarns is first to mordant them with bichromate of potash and to finish them in a subsequent bath with the dye. That there are other methods we are well aware, but there are none so satisfactory as this one, where skein dyeing is concerned. For a good black use about 3 per cent of chrome, 2 per cent of lactic acid one of bluestone, and 1 per cent of oil of vitriol in the mordant bath. Sift and slightly rinse in cold water, and finish with about 10 per cent of dry hematine in a separate kettle, adding a little fustic if you care to aim for a jet black. The usual time in each dip is one hour, but this may be abbreviated to 40, or even to 20 minutes in each bath if necessary. Both baths may be kept up by additions and used right along. For logwood blues just reduce the chrome and logwood. Leave the bluestone out if you wish and use a little hypernic, or something in th second bath to give bloom. Logwood blues may be dyed with little or no chrome, using alum and oxalic acid in the mordant bath; but they are not so fast to light.

So much for carpet yarn dyeings of the past generation upon wool. They may be found to contain hints and suggestions for the time of stress. Much of what we have noted has also application to silk, as the elders in this branch of dyeing who to-day survive will concede. Now we may turn to carpet shades on cotton.

Cotton yarns are first of all to be boiled out enough to thoroughly wet them throughout so as to ensure penetration and even coloring. Very useful, and often in request, are the ranges of of pearl drabs, silver greys, and light slates formerly produced from logwood extract. For pale shades about 1 per cent of 51 deg. extract will suffice. Liquid logwoods are generally better adapted for cotton dyeing than the dry forms, containing as they do more tannin.) Give eight turns at a temperature of 120 deg. Fah.; lift, and sadden in a separate bath with one per cent copperas. Twice as much logwood along with 2 ounces of sal soda, and 2 per cent copperas makes a pretty shade, or one with a little fustic extract 51 deg. in place of the soda. A light slate might need 5 per cent logwood, together with one quarter of 1 per cent soda, and in a second dip 1 per cent copperas, and one half of 1 per cent bichromate of soda. For a fuller slate try about 8 per cent logwood with 1 per cent soda; and afterwards 2½ per cent copperas; or a still deeper one with possibly 10 per cent logwood 51 deg., 2 per cent fustic 51 deg., and one quarter of 1 per cent soda; finishing with 3 per cent copperas.

Yellower tones of dove color, sage, etc., are colored in the same way. A nice light one might get three per cent each of fustic, and hypernic 51 deg., and afterwards 1 per cent copperas. A deeper one might call for 8 per cent fustic, 1 per cent each of alum and bluestone at 140 deg. Fah. for half an hour; and a finishing bath of 2 per cent copperas. One less pronounced could be done with 10 per cent each of sumac 51 deg., and fustic 51 deg.; and 3 per cent of copperas at the end.

A light warm cream of pleasing appearance is dyed with 2 per cent of cutch extract, and 4 ounces of bluestone at boiling heat for an hour. Lift and sadden in 5 turns at 140 deg. Fah. with 1 per cent of copperas and half as much chrome. A dull tan brown is colored with 20 per cent of cutch extract, and 2 per cent of bluestone, finishing with 2 per cent chrome. A brighter, and thinner tan will take 6 per cent of cutch extract and 8 ounces of bluestone, giving the yarn 5 turns at 100 deg. Fah., thin finish in a fresh bath cold with 1½ per cent copperas—5 turns, and rinse.

A fast pale balbriggan got 8 ounces nitrate of iron, giving 4 turns at 120 deg. Fah.; afterwards 3 turns in a fresh bath of 1 per cent carbonate of soda. For a heavier shade of the same, turn for half an hour at 120 deg. Fah. in a bath containing 2 per cent fustic extract 51 per cent, 1 per cent hypernic extract 51 deg., and half a pound each of alum, and bluestone. Lift and rinse. For an ecru try for half an hour at 120 deg. Fah. 4 per cent fustic, 2 per cent of hypernic, and one each of alum, and bluestone. Sadden in a second bath with 2 per cent copepras—six turns at 120 deg. Fah. A full, yellowish stone drab may be dyed by the same plan if one adds to the last quantities an extra one pound of logwood extract 51 deg., and another of copperas. A deep redish brown was dyed in 8 turns at boiling heat with 20 pounds of cutch liquor, and 2 of bluestone; it then received 6 turns at 100 deg. Fah. in 5 per cent of chrome; and lastly 6 turns more in a bath containing 10 pounds logwood extract 51 deg., and 10 ounces of copperas.

