CANADA

DEPARTMENT OF MINES

HON. W. A. GORDON, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

NATIONAL MUSEUM OF CANADA

W. H. COLLINS, ACTING DIRECTOR

BULLETIN No. 71

Annual Report for 1932

CONTENTS

OTTAWA
J. O. PATENAUDE, ACTING KING'S PRINTER
1933

Price, 10 cents

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GENERAL ACTIVITIES OF THE NATIONAL MUSEUM OF CANADA

By W. H. Collins, Acting Director

The conditions that forced a discontinuance of field work by the National Museum of Canada in 1931 unfortunately continued throughout 1932 and the main museum activities were consequently limited to laboratory work, to the revision and extension of exhibits in the public halls, and to the scientific study of materials collected in the field, and the preparation of reports on the same.

Efforts were concentrated for some time on the hall of Palæontology. The hall is small and hopelessly inadequate, but the available space is being utilized to the best advantage. Exhibits have been rearranged and reconstructed and the labelling has been improved. Those in charge have kept the general public in mind and have recognized the growing tendency to regard the museums not as repositories of attractive curios or rare specimens of scientific interest but as centres of popular education. The story of the lives of the long succession of plants and animals, some miraculously persisting unchanged throughout geological ages, some rising rapidly to dominance and then mysteriously vanishing, and some evolving into forms more and more complex and with more highly specialized functions, culminating in man, can be made intensely interesting. The facts that the records are incomplete and that the broken chain of events must in part be left to the imagination to piece out, only enhance the interest. The rearrangement of the exhibits and the mounting and framing in mahogany of the fine collection of dinosaur tracks from Peace River Valley, Alberta, have increased their educational value and added to the orderliness and attractiveness of the hall.

Two exhibits have been placed on the grounds of the Museum and have called forth specially favourable comment. One is a cast in cement of a dinosaur trackway of six tracks placed on a level with the ground; the other is a cast in cement of a single enormous dinosaur track raised 12 inches from the ground. It is deep and makes an excellent bird bath.

In the Hall of Anthropology arrangements are well under way for setting up an Eskimo habitat group. An alcove has been partitioned off from the rest of the hall, and an opening in the partition affords a view of an igloo interior. The exhibit will be completed and in place in a few weeks.

Several loans, mainly of Indian and French-Canadian handicrafts, were made during the year. The Acting Director arranged for a display of exhibits at the Central Canada Exhibition held in Ottawa in August. Three booths were occupied, one by the Division of Biology, one by the Division of Anthropology, and one by the Geological Survey.

The paucity of new material being acquired for scientific study and for exhibition purposes is due to the temporary suspension of field work and the restricted appropriation available for purchase of specimens. In

the course of field work large collections of zoological, botanical, and archæological specimens are made and many of ethnological articles are obtained at little cost. Most of the money available for specimens is used to purchase anthropological material, which is becoming increasingly difficult to obtain, especially as there is a good market for it in foreign countries. The Biological Division collects in a small way locally, but is at present forced to depend largely on donations from other Government departments, such as the National Parks and the Dominion Lands Administration, Department of the Interior, and from numerous naturalists throughout Canada with whom most friendly relations have been established.

A delightful function, for which the Museum, in addition to the National Gallery, was thrown open and to which the staff contributed its services, was the reception given by the Minister of Public Works to the Imperial Economic Conference which met in Ottawa in the summer of 1932. C. M. Barbeau was influential in arranging for an excellent musical program of folk songs in the rotunda.

It is in a time like the present when, on account of financial stringency, activities of institutions such as museums are greatly curtailed that the friendship of individuals and other institutions is appreciated. The Acting Director is not unmindful of the Museum's indebtedness in this regard and takes pleasure in expressing his sincere thanks to the Department of the Interior for donations and co-operation; to the Department of Public Works for sympathetic consideration of requests for decorating and repairs and for promptness in their execution; and to the Royal Canadian Mounted Police, and the Department of Indian Affairs for kindly co-operation. He is very grateful to many other organizations, Canadian and foreign, and to individuals for donations and exchanges and for gratuitous assistance in scientific research, and to the Canadian press for assistance in bringing the activities of the Museum to the attention of the public.

Miss T. L. Klotz resigned from the position of Herbarium Assistant on November 15, 1932.

EDUCATIONAL AND EXTENSION SERVICE

The educational service of the National Museum is being extended gradually within the limits of its staff and facilities. The organization and administration of this branch of the Museum's activities are carried on by the staff of the Director's office incidental to other duties of the Geological Survey and the Museum.

The following is a review of the service the Museum offers at present:

MOTION PICTURES

The motion picture film library now includes the following subjects: biology, anthropology, geology, and miscellaneous. For a detailed list of the pictures *See* " Catalogue of Motion Picture Films," 1933, National Museum of Canada.

These motion picture films are available on loan to schools, universities, and societies or institutions. No rental fee is charged, but the borrower is required to pay the shipping charges.

LANTERN SLIDES

Sets of lantern slides are being assembled for loan to educational institutions and lecturers with the object of stimulating interest in natural history. A nucleus of sets has been established and includes the following series: Indians and Eskimos, dinosaurs, topographic forms, reptiles and amphibians. A large collection of slides of Canadian birds now available is being prepared in sets, but pending the final arrangements of the sets, selections are being made to meet the needs of individual inquirers. The collection will be added to gradually and when present plans materialize sets of lantern slides will be available to represent adequately, and illustrate, Canadian fauna and flora, the Indians and Eskimos of Canada, the geography of Canada, and the natural sciences.

Special sets of lantern slides are arranged for use in the automatic balopticon installed in the rotunda of the Museum. This projector has already proved its usefulness as an educative medium.

STILL PHOTOGRAPHS

A large collection of petrographic negatives has been accumulated by the National Museum and the Geological Survey, Canada, with which the Museum is closely associated over a period of more than seventy years. Prints, enlargements, and lantern slides are made from these negatives and are sent at cost price to schools and universities requiring these visual aids in teaching.

Each year many requests are received from authors, journalists, and publishers for photographs to illustrate special articles. The National Museum welcomes such requests and aims to assist writers and publishers in every possible way.

LOAN OF SPECIMENS

Specimens of birds, small mammals, Indian clothing, and implements are available for loan to teachers, but up to the present very few loans have been made outside of Ottawa. This service has developed on account of the demand from teachers in local schools for this assistance and very little expense is involved either to the Museum or the teachers. The teachers call at the Museum for the specimens and return them within a time limit.

To extend this service outside of Ottawa would involve considerable expense to the Museum in providing the additional loan sets that would be required, and it is considered that the expense of shipping renders the feasibility of extending this service impracticable. If in the future loan centres are established outside of Ottawa consideration may be given to extending this service.

MINERAL AND ROCK COLLECTIONS

Three grades of collections of minerals and rocks are prepared by the Geological Survey for sale to educational institutions. The prices of these collections and full information about them may be obtained on application to the Director of the Geological Survey.

A table indicating the number of collections sold in the past year is included in the report of the Chief of the Mineralogical Division.

MUSEUM LECTURES

One of the most important educational activities of the National Museum is the series of illustrated lectures given in the lecture hall of the Museum. The lectures are arranged by a committee whose report follows.

Seventeen illustrated lectures were given under the auspices of the National Museum in the winter of 1932-33, and if attendance is any criterion of the value and interest of the lectures these two series were the most successful since this educational feature was inaugurated by the Museum. The first series commenced on November 5 and ended December 14; the second series extended from January 7 to March 22.

The titles of the lectures and the respective speakers were as follows:

First Series:

The Wild Mammals of Ontario, by R. M. Anderson, Ph.D., National Museum of Canada, Department of Mines.

Indian Music, by Marius Barbeau, B.A., B.Sc., LL.D., Ethnologist, National Museum of Canada, Department of Mines.

New Zealand, A Paradise of Scenic Delights, by James C. Brady, Department of Trade and Commerce, Dominion Bureau of Statistics.

Early Days in Bytown, by Hamnett P. Hill, K.C.

Arctic Patrol, 1932, by D. L. McKeand, of the Northwest Territories and Yukon Division of the Dominion Lands Administration, Department of the Interior.

Death to the Pests in the Dwellings of Man, by C. R. Twinn, B.S.A., of the Entomological Branch, Department of Agriculture.

Second Series:

The Four Seasons, a four-reel motion picture film prepared under the direction of Dr. Raymond L. Ditmars, Curator, New York Zoological Gardens.