We shall conclude with a black or two. Here is one on jute yarn, often in demand for carpet work. Start the kettle with 40 per cent, logwood extract 51 deg., 6 per cent of soda ash, and 6 pounds of bluestone. Turn the yarn for an hour and a half in this at boiling heat, lift and drain for an hour; finally wash off in a clean bath with 2 per cent chrome. 30 per cent of logwood will be enough for a second lot in the first kettle, and 20 per cent for all succeeding batches. Half the soda ash and bluestone will answer. For an excellent black on cotton yarn mordant first with 20 per cent of sumac extract 51 deg., then pass through a warm bath containing 7 per cent copperas and 3 per cent of bluestone for half an hour and rinse. Dye next at a boiling heat for one and a half hours with 25 per cent of good logwood extract 51 deg. (English, French, or American)); and 5 per cent of fustic extract 51 deg. Lift, and finish at a boil for half an hour in a bath containing 5 per cent copperas, and 3 per cent of bluestone. A cheaper black was often dyed with 25 to 30 per cent of logwood extract, 5 per cent of cutch extract, 4 per cent of soda ash and the same of bluestone. The yarn was turned in this for two hours and lifted to "age" for three hours—or until another batch was put through in the same kettle. It was then re-entered and turned again for another hour; lifted, and washed off with four turns in a bath with 1½ per cent of chrome. For a second lot of yarn in the same logwood bath one-fourth less stuffs were used; and for succeeding lots one third less.

We submit these selections as suggestive, reading of course; and for a time of trouble; not at all with the idea of permanently going back to them.

THE BIG AND SMALL OF IT.

A recent bulletin, B. 10, of the Herbert Morris Crane and Hoist Company, Toronto, illustrates and shows the construction of the largest standard chain block in the world. It is made for a load of 60 tons and some idea of its proportion is given by comparison with a chain block of ¼ ton capacity photographed along side it. The load with which this chain block is regularly tested is 90 tons, which is the usual 50 per cent overload test to which all Morris chain blocks are submitted.

THE LATE GILBERT M. PARKS.

Founder of G. M. Parks Co., Died Nov. 22, in Boston.

Gilbert M. Parks, founder of the G. M. Parks Co., Fitchburg, Mass., died on November 22 at the Corey Hill Hospital, Brookline, Mass., following an operation performed a week previous. The late Mr. Parks had been an invalid for some three years, having retired from active association with the business he had built up in September, 1911. Besides his widow, he is survived by two daughters and three sons, Robert S., Frederick W., and Howard M. Parks, all members of the G. M. Parks Co.

THE FABLE OF THE CALF PATH.

By SAN W. FOSS.

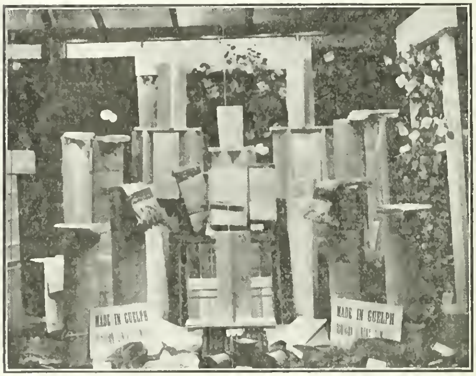
Some years ago the following poem appeared in a United States trade journal. While hunting through some old clippings the other day we came across it, and thinking it "a propos" to the present situation, publish it for the benefit of those of our readers and others who persist in sticking to the beaten path. Man's proclivities lie in that direction. The present is a time when we have to get out of the rut. There's many a good thought and suggestion held out.—Editor.