How We Make a New Apple, by W. T. Macoun, D.Sc., Dominion Horticulturist, Department of Agriculture.

Architectural Trends, Ancient and Modern, by A. J. Hazelgrove, M.R.A.I.C.

The British West Indies and Its Products, by F. E. Holloway, Montreal, Quebec.

Mountains and Lakelands of British Columbia, by J. M. Humphrey, Malakwa, British Columbia.

The Indians of the Pacific Coast of Canada, by Harlan I. Smith, National Museum of Canada, Department of Mines.

Canadian Homes from Coast to Coast, by F. C. Nunnick, B.S.A., Chief of the Division of Extension and Publicity, Dominion Experimental Farm, Department of Agriculture.

Australia: A Sunshine Land, by L. R. Macgregor, Australian Trade Commissioner in Canada, Toronto, Ontario.

Across the Great Plains, by Loris S. Russell, B.Sc., M.A., Ph.D., Geological Survey, Department of Mines.

The League of Nations at Work, by N. A. Robertson, of the Department of External Affairs.

From Cape North to Cape Sable, by William G. Ernst, K.C., M.P.

The attendance was as follows:

First Series	Six children's lectures	Six adult's lectures
Total attendance	5,690	2,770
Average attendance	948	462

Second Series	Eleven children's lectures	Eleven adult's lectures
Total attendance	8,830	4,970
Average attendance	803	452

First and Second Series	Children	Adults
Total attendance	14,520	7,740
Total attendance at all lectures		22,260

There was an increase over the previous year of 4,615 in the total attendance at all lectures. The average attendance at the lectures in 1930-31, 1931-32, 1932-33 was: (1) children's lectures, 660, 755, and 875, respectively; and (2) Wednesday evening lectures, 308, 340, 457. It is significant that the increase in the average attendance at the Wednesday evening lectures in 1932-33 was 117 over 1931-32, whereas in the previous year the increase in the average attendance at the Wednesday evening lectures was only 32. The average attendance at the adult's lectures has grown from 250 in 1929-30 to 457 in the past year. The seating capacity of the lecture hall is 406 so that at most of the lectures last year it was necessary to use spare chairs. The additional chairs did not solve the seating problem, however, as many people were refused admission to the hall on Wednesday evenings after it was filled almost beyond capacity. On Saturday mornings there has been a corresponding increase in the attendance of school children, but it is possible to accommodate all the children attending by repeating the lecture two or three times.

The success of the lectures and the widespread interest they have aroused in cultural subjects is due chiefly to the speakers who have given their time and talent generously to this public service. The Lecture Committee acknowledges its indebtedness to the speakers and takes this opportunity to thank them again most heartily for their cordial co-operation. It may not be generally realized that many hours of study are spent by the speakers in preparing for these lectures and the spontaneity with which they are given testifies to the concentrated study that has been devoted to them.

Up to this year practically all the speakers have been residents of Ottawa. The National Museum has no funds available to pay the travelling and hotel expenses of speakers and it is not possible, therefore, to invite distinguished speakers from elsewhere to lecture at the Museum unless they happen to be in Ottawa on other business or wish to pay their own expenses. The following out-of-town residents very kindly consented to lecture at the Museum in the winter of 1933: F. E. Holloway, Montreal; J. M. Humphrey, Malakwa, British Columbia; L. R. Macgregor, Australian Trade Commissioner in Canada, Toronto; and William G. Ernst, K.C., M.P., whose home is at Bridgewater, Nova Scotia, but lectured while he was in Ottawa

during the Parliamentary session. The Lecture Committee is sincerely grateful to these speakers and hopes that this exemplification of public-spiritedness will be shared by other speakers in various parts of Canada when the opportunity presents itself for them to be associated in the educational work of the Museum.

For many years the Canadian Boy Scouts Association (Ottawa district) has provided ushers at the children's lectures on Saturday mornings. This assistance is very greatly appreciated by the Lecture Committee. The active participation of the Scouts in acting as ushers and assisting the Committee enables the children to feel that they have a share in the program and in this way fosters in them a spirit of responsibility. With the same object in view, the Committee invited several children with particular talent to contribute vocal or instrumental solos before the commencement of some of the lectures.

For the loan of motion picture films during the past year the Lecture Committee acknowledges the courtesy of the following institutions: National Parks of Canada, Department of the Interior; Development Branch, Canadian Pacific Railway; New Zealand Government; Canadian Government Motion Picture Bureau; Northwest Territories and Yukon Branch, Department of the Interior; Society for Visual Education Inc., Chicago, Illinois; Pinkney Films Service Company, Pittsburgh, Pennsylvania; Fruit Branch, Department of Agriculture; Wholesome Films Service, Boston, Massachusetts; Cunard Steamship Company, Montreal; Australian Department of Trade and Commerce.

The co-operation of the *Ottawa Journal,* the *Ottawa Citizen,* and *Le Droit,* is also very much appreciated. By providing space for reports of the lectures, and by editorial references, the local newspapers have given prominence to the lectures that has been a valuable factor in contributing to their success.

The personnel of the Lecture Committee is: Harlan I. Smith (Chairman), M. E. Wilson, Clyde L. Patch, and G. W. Richardson (Secretary).

DIVISION OF ANTHROPOLOGY

The activities of the staff were limited almost wholly to office work.

Diamond Jenness remained at his office throughout the year, preparing reports and attending to the usual inquiries and correspondence. The assembling of papers for the Anthropological Section of the Fifth Pacific Science Congress, postposed from 1932 to 1933, occupied a considerable part of his time. He superintended, also, the distribution of Dr. Ami's collection of archæological material among various Canadian museums, and acted in an advisory capacity on an interdepartmental Reindeer Committee. During the early summer he completed and published " Fifty Years of Archæology in Canada " (in Fifty Years' Retrospect, 1882-1932, Anniversary Volume, Royal Society of Canada, 1932). Later in the year he completed three reports for the museum, one on the " Sekani Indians of British Columbia," another on the " Ojibwa Indians of Georgian Bay," and a third on the " Grammatical Structures of the Western Eskimo Dialects." He is now engaged in the preparation of a report on the " Carrier Indians of British Columbia."

Mr. Barbeau proceeded with the preparation of the materials and text for his monograph on "The Eagle Phratry of the Tsimsyans, Its Southward Migrations." Part of the introduction is practically ready and a considerable part of the Indian narratives on the past history of the Eagle clans.

The migration of the Eagle clans forms part of a significant drift of population southwards in the whole northwest, from Alaska into British Columbia, and across the Rockies eastward toward Hudson Bay or southward to the Great Plains. It illustrates natural processes also at work elsewhere. For that reason close attention is devoted to the whole problem of southward migrations in the northwest and ultimately the Siberian origin of the migratory tribes that crossed Bering Sea not so long ago. Several papers were written on this topic during the year in preparation for the general introduction of the monograph on the Eagle phratry.

A number of Tsimsyan Indian songs, prepared for a large museum monograph now ready for publication, were compared with kindred Asiatic materials. This study in the latter part of the fiscal year brought remarkable results. A number of Indian songs studied by Mr. Barbeau in collaboration with Professor Kiang, a Chinese authority now at McGill University, proved closely to resemble some Chinese songs; particularly a group of dirge songs in connexion with burial ceremonies and incineration, which plainly discloses that a primitive form of Buddhism was prevalent among the Northwest Coast Indians in late prehistoric time. This shows that the ancestors of the Indians presumably had moved out of Siberia after Buddhism had travelled from India through China, and penetrated Siberia, possibly after the tenth century.

A group of songs, collected for the Jesup North Pacific Expedition among the Koriaks, Chuckchee, and Yukaghir of Siberia were studied early in January at the American Museum of Natural History in New York. They disclose surprisingly close historical affiliations with the songs of Northwestern Indians in a number of ways; among other things, the threefold native, Chinese and Cossack elements in Siberian songs which are also found, but less intensively, in the songs of the British Columbia natives.

The work on the migration and Asiatic origin of these Northwestern Indians and the Tsimsyans occupied most of the year.

A volume of fifty French-Canadian folk songs with historical annotations was completed in the spring of 1932.

Mr. Barbeau's services were lent for several weeks, in August and September, to the Quebec Government in connexion with the Zoological Garden of Charlesbourg. He helped in the elaboration of plans for the conservation of handicrafts and traditional resources of French Canada, in particular in so far as they bear on the economic life of the country. During that period several counties around Quebec were revisited, specimens were collected, photographs taken, and useful information gathered.

Mr. Barbeau during the year enabled the Quebec Government to procure one of the finest totem poles of the Northwest Coast for the Zoological Garden; and also the British Museum, of London, to acquire a totem pole from Nass River. He prepared extensive historical notes on these totem poles, and also on those acquired the previous year for the Royal Ontario Museum, of Toronto.

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The correspondence at the office continues to absorb time throughout the year, particularly in connexion with inquiries on the Indians and Canadian folk lore and songs.

Harlan I. Smith continued his work of organizing the accumulated data of Canadian archæology, including particularly that on the middens of Canada, the human form in prehistoric Canadian art, and the material resources of prehistoric times in Canada. He prepared a list of the antiquities near Prince Rupert, British Columbia, and a list of archæological sites in Prince Edward Island; also an illustrated article on "The Man Petroglyph," near Prince Rupert.

Mr. Smith made efforts to bring to the attention of artists and manufacturers the possibilities of using designs from Canadian Indian art for distinctive Canadian manufactures and souvenirs. Encouraging results were obtained in bronze and aluminium casts, silver plated ware, pewter etching, and wood carving. These objects reproduce some of the earliest art of Canada illustrating the first mythology of the country and are based on specimens in the National Museum of Canada.

W. J. Wintemberg partly completed his report on the culture of the Sidey-Mackay village site in Simcoe County, Ontario, and did considerable work on his report on the ancient site at Tadoussac, Quebec. He prepared a short article on the types, probable use, ethnic origin, and geographical distribution of certain stone implements, the use of which has heretofore not been thoroughly understood. He concludes they were probably used as tomahawk blades.

Douglas Leechman made a study of the occurrence of caries in the Indian and Eskimo teeth in the Museum collections and prepared a paper on the subject.

Progress is being made on the Eskimo habitat group for the west Hall of Anthropology. The igloo of which the interior only is to be shown has been completed.

Three special exhibits were prepared during the year: one for the Canadian Handicrafts Exhibition at Toronto; one for the Central Canada Exhibition held at Ottawa in the summer; and one for the Joan of Arc Institute, Ottawa, in the spring of 1933.

The sorting out of the material received from the estate of the late Dr. H. M. Ami continued, and twenty separate collections were made up from it. Fourteen collections were sent to various museums in Canada, one to New Zealand, and five were retained for future distribution.

Loans of specimens to Normal and Public School students, as well as to artists and other interested people, continue. Undoubtedly these loans do much to make the Museum known and its usefulness appreciated.

Publications

The following articles were published by the staff of the division:

Three Iroquois Wampum Records. By D. Jenness. Annual Report for 1931, National Museum of Canada, Bulletin No. 70, pp. 25-30, 1 pl.

Les Chansons Populaires du Canada. By Marius Barbeau. Royal Society of Canada, section 1, May, 1932.

How America Was First Peopled. By Marius Barbeau. Royal Society of Canada, section 2, May, 1932.

A Distinctive Canadian Art. By Marius Barbeau. *Saturday Night,* Toronto, August, 1932.

Fifty Years of Archæology in Canada. By Diamond Jenness. Royal Society of Canada, "Fifty Years of Retrospect 1882-1932," 1932.

Island of Orleans. By Marius Barbeau. *Canadian Geographic Magazine,* September, 1932.

The Witch Canoe. By Marius Barbeau. *Canadian Geographic Magazine,* December, 1932.

Totem Poles for the Provincial Museum. By Marius Barbeau. *Toronto Star Weekly,* January, 1933.

Quebec Wood-Carvers. By Marius Barbeau. *Dalhousie Review,* January, 1933.

The National Museum of Canada. By H. I. Smith. *The Museum Journal,* vol. 32, pp. 468-470, March, 1933.

Volcano Indians—Their Totems. By Marius Barbeau. *Toronto Star Weekly,* February, 1933.

Canadian Art Goes Forward. By Marius Barbeau. *Canadian Press,* February, 1933.

The following papers by Mr. Barbeau were published in *La Presse,* Montreal: Choses qui changent et gens qui passent (April, 1932); Le beau danseur (May); La Chasse gallerie (June); La Gaspésie (August); Nos anciennes sculptures sur bois (December); Le fouilleur mysterieux de Lanoraie (January, 1933); La Tournée-du-Moulin (March, 1933).

Lectures

Aboriginal Dyes and Paints. By Douglas Leechman. Royal Society of Canada, May, 1932.

Canadian Aboriginal Designs in Relation to Modern Industrial Art. By Douglas Leechman. Women's Art Association, Montreal, October 18, 1932.

How America was First Peopled. By Marius Barbeau. Canadian Club, North Bay, December, 1932.

How This District was First Peopled. By Marius Barbeau. Canadian Clubs, Barrie, and Port Hope, December, 1932.

Indian Music. By Marius Barbeau. National Museum, Ottawa, December, 1932.

The Indians of the Pacific Coast of Canada. By H. I. Smith. National Museum, Ottawa.

French Survival in Canada. By Marius Barbeau. Washington Academy of Science, January, 1933.

The Folk-lore of Canada. By Marius Barbeau. The Lord Reading Club, Ottawa, January, 1933.

Canadian Arts and Handicrafts. By Marius Barbeau. Ottawa Civic Hospital Nurses, February, 1933.

Art and Life. By Marius Barbeau. Radio address, February 27, 1933.

Accessions to Museum

There have been few additions to the anthropological collections during the past fiscal year, owing to there having been no field work. A number of small gifts of archæological specimens which, though sometimes negligible in themselves, are important in the aggregate, have been received.

Specimens accessioned in the course of the year may be divided into the following categories:

Ethnology	22
Archæology	241
Osteology	2
Portraits and drawings	8
Total	273

From the Staff:

Collected by W. J. Wintemberg:

Archæological specimens from Eglinton, Toronto, Ont.
Archæological specimens from Gatineau River, Quebec.

Collected by C. M. Barbeau:

Five homespun bedspreads, Ile-aux-Coudres, Quebec.
Chipped quartzite point, Baie-du-Febvre, Quebec.

By Purchase:

From W. A. Newcombe:

Four stone pipes from Saskatchewan.

From D. Jenness:

Sekani Indian robe of ground-hog skin.

From C. M. Barbeau:

Eagle form pecked in stone from British Columbia.

From Miss Geneva Lent:

Six crayon drawings of West Coast masks.

From N. de Grandmaison:

Two crayon portraits of Indian types.

From Mrs. E. R. Sharpe:

Two Prairie Indian stone pipes.

From Erik J. Johnson:

Three copper implements from Manitoba.

By Exchange:

From J. Walker:

Eskimo harpoon, float, and line from Hudson Bay.

By Donation:

From F. D. Foster:

Stone pipe from Hearst, Ontario.

From Major L. T. Burwash:

Archæological specimens from King William Island.

From F. Edwards:

Fragment of Indian pottery from Kenora, Ontario.

From P. M. Pringle:

Collection of archæological material from Ontario.

From K. Kyle:

Pottery fragments from Brant County, Ontario.

From A. Anderson:

Stone gouge from Harrington Harbour, Quebec.

From J. T. McPherson:

Abitibi Indian netting needle.

From Dr. J. M. Cooper:

Decorated head of snow goose from Rupert House, James Bay.

From Mrs. Mary Weekes:

Two phonograph records of Indian songs.

From W. H. Moore:

Archæological specimens from New Brunswick.

By Donation—*Concluded*

From P. J. Hogan:
Two pieces of bark cloth from New Brunswick.

From Mrs. Bertha Purdy:
Archæological specimens from Peterborough, Ontario.

From H. Hart:
Copper awl and six copper beads from York County, Ontario.

From E. J. Case:
Pottery fragment from Eglinton, Toronto, Ontario.

From D. B. Jennings:
Two chipped stone implements from Giscome, British Columbia.

From Dr. L. J. O'Brien:
Large obsidian blade from Grand Prairie, Alberta.

From Miss K. Rice:
Chipped stone blade from Herb Lake, Manitoba.

From A. O. Cartier:
Skull and mandible from Sorel, Quebec.

From Dr. R. T. D. Wickenden:
Chipped stone blade from Avonlea, Saskatchewan.

DIVISION OF BIOLOGY

R. M. Anderson, Chief of the Division, reports:

Owing to temporary curtailment of field work by the National Museum the scientific staff of the division has been able to devote more than the usual amount of time to detailed study and classification of the accumulated reserve collections of the Museum. At the end of the year the catalogued specimens of birds in the Museum numbered 25,179, the mammals 11,750, reptiles and amphibians 4,478. Several lots of specimens were determined for Government departments, institutions, private collectors, and other citizens. The museum specialists are always glad to identify specimens of mammals, birds, reptiles, or amphibians that are taken in any part of Canada. Such specimens are always interesting in establishing authentic records of the distribution and spread of different species.