One day through the primeval wood,
A calf walked home, as good calves should;
But made the trail all bent askew,
A crooked trail as all calves do.
Since then two hundred years have fled,
And I infer the calf is dead.
But still he left behind his trail,
And thereby hangs my moral tale.
The trail was taken up next day,
By a lone dog that passed that way.
And then a wise bellwether sheep
Pursued the trail o'er vale and steep
And drew the flock behind him too,
As good bellwethers always do.
And from that day o'er hill and glade,
Through those old woods a path was made;
And many men wound in and out,
And dodged and turned and bent about,
And uttered words of righteous wrath,
But still they followed—do not laugh—
The first migrations of that calf;
And through this winding woodway stalked,
Because he wabbled when he walked.
This forest path became a lane,
That bent and turned and turned again;
This crooked lane became a road,
Where many a poor horse, with his load,
Toiled on beneath the burning sun,
And travelled some three miles in one.
And thus a century and a half
They trod the footsteps of that calf.
The years passed on in swiftness fleet,
The road became a village street,
And this before the men were 'ware,
A city's crowded thoroughfare;
And soon the central street was this,
Of a renowned metropolis.
And men two centuries and a half,
Trod in the footsteps of that calf.
Each day a hundred thousand rout
Followed the zigzag calf about;
And o'er his crooked journey went
The traffic of a continent.
A hundred thousand men were led
By one calf near three centuries dead;
They followed still his crooked way,
And lost one hundred years a day;
For thus such reverence is lent
To well established precedent.
A moral lesson this must teach
Were I ordained and called to preach.
For men are prone to go it blind
Along the calf-paths of the mind.
And work away from sun to sun,
And do what other men have done.
They follow in a beaten track,
And out and in, and forth and back;
But still their devious course pursue,
To keep the path that others do.

"MADE-IN-CANADA" LINENS.

The Dominion Linens, Limited, of Guelph, Ont., is now in full operation under the new management, and from reports to hand is meeting with most encouraging success. The company has a mill at Tilsonburg, Ont., and a large new mill at Guelph, all the finishing being done in the latter plant. The reorganization has been brought about in a most thorough manner with the resut that manufacturing and selling costs have been greatly reduced, and the industry placed on a firm footing. The directorate includes several well known textile manufacturers of Western Ontario and practically assures success.

The list of materials manufactured by the Dominion Linens, Limited, includes damask, table cloths, napkins, glass cloth, kitchen cloth and towels, linen towels



and towelling crash, and huck towelling, dowlos, embroidery, linen, etc., sold under the trade mark "Domlin." Large orders have been received from various laundry companies, hotels and railways for towels and table linen, as well as from wholesalers and merchants throughout the country and the firm has now orders ahead sufficient for several months to come.

A "Made-in-Canada" campaign is being conducted in an effort to bring "Made-in-Canada" linens before the Canadian public. The accompanying photograph shows a unique feature of the campaign, being a display of "Domlin" linens in a store window in Guelph. We hope to have a good description of the industry in an early number of the Canadian Textile Journal.

MOST ATTRACTIVE CATALOGUE.

The Monarch Knitting Company, Limited, of Dunnville, St. Catharines and St. Thomas, Ontario, and Buffalo, N. Y., has just issued a most attractive and useful catalogue of the sweaters, sweater coats and knit goods manufactured. The colored description work is a novel departure showing the many and varied lines produced by the company. Monarch sweaters and sweater coats have become a by-word and merchants throughout the country speak of the pleasure of handling those lines. Each line, besides being pictured in colors is fully described in an easy, thorough manner so that the merchant knows exactly what he is being asked to buy. The catalogue is a most worthy effort and the Monarch Company is to be congratulated for its effort.

CANADIAN EXPORTS TO WEST INDIES

Of Textile Materials, the Produce of Canada.

This statement shows our exports of textile manufactures to the West Indies to be of comparative insignificance in spite of the excellent facilities for trade between the two countries. The following information regarding the German and Austrian trade in these materials, which is now open for Canadian manufacturers, is interesting.

Cordage and twines has hitherto been imported from Germany in considerable quantities through English wholesale firms. Men's half hose selling at from 4d to 2s per pair; women's hose selling at from 6d to 2s 6d per pair; braids, trimmings and laces; men's vests and pants; women's vests and blankets, all of cotton, direct and through English houses. Haberdashery and millinery, direct. Silk handkerchiefs, through English firms of cheap material and silk ribbons, through English firms. These goods are imported direct from Germany to the value of about $60,000 each year, while as much again is said to be imported through English firms each year.

	1909. $	1910. $	1911. $	1912. $	1913. $	1914. $
Clothing and wearing apparel	......	......	......	......	......	1,655
Cotton and manufactures of	2,061	2,419	4,891	436	10	323
Cordage, rope and twine	24,948	24,677	26,310	22,751	15,604	20,021
Rags	......	......	......	......	......	474
Sails, awnings, tents and tarpaulins	......	......	......	......	......	10
Wool, and manufactures of	162	152	110	264	167	557

MILL AND GENERAL TEXTILE NEWS

Leonard Junier is now overseer of carding with the Empire Cotton Co. at Welland, Ont.

P. C. Calvert has accepted the position of superintendent with the Paton Manufacturing Co., Sherbrooke, Que.

The Arrow Neckwear Company, Limited, of Toronto, has obtained an Ontario charter. The capital is $40,000. J. H. Flemming and J. H. A. Hird of Toronto, are the principal incorporators.

Mr. Alex. Rosamond, president of the Rosamond Woollen Co., Almonte, Ont., went over to England last month on business and has since joined one of the English businessmen's regiments for active service. His brother, Archie, is in charge of the business in Almonte during his absence.

Dr. Bonner, of Radcliffe, Alta., states that he has been successful in making financial arrangements, enabling him to proceed with the equipping of the knitting mill there. The building has been erected, and it is expected that the plant will be in operation early in the new year.

The Perfect Knit Mills, Ltd., of Listowel, Ont., which Max Becker is managing director, contemplate an extension to the present plant to cost $4,000.

The St. Catharines Silk Mills, Limited, St. Catharines, Ont., are now in operation. The plant is situated on Carleton Street and is equipped with 3 looms to manufacture silk undergarments. H. C. Specht is president, F. L. Kramer, treasurer, both of Buffalo, N.Y., and B. S. Griffith, formerly of the Niagara Silk Mills of North Tonawanda, N.Y., and Niagara Falls, Ont., is capitalized at $100,000. Messrs. R. L. Baker & Co. of Toronto are the selling agents.

The Dods Knitting Company's plant at Orangeville, Ont., is about ready for full operation. The machinery is installed and Mr. Dods hopes to have everything in good running order by the end of the month.

A. F. Drew, superintendent of the Dominion Textile Company's plant at Halifax, N.S., has fully recovered from his recent illness and took up his duties again on the first of the month.

W. H. Wyman of the American-British-Canadian Distributers, who, it was reported, was considering the establishment of a silk mill in Kingston, Ont., informs us that nothing has been done other than that he has been negotiating with several municipalities with a view toward starting a plant for the manufacture of silk threads and fabrics.

F. W. Sumner, president of the Humphrey's Unshrinkable Underwear Co., Moncton, N.B., has refuted the statement that the company's dividend was "several weeks overdue" as reported in several papers last month. He states that the dividend was paid as usual on October 1.

Percy White of the firm of Morgan and Co., wool brokers, Boston, Mass., has been around the woollen mills in Canada during the month in the interests of his firm. Mr. White is confident that his firm will shortly build up a good connection with Canadian mills, as he received much encouragement during his trip.

Wm. Mitchel of Kincardine, Ont., who is considering the starting of a woollen mill in that town, writes that a by-law will be submitted to the ratepayers on January 1, for the purpose of procuring financial assistance for the proposition. If successful, he hopes to have a plant in operation by Spring, 1915. Yarns, tweeds, blankets, flannels and wool socks will be manufactured.

The Dominion Textile Company has given the use of one of the storehouses connected with the Merchants Mill, Montreal, to the Militia Department for a barracks. This building was formerly used as a bleachery, but the machinery was taken out some years ago, and it has since been used for storing purposes.

The report last month that Belgian interests would establish a cotton spinning plant at Three Rivers has been found to be somewhat premature. Negotiations are progressing and the city holds out inducements, but nothing definite has been done. These same interests have been negotiating for a favorable site around Montreal for some time.

BOSTON WOOL SITUATION.

(Special Correspondence.)

Boston, December 1.—The local wool market contiues rather quiet, but firm. Foreign advices are not encouraging and United States buyers are practically prohibited from doing any business in England or the Colonies. They are getting more wool in South America than hitherto, but are finding serious difficulty in getting the wool shipped. English buyers continue to take wool freely in Buenos Ayres, but our buyers are reported to be getting some. Latest quotations are 12½ pence for Class 4 wool and 12 pence for Lincolns, cost and freight in both cases. With insurance and war risks added, this would make the cost in the grease laid down here 26½ cents for Class 4 and 25½ cents for Lincolns. At Montevideo a wide range of quotations is being made.

Old wools are being steadily picked away. Even in the houses where the most confidence is felt in regard to future prices no disposition to hold back the wool on hand is manfest.