Various lots of specimens have been obtained on loan from: Royal Ontario Museum of Zoology, Toronto; Provincial Museum, Regina, Sask.; California Academy of Sciences, San Francisco; American Museum of Natural History, New York; Academy of Natural Sciences, Philadelphia; Grand Coteau Museum of Canadian Club, Shaunavon, Sask.; Experimental Fisheries Station (Atlantic), Halifax, N.S.; also from Major Allan Brooks, Okanagan Landing, B.C.; Mr. C. H. Douglas Clarke, Toronto; Mr. Stuart Criddle, Treesbank, Man.; Mr. Eli Davis, London, Ont.; Mr. Kenneth Racey, Vancouver, B.C.; Mr. W. E. Saunders, London, Ont.

Reciprocally, specimens from the museum collections have been loaned for study purposes, not only in Canada but to several institutions in the United States and in Europe. At various times during the year the study collections have been consulted by visiting specialists.

In the absence of a regularly organized biological survey in Canada, part of the work of such an organization is taken over by the National

Museum, and such field investigations and surveys as can be made by the limited staff of the Museum take account of the economic and practical aspects of the wild life of Canada, as well as the purely scientific side, and the museum officials are often called upon to co-operate with other departments, particularly the Departments of Agriculture, Interior, and Fisheries, in connexion with matters relating to wild life that are not adequately covered by any one department.

R. M. Anderson and P. A. Taverner have served as members of the interdepartmental Advisory Board on Wild Life Protection, and also attended the semi-annual Conference of Federal and Provincial Game Officials held in the lecture hall of the National Museum, Ottawa, April 14 to 16, 1932, and the 5th Annual Meeting of the American Ornithologists Union held at Laval University, Quebec, October 18 to 21, 1932. Mr. Anderson also served as honorary advisory zoologist for the Gatineau-Lièvre-Nation division of the Province of Quebec Association for the Protection of Fish and Game.

Field Work

Reduction in Museum appropriations for the year prevented field work from being done except in a small way locally. Clyde L. Patch, C. E. Johnson, D. Blakely, Charles H. Young, and Miss W. K. Bentley collected fresh material from time to time for the making of habitat groups, and a number of small birds and mammals were collected and mounted to fill out the school loan collections. Charles H. Young collected about 900 specimens of insects, including about 30 that are apparently new forms, most of this work being done at night. Many specimens of insect larvæ were also collected and reared, to have fresh, unbroken material for display cases prepared by Mr. Johnson and Mr. Young.

The temporary cessation of field work in several lines has not been entirely detrimental in some ways. The staff of the Museum has always been so small that they have not always been able to prepare specimens as they came in, and an opportunity is being given to catch up with the routine work, as well as to enable the scientific staff to finish belated technical reports. Research work on material from new regions usually takes more time than was consumed in collecting the specimens, and correspondence work in relation to museum-building and in gathering data also takes much time. However, it must be recognized that field work is necessary to provide the basic material for research. Limited investigations can be made for a time on material at hand, but if new material does not come in, advanced research on Canadian fauna and flora will ultimately come to a standstill. Moreover, as wild life conditions are constantly changing, lost opportunities for study of present conditions can never be entirely made up.

Office Work

R. M. Anderson continued systematic work on the mammal collections of the museum, and finished determining and revising all the specimens of several families and genera. The " Check-List of Canadian Mammals "

has been virtually completed in card catalogue form and is nearly ready for publication. This work is very convenient for reference in study of Canadian mammals, as the nomenclature has been brought up to date in readily accessible form, and much new information has been collected on the distribution of the different species and subspecies of mammals of Canada, which are now known to number over 500 forms. Work has been continued on a bulletin on "Animal Life and Life Zones of Southern British Columbia" covering the four seasons' work (1927-1930) of Museum field parties along the International Boundary line from the Strait of Georgia to the Rocky Mountains, with certain additions made during the past two years. The British Columbia mammals in the National Museum now number about 4,000 specimens, and many others have been obtained by loan, or examined in various other Museums. Considerable data have also been added to the file on "Mammals of Canada," which has been under way for several years, and C. E. Johnson has during the year made a few more coloured plates and a number of line drawings, picturing skulls and adding ranges of species to base maps.

Mr. Anderson, by request, also prepared two papers for the Division of Biological Sciences, Fifth Pacific Science Congress, one on "The Distribution, Abundance, and Economic Importance of the Game and Fur-bearing Mammals of Western North America" (illustrated with maps of ranges of important species); and "Effect of the Introduction of Exotic Animal Forms."

Some progress has been made in plotting records of species of Canadian mammals, with accompanying citations, on large maps, for the divisional scientific file. Valuable information on distribution, abundance, and habits of Canadian mammal species is derived almost daily from volunteer and solicited correspondents in different parts of the country, and considerable time has to be spent abstracting and transcribing such notes on cards under the proper species headings, so that the information is available when wanted.

As P. A. Taverner, ornithologist, has done no field work for two years, opportunity has been given to carry on with office projects that have hitherto been proceeded with in a more or less desultory fashion. Principal amongst these has been the sifting out and filing of the bibliographical and distributional data on the birds of Canada. In the course of this work several thousand cards have been written and filed during the year, bringing the number of cards in this system up to nearly 55,000. They give a most valuable synopsis of ornithological conditions in the Dominion, and contain so far as can be estimated about three-quarters of the scientific information on the subject that has been published. Along with this card index has been carried the plotting of the ranges of Canadian birds on maps, one for each species, some five hundred in all. This work was started in 1917 and the maps are as completely up-to-date as it is possible to bring them. Their value in giving at a glance a graphic view of the status of any species in the Dominion can hardly be estimated.

Mr. Taverner in collaboration with Dr. George Miksch Sutton, representing the Carnegie Museum of Pittsburgh, has prepared a well-annotated

faunal list of the Birds of Churchill, Manitoba. It embodies the work in that locality of this Museum in 1930 and that of the Carnegie Museum and others in 1931 and 1932, and is ready for publication.

The manuscript uniting "The Birds of Eastern Canada" and "The Birds of Western Canada" into one volume, "The Birds of Canada," has been finally completed and is now in the hands of the editor.

A number of reviews of ornithological books of particular Canadian interest, some short notes on timely ornithological matters, and a memorial of the late William Spreadborough (1856-1931), who was for many years in close association with the National Museum as a field assistant and collector of plants, birds, and mammals, with John Macoun, James M. Macoun, A. P. Low, James McEvoy, and others, were published in the Canadian Field-Naturalist. A paper entitled "A Study of Kumlien's Gull, *Larus kumlieni*", is in course of publication in the same periodical.

Amphibians and reptiles were received for identification by Clyde L. Patch, chief taxidermist and herpetologist, and information relating to these creatures was given to inquirers. A number of communications came to the Museum inquiring for literature relating to frog farming.

Three hundred and sixty-four birds, mammals, amphibians, and reptiles were lent to educational institutions for use in nature study and art work. Thirty-seven new mammals and birds were collected and prepared for lending, and the entire loan collection of one hundred and nine specimens was mounted on new bases and placed in individual boxes for protection. The boxes are light and durable, and are fitted with bevelled cleats which hold the specimens securely, but permit of their easy withdrawal for examination.

The following mammals and birds have been prepared, and installed in the biological exhibition hall: Canada lynx, Arctic white wolf, cottontail rabbit, eastern chipmunk, wood duck, surf scoter, and red-breasted merganser.

At the solicitation of the directors of the Central Canada Exhibition Association a biological and botanical exhibit was installed in the main building for display during the week of August 22 to 27, 1932. The space occupied measured 10 by 25 feet. The back wall and one end wall were hung with coloured mammal plaques and 3-foot by 4-foot photographic enlargements of some unusual Canadian mammals, birds, and reptiles. The other end wall contained a selection of attractive pressed plants from the Museum's botanical collection. A third of the floor space was occupied by a cement bird bath cast from a 25 by 25-inch dinosaur footprint. This bath was provided with suitable surroundings. The centre of the exhibit consisted of several interesting zoological specimens and the left-hand third of the exhibit contained thirty potted and cut native wild plants bearing flowers and fruit.

A member of the Museum staff was present to give any desired information.

Publications

The So-called Agropyron caninum (L.) Beauv. of North America. By M. O. Malte. Annual Report for 1930, National Museum of Canada, Bulletin No. 68, pp. 27-57, 5 plates.

A New Subspecies of Willow Ptarmigan from the Arctic Islands of America. *Lagopus lagopus leucopterus,* susbsp. nov. By P. A. Taverner. *Ibid.,* pp. 87-88.

A New Hybrid Grouse, *Lagopus lagopus* (Linnaeus) X *Canachites canadensis* (Linnaeus). *Ibid.,* pp. 88-91, Plate I.

A Partial Study of the Canadian Savannah Sparrows, with Description of *Passerculus sandwichensis campestris,* the Prairie Savannah Sparrow. By P. A. Taverner. Proceedings of the Biological Society of Washington, vol. 45, 1932, pp. 201-206.

William Spreadborough—Collector, 1856-1931. By P. A. Taverner. The Canadian Field Naturalist, vol. 47, No. 3, 1933, pp. 39-41. With portrait.

Five New Mammals from British Columbia. By R. M. Anderson. Annual Report for 1931, National Museum of Canada, Bulletin No. 70, pp. 99-119, Plate 1. Issued November 24, 1932.

Methods of Collecting and Preserving Vertebrate Animals. By R. M. Anderson. National Museum of Canada, Bulletin No. 69, Biological Series No. 18, Ottawa, 1932, pp. 1-141, 46 figs.

The Last of the Heath Hens. By P. A. Taverner. The Canadian Field Naturalist, Dec., 1932.

Lectures

The Wild Mammals of Ontario. By R. M. Anderson. Free Public Lecture, First Series. National Museum of Canada.

Some Thoughts on Wild Fowl Conservation. By P. A. Taverner. Provincial and Federal Game Conference, Ottawa, April, 1932.

Accessions to Museum

ZOOLOGICAL COLLECTIONS

Mammals received and catalogued	323
Birds received and catalogued	169
Amphibians and reptiles received and catalogued	74
Nests and eggs received and catalogued	7

MAMMALS

By Gift 159

R. A. Cumming, Vancouver, B.C. 18 skins and 17 skulls, including Douglas squirrels, western bushy-tailed wood rat, Olympic long-tailed vole, Washington white-footed mouse, Pacific big brown bat, Alaska little brown bat, Keen bat, and northwestern long-legged bat.

R. W. Tufts, Wolfville, N.S. 3 young flying squirrels, in alcohol.

Frank L. Farley, Camrose, Alberta. 2 least weasels, 1 juvenile pocket gopher.

Kenneth Racey, Vancouver, B.C. 13 skins and 13 skulls of Olympic dusky shrew (*Sorex obscurus setosus*) showing various pelages and stages of moult, 2 skins and 2 skulls of Wrangell lemming mouse (*Synaptomys borealis wrangeli*), 1 skin and skull of Yellow-haired porcupine from Chilcotin district, B.C., 2 Chilcotin hoary marmots (*Marmota caligata raceyi* Anderson) type and allotype described in Annual Report for 1931, issued Nov. 24, 1932.

Hon. W. A. Gordon, Ottawa. Skin and skull of Northern White-tailed deer (*Odocoileus virginianus borealis*).

D. Alford, Ottawa. 1 star-nosed mole in the flesh.

F. Bradshaw, Director, Provincial Museum, Regina. 1 "hunter's skin" of black-footed ferret.

E. C. Powell, Ottawa:1 big brown bat, taken alive March 25, 1932.

R. I. Hamilton, Central Experimental Farm, Ottawa. 1 Drummond meadow mouse, from Jasper Park, Alberta.

MAMMALS:—*Continued*

By Gift—Continued

John C. Shelford, Wistaria P.O., B.C. 17 small mammals, 1 least weasel, 1 water shrew, 1 common long-tailed shrew, 2 dusky shrews, 1 red squirrel, 2 Hollister chipmunks, 1 Richardson flying squirrel, 1 wood-rat, 2 Drummond meadow mice, 3 red-backed mice, 1 Bonaparte weasel, 1 northern white-footed mouse.

Gifford Johnson, Ottawa. 1 cottontail rabbit, 1 red fox cub, from Long Swamp, Ont.

Leo P. Bott, Little Rock, Arkansas. 1 mounted specimen of native dog of Stikine River Indians of British Columbia.

E. F. G. White, Ottawa. 1 cottontail rabbit, found dead in yard.

E. M. Kindle, Ottawa. 3 woodchucks, 1 snowshoe rabbit, 1 white-footed mouse, from farm on Montreal Road near Ottawa.

J. M. Swaine, Entomological Branch, Department of Agriculture. 1 short-tailed shrew from Grand Cascapedia River, Que.

H. M. Laing, Comox, B.C. 3 skins and 3 skulls of white-footed mouse, type and topotypes of *Peromyscus maniculatus interdictus* Anderson (described in Annual Report of National Museum for 1931, issued Nov. 24, 1932).

L. S. Russell, Ottawa. 1 white-footed mouse (*Peromyscus maniculatus borealis*), 1 northern chipmunk (*Eutamias minimus borealis*), 1 wood-rat (*Neotoma cinerea drummondi*) from Peace River, Alberta.

R. T. D. Wickenden, Ottawa. 45 small mammals from southern Saskatchewan: 1 snowshoe rabbit, 2 red squirrels, 3 chipmunks, 3 pocket gophers, 1 prairie jumping mouse, 18 white-footed mice, 11 red-backed mice, 4 little upland vole, 1 house mouse, 1 cottontail rabbit.

A. E. Porsild, Dominion Lands Administration, Department of the Interior, Aklavik, N.W.T. 2 Dawson red-backed mice, 2 house mice from Mackenzie Delta.

Mr. and Mrs. C. E. Johnson, Ottawa. 1 porcupine, 1 snowshoe rabbit, 3 short-tailed shrews, 1 white-footed mouse, from Norway Bay, Que.

Colonel Robert Dollary, Sudbury, Ontario, 1 pair of antlers of adult western woodland caribou, from Lac du Bonnet, Manitoba.

Mrs. I. MacLachlan. 2 mounted mammals, 1 red squirrel, 1 eastern chipmunk.

Miss E. Treau de Coeli, Ottawa. 1 pure bred Scotch collie, in the flesh.

H. F. Hughes, Curator, Grand Coteau Museum of the Canadian Club, Shaunavon, Sask. 1 short-tailed weasel "hunter's skin", 1 short-tailed weasel mummified body, 1 black-footed ferret, "hunter's skin".

W. L. Kerr, Experimental Station, Morden, Manitoba. 4 Nebraska Cottontail, in the flesh.

National Parks of Canada, Department of the Interior, Ottawa. 2 skulls of black bear from Jasper Park, 1 "hunter's skin" of Rocky Mountain marten, Jasper Park, 1 skull with antlers of large bull elk, from Waterton Lakes Park, Alberta.

Dominion Lands Administration, Department of the Interior, Ottawa. 85 mammals collected by J. D. Soper in Wood Buffalo Park, Alberta, and Northwest Territories, 2 Mackenzie snowshoe rabbits, 12 northern red squirrels, 6 northern chipmunks, 2 beavers, 1 porcupine, 11 Drummond meadow mouse, 15 Athabaska red-backed mouse, northern white-footed mouse, northern lemming mouse, 2 shrews, 2 skulls of wood buffalo.

Hudson's Bay Company, from St. Lawrence District office, Montreal. Specimen from Mistassini Post, Que. 15 skulls—6 ermine, 8 mink, 1 otter.

Entomological Branch, Department of Agriculture. 39 small mammals collected by R. E. Balch and assistants, Division of Forest Insects, on Grand Cascapedia River, Que.: 12 short-tailed shrews (*Blarina brevicauda*), 3 common long-tailed shrews (*Sorex c. cinereus*), 1 dark smoky shrew (*Sorex fumeus umbrosus*), 2 pygmy shrew (*Microsorex hoyi intervectus*), 12 red-backed mice (*Clethrionomys gapperi ochraceus*), 9 white-footed mice (*Peromyscus maniculatus abietorum*); taken in investigation for control of white spruce sawfly.

MAMMALS—*Concluded*

By Purchase

Harry Harper, Yahk, B.C. 1 skull with antlers of Yellow-tail deer (*Odocoileus virginianus ochrourus*).

C. J. Smith, Comox, B.C. 6 skins and 6 skulls of Vancouver Island cougar (*Felis concolor Vancouverensis*), 1 male adult, 1 female adult, 1 female 2 years, 1 male and 1 female 1½ years, 1 juvenile 4 months old.