Prominent among the sales of Territories of late is the transfer of half a million pounds of Montana clothing wool at prices running from 20 to 22 cents according to grade. Houses in general where Territory wools are still in stock note an improved demand. Another house reports sales of 200,000 pounds, mostly clothing wool, at prices which bring the scoured cost within the range quoted below. Still another house has sold a lot of 150,000 pounds fine Territory at 18 cents in the grease, or 56 to 57 cents clean.

Scoured values are slightly higher, especially for the better grades. Fine staple territory wool is not quoted at 62 to 63 cents, half-blood staple at 58 to 60 cents, three-eighths blood staple at 52 to 53 cents, quarter-blood staple at 46 to 47 cents. Fine clothing Territories are quoted at 57 to 58 cents and fine medium at 55 to 56 cents.

Scoured wools have moved fairly well, several hundred bags changing hands on the basis of 55 to 57 cents for choice fine and 53 to 55 cents for average fine and fine medium. The demand from Canada has decreased again, owing to the trouble experienced in getting the wool over the border. A large number of carloads are reported held up until a satisfactory "pedigree" can be arranged for the shipments.

Considerable demand is reported for pulled wools, especially B supers to go abroad. Some New York pullers are reported to be holding their choicest brushed wools at 50 cents in the grease, or 57 cents clean, though most of the Eastern pullings are offered at 48 to 52 cents clean for B supers and 52 to 53 cents for A lambs. Chicago pullings have been advanced to 46 to 48 cents for B supers and 50 to 52 cents for A supers. The speculative buying among dealers in both scoured and pulled wools has produced high prices, according to reports.

Fleece wools are quiet, only small sales being noted. Holders of the small remaining stocks are firm and prices, especially for medium combing grades are advancing. Current quotations for Ohio fleeces are about as follows: Fine washed delaine, 31 to 32 cents; XX and above, 30 to 31 cents; fine unwashed delaine, 25½ to 26½ cents; fine unwashed clothing, 25 cents; half-blood combing, 29 to 30 cents; three-eighths blood combing, 30 cents; quarter-blood combing, 29 to 30 cents; medium clothing, 25 to 26 cents. Indiana quarter-blood combing is reported to have sold at 29 cents, Ohio quarter-blood combing is held at 30 cents, though no sales are yet reported at that figure.

Foreign wools are quiet, owing to the small offerings of grades most wanted.

LANCASHIRE COTTON INDUSTRY.

The cotton industry of Lancashire is making slow but steady progress towards recovery from the depression which has existed since the war began, says the London Statist of November 14. A change of sentiment is now showing itself on the part of buyers. At the time of writing no official announcement has been made as to the reopening of the Raw Cotton markets in America and Liverpool, but it is believed that trading in futures in full will be resumed on Monday. Some people fear a slump in values in the raw material when the present restrictions are removed. Be that as it may, many buyers of yarn and cloth have come to the conclusion that prices are on a low level and the moment is a favorable opportunity to purchase cheaply.

An increasing inquiry in piece-goods for India has come through this week, and although many of the offers have been quite unworkable, a fair business has been done in well-known makes of shirtings. Light fabrics such as dhooties have been neglected and it is believed that stocks abroad are very heavy. Last month we shipped more cloth to Calcutta than in October last year, but it is understood that most of the goods were of light descriptions. China buyers have also been more prepared to purchase in well-known standard makes, and many manufacturers have had a better week than at any time since the beginning of August. Things are very unsettled in the Near East, but some letters and telegrams from Egypt are more encouraging, and it is said that stocks there are comparatively low and that merchants want to buy. Any improvement in employment in the weaving section must come about slowly, but already there are indications of more looms being got to work. Our shipments in cloth last month were about the same as in September, but of course the total compares very unfavorably with the same month last year. A feature of interest in connection with the returns is the continued big takings by India, especially Bengal.

The undercurrent of demand in home American yarns continues fairly healthy, and the recent advance in prices, especially in coarse numbers, is being well maintained. There is much less pressure for fresh orders than a few weeks ago. Bolton spinnings made from Egyptian cotton have recently been purchased more freely and many producers have strengthened their position. Prices are now dearer and further progress is being blocked. As can only be expected, our foreign trade in yarn is dwindling, and the Board of Trade returns for October give the shipments as less than half those in the same month last year. Although more buying has recently occurred for Holland, the demand for India remains very disappointing.

It is said that some extensions of spinning and weaving concerns in Lancashire are being pushed on at a more rapid rate than expected, owing to the fact that textile machinists are unable to ship goods abroad and are in a better position to complete contracts quickly at home.