A. E. Porsild, Dominion Lands Administration, Department of the Interior, Aklavik, N.W.T. 2 skins and 3 skulls of Barren ground bears (payment to natives).

H. F. Hughes, Shaunavon, Saskatchewan. 1 black-footed ferret in the flesh and 1 "hunter's skin", 1 long-tailed weasel, 3 short-tailed weasel, 1 least weasel.

BIRDS

By Gift:

R. A. Cumming, Vancouver, B.C. 10 bird skins.

Dr. R. E. DeLury, Dominion Observatory Ottawa. 1 sharp-skinned hawk, 1 cowbird, 1 ovenbird, 1 rusty blackbird, in the flesh.

Florian V. Crete, C.S.V., Director du Musée, Institution des Sourds-Muets, Montreal. 1 cage bird (*Spinus c. citronella*) in the flesh.

Dr. M. Y. Williams, Vancouver, B.C. 1 skin of Cooper's hawk, from Riske Creek, Chilcotin, B.C.

Major Allan Brooks, Okanagan Landing, B.C. 1 skin Pacific Godwit, 2 violet-green swallows.

Hugh Kelly, Ottawa. 1 starling in the flesh.

R. W. Tufts, Wolfville, N.S. 1 dowitcher.

Alfred Irwin, Ottawa. 1 cowbird.

National Parks of Canada, Department of the Interior, Ottawa. 1 pileated woodpecker and 1 pine grosbeak in the flesh.

Frank L. Farley, Camrose, Alberta. 3 eggs of gull.

Hoyes Lloyd, Ottawa. 1 yellow-bellied sapsucker.

Wm. Freeman, Ottawa. 1 downy woodpecker, found dead.

L. S. Russell, Ottawa. 1 Wright's flycatcher, 1 red-tailed hawk, from Peace River, Alberta.

Anonymous donor, Ottawa. 1 yellow warbler, found dead.

E. F. G. White, Ottawa. 1 juvenile Greater snow goose (*Chen hyperborea atlantica*) hatched at Central Experimental Farm, July 3, 1932; 3 northern sharp-tailed grouse from Timmins, Ontario.

L. McI. Terrill, Montreal. 1 sharp-tailed sparrow from Kamouraska County, Que.

Rex Meredith, Quebec. 1 yellow rail, in the flesh.

A. C. Courrier, Ottawa. 1 red-tailed hawk in the flesh.

H. C. Warner, Ottawa. 1 wood duck in the flesh (mounted for exhibition hall).

Douglas Leechman, Ottawa. 1 wing each of male and female Baldpate.

Wm. Bodin, Wilson Point, Miscou Island, N.B. 1 green-winged teal.

A. Bourguignon, Ottawa. 1 northern sharp-tailed grouse in the flesh.

A. L. Gormley, Arnprior, Ont. 1 barred owl in the flesh.

Dominion Lands Administration, Department of the Interior. 47 birds collected by J. D. Soper, in Wood Buffalo Park, Alberta and Northwest Territories.

By Exchange:

Museum of Princeton University. 1 brown pelican, 2 reddish egret, 2 little blue heron, 2 Louisiana heron, 1 laughing gull, 1 black skimmer, 1 Arizona hooded oriole, 1 mocking bird, 1 Palmer thrasher, 2 pine-woods sparrow.

James Moffitt, San Francisco, California. 1 skin, California brown pelican (salted).

Museum of Comparative Geology, Harvard College, Cambridge, Mass. 2 Allen's ptarmigan, 2 Welch's ptarmigan from Newfoundland.

BIRDS—*Concluded*

By Purchase:

A. E. Porsild, Dominion Lands Administration, Department of the Interior, Aklavik, N.W.T. 27 skins (salted) from Mackenzie Delta region, N.W.T. (payment for work done by natives).

AMPHIBIANS AND REPTILES

By Members of Staff and by Gift:

N. J. Atkinson, Lucerne-in-Quebec.. 3
Earl Brinston, Ottawa, Ont.. 1
J. Roland Brown, Hamilton, Ont.. 1
Edmond De Coeli, Castor Lake, Que.. 1
Lucien Delorme, Ottawa, Ont.. 1
W. A. Dent, Sarnia, Ont.. 2
Laurence A. Fowler, High River, Alta.. 1
Roy L. Fowler, Wasa, B.C., Aldersyde, Alta.. 3
Chas. F. Holmes, Manyberries, Alta., Dollard and Shaunavon, Sask. 7
C. E. Johnson, Kingsmere, Que., Arnprior, Ont.. 9
Clifford Johnson, Ottawa, Ont.. 1
Douglas Leechman, Ottawa, Ont.. 1
Charles Macnamara, Arnprior, Ont.. 1
Everett Maguire, Ottawa, Ont.. 1
Bruce McCrea, Ottawa, Ont.. 1
R. O. Merriman, Hamilton and Point Pelee, Ont.. 3
Wm. H. Moore, Scotch Lake, N.B.. 3
L. H. Ostrom, Ottawa, Ont.. 1
C. L. Patch, Marshall Bay and Ottawa, Ont., Bryson and Burbidge, Que.. 27
K. Racey, Southern British Columbia.. 2
L. S. Russell, Whitemud River Valley, Alta.. 1
Leslie Stone, Ottawa, Ont.. 1
Walter H. Wickware, Portland, Ont.. 2

INVERTEBRATES

By Gift:

G. Smith, Ottawa. 1 horseshoe crab (*Limulus polyphemus*), from Ocean Grove, New Jersey.
L. J. Weeks, Ottawa, 26 lepidoptera, collected summer of 1926, Nettilling Lake, Baffin Island, N.W.T.
L. S. Russell, 4 boxes of insects from Peace River, Alberta.

National Herbarium

M. O. Malte, Chief Botanist, made considerable progress in the work on the flora of Arctic Canada. Many of the so-called critical genera were thoroughly studied and worked up, a task that was made possible by loans of Arctic plants from the Gray Herbarium, Cambridge, Mass., The New York Botanical Garden, New York, N.Y., The Danish Arctic Biological Station, Disko, Greenland, and the Botanical Division of the Government Museum, Stockholm, Sweden. Considerable time was also spent on distribution of duplicates, renaming of specimens, and general readjustment of the herbarium. No field work was undertaken.

Plants received on account of exchange.. 721
Université de Montreal, Montreal, Que.. 176
Agricultural College, Oka, La Trappe, Que.. 328
Gray Herbarium, Cambridge, Mass.. 74
University of California, Berkeley, Calif.. 143

Plants received as donations	231
W. E. D. Halliday, Winnipeg, Man	97
H. T. Gussow, Ottawa, Ont	71
D. H. Nelles, Ottawa, Ont	41
N. Criddle, Ottawa, Ont	15
George H. Turner, Fort Saskatchewan, Alta	2
V. E. Shellford, Champaign, Illinois	2
H. Groh, Ottawa, Ont	1
J. H. C. Dempsey, Hamilton, Ont	1
H. F. Lewis, Ottawa, Ont	1
Plants distributed on account of exchange	1,615
Université de Montreal, Montreal, Que	93
Agricultural College, Oka, La Trappe, Que	263
Gray Herbarium, Cambridge, Mass	344
University of California, Berkeley, Cal	352
British Museum, London, England	113
Kew Botanic Gardens, Kew, England	84
Botanical Museum, Berlin-Dahlem, Germany	88
Botanical Division, Government Museum, Stockholm, Sweden	119
Botanical Museum of the University, Lund, Sweden	95
Botanical Museum of the University, Helsingfors, Finland	64

DIVISION OF PALÆONTOLOGY (Geological Survey)

E. M. Kindle, Chief of Division, reports:

Considerable attention has been given during the year to the general problem of making the very extensive literature in which North American fossils are figured and described more accessible to those who use fossils.

Much of the correlation work on which geology rests depends on the quality of the work of the stratigraphic palæontologist. And the quality of his work is conditioned by the efficiency with which he can refer to and use described fossils. It is believed, therefore, that not only all palæontologists but all geologists will welcome the plan of bringing together in a card file system all of the species of North American fossils that have been described in several hundred different publications. No library can ever hope to possess all of the publications in which new species of fossils have been described, but re-publication on the species card plan will eventually make available at a cost within the reach of the smallest college library, descriptions and figures of all.