An analysis of the stocktaking results of three large spinning companies for the past three and six months shows a loss of 13.20 per cent per annum on share capital, and a loss of 7.69 per cent per annum on share and loan capital combined, after allow interest in looms.

TABLE SHOWING THE IMPORTS OF RAW AND MANUFACTURED TEXTILES INTO CANADA FOR THE MONTH OF AUG., ACCORDING TO THE LATEST FIGURES COMPILED BY THE DEPARTMENT OF TRADE AND COMMERCE

	Imports for August, 1914	Imports for 5 mos. ending August, 1914	Imports for Fiscal year ending Mar. 31, 1914	Imports for Fiscal Year Ending March 31 1913
Imports of wool and manufactures of, into Canada:				
Blankets, pure wool	13,795	42,540	172,151	141,342
Cassimeres, cloths and doeskins	249,670	789,606	1,967,706	3,221,612
Coatings and overcoatings	119,411	512,840	1,317,921	1,216,752
Tweeds	97,521	375,950	1,274,755	1,473,463
Felt cloth, N.O.P.	2,115	18,064	58,869	31,920
Flannels, plain	20,032	78,478	155,491	126,141
Knitted Goods, N.O.P.	102,618	294,770	1,265,261	1,507,032
Bed comforters	55	76	7,644	3,674
Railway rugs	7,383	27,000	74,142	64,141
Shawls	11,750	36,104	97,836	131,576
Shirts	3,013	14,108	70,595	61,652
Socks and stockings	173,600	539,254	1,829,668	1,664,825
Undershirts and drawers, N.O.P.	72,647	156,347	424,413	82,567
Yarns, 30c. lb. and over	99,549	511,670	2,284,205	2,240,973
Yarns, N.O.P.	29,512	111,347	267,135	305,328
All fabrics and manufactures, N.O.P.	997,765	3,442,703	10,115,541	10,435,013
Lustres, mohairs, alpacas and Italian linings	74,978	350,385	1,162,308	1,324,483
Women's and children's dress goods	22,743	121,366	194,938	221,287
Clothing, women's and children's outer garments	74,034	175,568	589,788	528,130
Clothing, ready-made, N.O.P.	188,746	625,005	2,183,755	2,418,111
Carpets, mats and rugs	140,731	613,781	1,592,031	2,987,748
Felts, pressed	22,931	110,218	405,055	389,382
Worsted tops—dutiable	.....	....	1,928	445
Noils and worsted tops, N.O.P. free	58,925	323,772	1,072,066	980,432
Wool, not further prepared than washed, free	167,381	629,756	1,872,089	2,068,028
Yarns, free	823	3,755	11,265	19,358
Imports of Cotton and manufactures of Cotton, into Canada:				
Cotton cordage	1,378	16,707	41,058	37,192
Duck, over 8 ozs., per sq. yd., N.O.P.	36,377	330,018	909,886	1,131,705
Embroideries	40,168	257,197	1,143,703	1,549,711
Gray, unbleached cotton fabrics	49,350	289,859	1,454,498	1,061,683
White or bleached cotton fabrics	203,413	1,119,727	3,319,255	3,003,130
Tailors' hollands of cotton and towelings in the web	20,413	94,898	227,956	267,492
Fabrics, printed, dyed or colored, N.O.P.	463,187	2,094,040	6,580,065	7,042,249
Jeans, coutiles and sateens for use in corset manufacture	23,984	119,578	286,592	301,365
Handkerchiefs	50,808	192,887	652,516	832,652
Batts, batting and sheet wadding	2,818	12,346	35,320	33,701
Bobbinet plain, in the web	3,678	21,075	68,090	55,895
Knitting yarn, N.O.P.	13,495	96,192	252,844	207,008
Warps	53	799	10,747	6,099
Seamless bags	947	6,173	58,732	63,699
Sheets, bed quilts, pillow cases and damask of cotton in the piece, uncolored table cloths or napkins of cotton	100,567	365,588	1,184,927	1,109,557
Shirts of cotton	28,434	164,606	629,471	655,976
Sewing thread	21,677	162,170	606,241	700,290
Crochet and knitting cotton	2,282	24,436	86,399	39,964
Other thread, N.O.P.	15,725	92,047	151,777	102,264
Clothing N.O.P.	18,835	1,168,613	2,949,986	3,044,538
Blouses and shirt waists	12,802	98,105	200,181	232,067
Cotton bags, N.O.P.	26,711	63,896	195,256	151,966
Lampwicks	1,617	11,928	29,862	....
Lace	92,727	370,285	1,144,225	1,685,532
Shawls	342	2,368	6,008	2,583
Socks and stockings	46,701	327,699	1,070,702	812,518
Tape, uncolored and colored	7,979	40,073	78,403	13,123
Towels	36,426	155,464	448,587	472,801
Undershirts and drawers	8,930	43,468	113,659	115,440
Uncolored cotton fabrics, bleached	4,696	15,579	49,772	37,851
Velvets, velveteens and plush fabrics	178,865	547,387	1,015,823	996,310
Other manufactures of cotton, N.O.P.	104,863	489,010	1,170,007	1,270,788
Raw cotton, free	175,621	1,563,582	9,752,437	8,735,191
Yarn No. 40 and finer, free	65,213	325,853	1,051,520	1,231,953
Yarn, polished or glazed for manufacture of shoe laces, free	1,228	5,643	4,823	1,435
Imports of Silk and manufactures of Silk, into Canada:				
Fabrics, N.O.P.	636,121	2,460,255	6,191,521	5,762,223
Fabrics, for manufactures of neckties	34,603	153,468	249,283	170,625
Handkerchiefs	14,043	38,948	118,260	114,231
Blouses and shirt waists	7,171	29,152	70,390	90,140
Clothing	89,173	295,421	1,100,406	1,021,134
Silk, spun, N.O.P. and in the gum not more advanced than single team or thrown organzin, not colored	834	2,911	66,309	53,605
Silk, in gum or spun for manufacture of ribbons and shoe laces	110	789	499	1,595
Sewing and embroidery silk	8,952	38,029	141,779	145,815
Shawls	71	576	4,645	13,647
Shirts	530	5,228	19,486	13,824
Silks—N.O.P.	41,955	135,109	369,681	568,090
Socks and stockings	21,679	137,520	298,915	280,940
Underwear and drawers	2,148	5,830	11,890	4,304
Velvets and plush fabrics	102,503	234,960	607,596	555,434
Artificial silk, free	26,209	80,434	179,459	....
Silk, in gum, or spun, for mfr. of underwear or woven labels	16,204	52,515	78,066	....
Silk, raw, or as reeled from the cocoon	10,685	104,193	335,385	....
Imports of Jute, Flax, Hemp, and mfrs. of same into Canada:				
Bags or sacks	40,129	112,625	294,757	294,495
Canvas of hemp for ship's sails	187	2,521	21,286	....
Carpetings, rugs, mats	2,910	20,258	63,392	85,119
Uncolored damask of linen in the piece, stair linen, diaper, doylies, tray cloths, table napkins and cloths, quilts and sheets	82,744	352,567	1,030,424	1,192,979
Handkerchiefs	21,469	68,303	281,732	303,517
Towels	18,566	64,279	201,417	225,697
Fabrics, brown or bleached	7,103	24,269	128,073	175,201
Fabrics of flax, unbleached N.O.P.	39,009	155,206	420,798	457,573
Tailors hollands of linen and towelling in the web	18,054	85,339	201,711	231,257
Linen clothing N.O.P.	824	7,116	21,287	18,713
Linen blouses and shirt waists	....	219	1,251	301
Linen thread, N.O.P.	9,082	93,686	239,905	273,059
Linen shirts	....	602	1,550	4,714
Tapestry, jute	19	49	1,187	683
Jute cloth, uncolored, not finished	115,214	228,308	11,790	21,326
Fabrics of flax, printed, dyed or colored	5,241	16,402	42,916	45,198
Other manufactures of flax, or hemp, N.O.P.	4,695	24,674	52,102	92,160
Manufactures of jute, N.O.P.	11,612	93,583	283,022	359,250
Linen yarn, free	5,655	23,352	22,635	58,825
Jute cloth as taken from loom, free	39,801	780,864	2,746,493	2,601,785
Jute or hemp yarns, free	16,078	128,088	283,736	481,747
Jute canvas, uncolored, free	....	468,011	2,092,703	1,424,011
Miscellaneous Imports:				
Knitted goods of every description, N.O.P.	12,188	66,467	180,540	118,536
Binder twine, free	621,714	1,977,621	3,779,589	2,320,351