A proposal to apply to the Devonian faunas of North America the species card plan of re-publishing type figures and diagnoses of all described fossils, which was submitted by E. M. Kindle to the Toronto meeting of the Palæontological Society of America in 1930, was approved and a committee appointed to make plans for carrying out the proposal. A report of this committee was presented to the Cambridge meeting of the Palæontological Society in December, 1932. More than a dozen palæontologists have undertaken to co-operate in carrying out this plan for Devonian fossils. During the month of August ten days were spent in the New York State Museum at Albany, in studying types in connexion with this work.

Office Work

A. E. Wilson has continued work on the card catalogue of invertebrate fossils. C. M. Sternberg has extended the work of preparing a card catalogue on the vertebrate type fossils, and prepared several labels for the exhibits.

Palæontological papers have been prepared and published by F. H. McLearn, A. E. Wilson, and C. M. Sternberg as shown by the list in this report. Four reports on fossil plants for members of the Geological Survey staff have been prepared by W. A. Bell. L. S. Russell has completed a revision of the Lower Oligocene mammals of the Cypress Hills formation. He has also described the Upper Eocene mammals from the Swiftcurrent beds and made brief visits for comparative study of mammals to the American Museum and Princeton University Museum.

Museum Exhibits

Work has been continued on the new systematic exhibit of invertebrates by A. E. Wilson. The notable contribution of G. Ensell in the shape of glass restorations of sponge spicules, hydrozoa, and radiolaria has added much to the interest of one of the cases in this exhibit. An exhibit displaying the succession of faunas from Middle Cretaceous time to the present and the successive formations in which they are preserved in the Great Plains region, together with the more important geological changes North America has undergone since early Cretaceous time, has been completed. Several of the larger mounts have been veneered and a large mastodon skull has been remounted. Among the additions to the vertebrate mounts in the Museum is a skull of Ram-nosed Mosasaur.

Educational Work

During the year fifty sets of fossils were supplied for the use of teachers in High Schools. A collection of fossils for use in teaching geology was sent the Mount Allison Univeristy to replace collections destroyed by fire. A collection of fossils was also supplied to the Prince of Wales College and Normal School at Charlottetown, Prince Edward Island.

Facilities for study of special collections have been extended to various foreign scientists. Dr. T. Kobayashi of Japan made a short visit to the Museum for study purposes.

The following addresses were given by members of the division:

"Fossil Vertebrates of Canada." By L. S. Russell, Dept. of Geology, McGill University, April 11 and 13, 1932.

"Canadian Dinosaurs." By C. M. Sternberg, Royal Astronomical Society of Ottawa, January 27, 1933.

Publications

The following papers were published by members of the division during the year.

Experiments with the Settling of Bentonite in Water. By E. M. Kindle, U.S. National Research Council, 1932.

Footprints. By E. M. Kindle, Canadian Mining Journal, June, 1932.

Turning Pages in the Great Stone Book. By E. M. Kindle, Forest and Outdoors, January, 1933.

Lacustrine Concretions of Manganese. By E. M. Kindle, American Journal of Science, December, 1932.

Dinosaur Tracks from Peace River, B.C. By C. M. Sternberg, Annual Report for 1930, National Museum of Canada, Bulletin No. 68, pp. 59-86, 5 pls., 9 figs.

New Variety of *Valvata lewisi* from the Pleistocene of Ontario. By A. LaRocque, Canadian Field Naturalist, vol. 46, December, 1932.

Trends in Fifty Years of Canadian Stratigraphy. By F. H. McLearn, Fifty Years Retrospect 1882-1932, Anniversary Volume, Royal Society of Canada, 1932.

Problems of Lower Cretaceous of the Canadian Interior. By F. H. McLearn, Trans. Royal Society of Canada, 1932.

Three Fernie Jurassic Ammonoids. By F. H. McLearn, Trans. Royal Society of Canada, 1932.

Contributions to Stratigraphy and Palæontology of Skidegate Inlet, Queen Charlotte Islands, B.C. (Cont.). By F. H. McLearn, Trans. Royal Society of Canada, 1932.

Mollusca from the McMurray Formation of Alberta. By L. S. Russell, Trans. Royal Society of Canada, July, 1932.

Fossil Non-marine Mollusca from Saskatchewan. By L. S. Russell, Royal Canadian Institute Trans., July, 1932.

A New Species of Merychippus from the Miocene of Saskatchewan. By L. S. Russell, Canadian Field Naturalist, vol. 47, Jan., 1933.

Two New Theripod Dinosaurs from the Belly River formation. By C. M. Sternberg, Canadian Field Naturalist, May, 1932.

The Skull of Leidyosuchus Canadensis. By C. M. Sternberg, Am. Midland Naturalist, July, 1932.

A New Fossil Crocodile from Saskatchewan. By C. M. Sternberg, Canadian Field Naturalist, September, 1932.

A Dinosaur Footprint Bird-Bath. By C. M. Sternberg, Canadian Field Naturalist, December, 1932.

Prehistoric Footprints in Peace River. By C. M. Sternberg, Canadian Geographical Journal, February, 1933.

Relationships and Habitats of Troodon and the Nodosaurs. By C. M. Sternberg, Ann. and Mag. of Nat. Hist., Feb., 1933.

Notes on the Pamelia Member of the Black River of the Ottawa Valley. By A. E. Wilson, Am. Jour. Sci., August, 1932.

Palæontological Notes. By A. E. Wilson, Canadian Field Naturalist, Sept., 1932.

Ordovician Fossils from the Region of Cornwall. By A. E. Wilson, Royal Society of Canada, 1932.

Accessions to Museum

VERTEBRATE FOSSILS

Presented:

U.S. National Museum.
Cast of phalanx of a camel from the Klondike.

Exchange:

Professor T. H. Clark, Redpath Museum, Montreal.
Cast of the type of *Bathygnathus borealis* and a specimen of *Palæospondylus gunni.*

INVERTEBRATE FOSSILS

Presented:

Raymond E. Peck, University of Missouri.

Trochiliscus octocostatus Peck, Sylamore (Kinderhookian), Williamsburg, Missouri.

Sycidium foeatum Peck, Sylamore (Kinderhookian), Williamsburg, Missouri.

Trochiliscus bilineatus Peck, Cerro Gordo member, Hackberry stage, (Devonian), Rockford, Iowa.

Trochiliscus laticostatus Peck, Sylamore (Kinderhookian), Williamsburg, Missouri.

Trochiliscus bilineatus Peck, Devonian, Muddy Lake well, Saskatchewan, Canada. 2,220-25 feet.

INVERTEBRATE FOSSILS—*Concluded*

Presented—Concluded

Raymond E. Peck, University of Missouri.
Trochiliscus liratus, Colombus Ls., Marblehead Quarry, Sandusky, Ohio.
Trochiliscus bilineatus? Columbus Ls., Marblehead Quarry, Sandusky, Ohio.
Trochiliscus bellatulus, Columbus Ls., Marblehead Quarry, Sandusky, Ohio; Holotype, Pl. I, figs. 21, 23, 24. (Manuscript of R. E. Peck.)

L. S. Russell, Geological Survey, Canada.
Casts of Cretaceous fossils (types) made by the donor with permission of the Department of Geology, University of Alberta.

U.S. National Museum, Washington, D.C.
1 specimen—*Pentacrinus fossilis* Blumenbach—Eng.
2 specimens—*Taxocrinus colletti* White—Indiana, for exhibition case.

E. Reinhard, Kenmore, N.Y.
2 trays of Eurypterid fragments—Ridgeway, Ont. Silurian.

Stanley Smith, The University, Bristol.
Devonian corals (type material) from France:
Prismatophyllum davidsoni—topotype—Boulonnais: Feigues.
P. boloniense—topotype—Boulonnais: Beaulieu.

Exchange:

G. D. Harris, Ithaca, N.Y., U.S.A.
Two trays Tertiary pelecypods and gastropods from the southern United States.

SHELLS

Presented:

W. S. Blatchley, Dunedin, Florida.
Recent—oyster shells from the west coast of Florida.

O. Grunwold, Blackwood, N.Y.
Recent—a collection of Florida mollusca labelled with their popular names.

E. M. Kindle, Geological Survey, Canada.
A small collection of shells from Oneida Lake, N.Y.

A. LaRocque, Geological Survey, Canada.
Pleistocene—Late Wisconsin—holotype and two paratypes of *Valvata lewisi mccolli* LaRocque, marl of Shallow Lake, Grey County, Ont.

A. E. Wilson, Geological Survey, Canada.
A small collection of recent shells from the West Indies.

CONCRETIONS AND SEDIMENTS

Presented:

A. F. Foerste, Dayton, Ohio, U.S.A.
Recent specimens of very thin-bedded silty clay deposited by flood at Dayton, Ohio, in 1913.

R. A. Logan.
A collection of manganiferous concretions from Ship Harbour Lake, N.S.

Charles Macnamara, Arnprior, Ont.
Concretions in clay, Lochwinnoch Creek 200 to 300 yards below where highway 17 crosses it, some 9 miles from Arnprior, Ont.

L. H. Cole, Mines Branch, Department of Mines.
11 concretions—Diogenes Brook, Malford, Inverness County, C.B., N.S.

Exchange:

Clyde L. Malott, University of Indiana.
"Cave pearls" from Indiana; Orange County, Elrod Cave, Crow Hollow Cavern, Marengo Caves.

FROM MEMBERS OF STAFF

O. N. Brown (per B. R. MacKay). A collection of Lower Cretaceous fossils from Smoky River, Alberta.

C. E. Cairnes, 3 lots of Tertiary fossils from B.C.:

(*a*) Pike (Suchee) Creek; (*b*) east of Chapperon Ranch, on Pike Creek; (*c*) south side of Estekwalan Mountain, northwest of Falkland. (*a*) and (*b*) are plants; (*c*) insects.

C. E. Cairnes. 2 lots of annelids or plants marked 189R and 212, Cranbrook region, B.C.

G. W. Crickmay. Silurian—1 tray Silurian fossils from Matapedia Valley, Quebec.

H. C. Cooke. 4 lots of fossils from Adstock Township, Beauce County, Que.

C. S. Evans. Ordovician fossils from Ontario—about 15 trays.

G. S. Hume. 8 lots of fossils from Flathead Valley, B.C., Jurassic, Carboniferous, and Ordovician.

E. J. Lees. 4 lots of Triassic fossils—Labarge area, Yukon.

E. J. Lees. 8 trays fossils (Mesozoic)—Labarge area, Yukon.

D. C. Maddox. Portion of humerus and ulna of plesiosaur from Saskatchewan.

D. C. Maddox. 1 specimen—*Placenticeras placenta;* Cretaceous Bearpaw, Alberta.

L. S. Russell. Peace River district, 4 trays of invertebrate fossils, Mesozoic.

DIVISION OF MINERALOGY (Geological Survey)

Eugene Poitevin, Chief of the Division, reports as follows:

Field Work

A. T. McKinnon spent almost two months in the provinces of Ontario, Quebec, New Brunswick, and Nova Scotia where he collected 14½ tons of minerals and rocks needed for the preparation of collections for prospectors and educational institutions.

Laboratory

This year, as usual, a large number of minerals and rocks were examined by E. Poitevin and H. V. Ellsworth. About four hundred memoranda were sent through the Director of the Geological Survey. These do not include verbal reports given to the many visitors who consulted them. Altogether about three thousand specimens were examined for prospectors, officials of the Department of Mines, and others interested in the mining industry.

Eugene Poitevin completed the mineralogical study of a collection of zeolites occurring in the serpentine belt of Megantic County, Quebec, and the study of several varieties of serpentine from the same district. He also studied a large number of topaz-bearing rocks occurring near Welsford, New Brunswick, and the results will be published in the Summary Report of the Geological Survey for 1932.

H. V. Ellsworth collaborated in the routine work of the division and continued special investigations of rare element minerals and possible sources of vanadium in Canada, this work including many determinations of minerals sent in by prospectors. During the year his report on the

"Rare Element Minerals of Canada" was published as No. 11 of the Geological Survey Economic Geology Series. His work on vanadium brought to light an occurrence of vanadiferous rock in British Columbia containing over 2 per cent V_2O_5, an account of which, in collaboration with H. C. Gunning, is published in the Summary Report of the Geological Survey for 1932, part A II.

R. J. C. Fabry made chemical analyses for W. H. Collins of nine specimens of rock from the Sudbury nickel eruptive as follows: four norites from Levack Township, two norites from Denison Township, one norite from Boswell Township, one micropegmatite from Garson Township, and one unnamed specimen from the transition zone, Levack Township. He analysed one specimen of serpentine and one specimen of serpentinized peridotite from Thetford Township for H. C. Cooke; one specimen of prehnite from Jacobs asbestos mine and one from King asbestos mine for E. Poitevin; he made partial analyses of seven samples of magnesite from British Columbia for C. E. Cairnes and made one determination of the alkalis in sericite schist from Memphremagog for H. W. Fairbairn.

There was a marked increase in the number of qualitative tests for the commoner elements carried out on specimens submitted to the division for rapid identification.

It is of interest to note that Mr. Quinlan, research assistant in the Department of Mineralogy of the University of Toronto, spent a month in our laboratory studying methods of rare mineral analysis developed by H. V. Ellsworth. Later in the autumn Mr. Maurice Archambault, chief chemist of the Quebec Bureau of Mines, also spent a month in our laboratory to familiarize himself with the chemical operations involved in rock and mineral analyses.

During the fiscal year just ended the Division of Mineralogy made many improvements in the collection on display at the National Museum.

It has also prepared several special exhibits, the most important one being arranged by Mr. Ellsworth and colleagues from the Geological Division, for the Central Canada Exhibition at Ottawa. Another exhibit was prepared by Eugene Poitevin in connexion with the meeting of the Dominion Land Surveyors at Ottawa.

Educational Collections

From 1928 to 1932, 2,459 collections were distributed to educational institutions, etc., averaging 492 collections a year, whereas during the fiscal year ending March 31, 1933, 751 collections were distributed containing 24,125 specimens and 135 bags of mineral chips. Material collected during the summer of 1932 amounted to 29,115 pounds of rocks and minerals.

The following collections were distributed to educational institutions, etc., during the year:

Province	Standard	Grade 3	Grade 4	Special grade 4	Miscellaneous	Mineral chips	Prospector's minerals	Prospector's rocks
British Columbia	.....	.....	.....	.....	2	.....	30	19
Alberta	.....	.....	.....	.....	5	.....	71	68
Saskatchewan	.....	.....	.....	.....	4	.....	14	4
Manitoba	.....	.....	.....	.....	3	.....	4	.....
Ontario	1	50	.....	.....	17	2	43	25
Quebec	1	2	50[1]	300[1]	8	.....	10	1
New Brunswick	.....	.....	.....	.....	2	1	.....	.....
Nova Scotia	.....	.....	.....	.....	2	.....	.....	.....
Prince Edward Island	.....	.....	.....	.....	1	.....	.....	.....
Foreign	1	.....	.....	.....	4	.....	5	1
No. of collections	3	52	50	300	48	3	177	118
Specimens	438	2080	2000	12000	1335	135	3464	2808

[1] Prepared specially for the Quebec Bureau of Mines.

During the fiscal year the following specimens were received:

Accessions

DONATIONS

Niccolite. From about 2 miles east of Francois River and approximately 3 miles from Great Slave Lake. Specimen sent in from Mr. H. E. Hume, Chairman, Dominion Lands Board, Dept. of Interior. Sent in to Mr. Hume by Paul Beaulieu through John A. McDougall, Fort Smith, N.W.T.

Radium Ore. Three specimens of radium ore (pitchblende and its alteration products) presented by Mr. G. L. Lechien, Director of Union Minière du Haut Katanga, Belgian Congo.

Hypersthene. Lot 19, Range VII, Labarre Township, Que. Donated by Mr. T. H. Taylor, Hebertville Station, Que.

Sphalerite and Galena. About a ton of each of these minerals was donated to this department for the educational collections, by Mr. W. M. Archibald, Consolidated Mining and Smelting Company, Trail, B.C.

Antimony Ore. About 515 pounds of this ore donated to this department by Mr. Red Hugh McLean, Secretary Treasurer, Lake George Mines, Limited, Lake George, N.B.

Nickel Ore Rich in Pentlandite. One thousand pounds of this ore has been donated by the International Nickel Company, Copper Cliff, Ont.

Bauxite. Shipment of bauxite from Mr. R. E. Powell, Vice-President, Aluminium (VI) Limited, Montreal, Que.

Suite of Specimens from Premier Mine, B.C. Obtained during summer of 1931 by G. Hanson, Geological Survey, Ottawa.

PURCHASES

Amethysts. Two specimens bought from Mr. W. C. King, Bedford, Que.

Pitchblende Ore. Sixty pounds of this ore consisting of seven Museum specimens and 120 small specimens from Great Bear Lake, N.W.T. Purchased from Eldorado Gold Mines, Limited.