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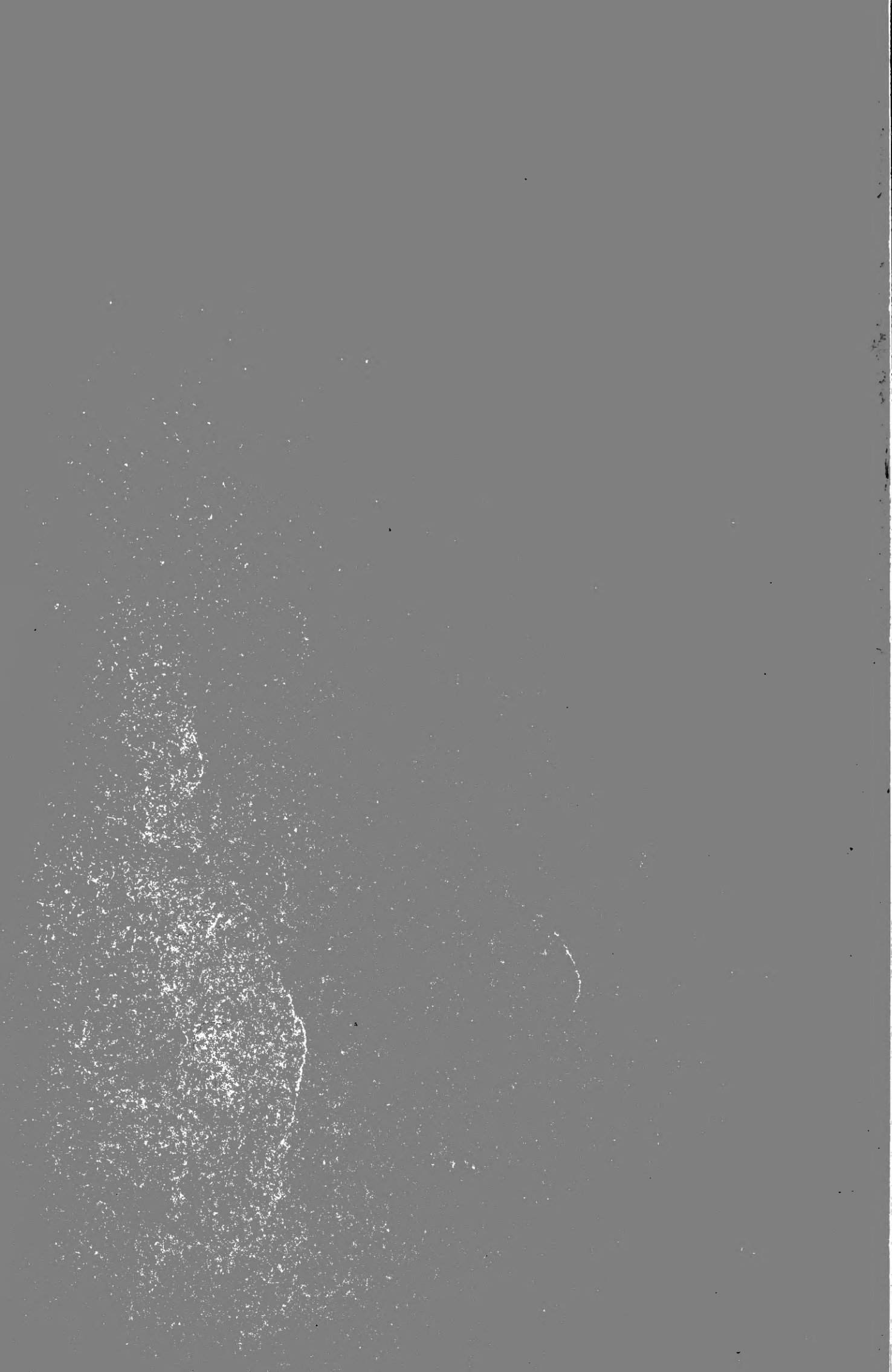


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CONTRIBUTIONS OF THE
ROYAL ONTARIO MUSEUM OF ZOOLOGY

No. 18: HISTORY OF THE ROYAL ONTARIO MUSEUM OF
ZOOLOGY. By J. R. DYMOND

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PROFESSOR B. A. BENSLEY
DIRECTOR OF THE ROYAL ONTARIO MUSEUM OF ZOOLOGY, 1913-1934

THE ROYAL ONTARIO MUSEUM OF ZOOLOGY

By J. R. DYMOND

THE function of a Museum of Zoology is to extend a knowledge of animal life. Through exhibits, publications and other activities, museums seek to put the public in possession of as much information as possible about animals. Museums also seek to add to existing knowledge; this phase of museum work is especially needed in an area like Ontario where, until recently, comparatively little has been known about the kinds and distribution of animals found within the province, except in the case of the larger and better known species. The need that existed for an institution to investigate our animal life is indicated by the fact that, since the establishment of the Royal Ontario Museum of Zoology, approximately sixty species of vertebrates not previously known to occur in Ontario have been found within the province. Many of these discoveries are directly the result of the Museum's investigations; others are traceable to its influence in developing the study of Ontario's natural history. In the following pages will be traced the growth of the interest in animal life and of the collections which ultimately culminated in the Royal Ontario Museum of Zoology and of the development of this Museum during the first quarter-century of its existence.

From the earliest days of settlement in Upper Canada, naturalists had planned and worked for a museum to exhibit the animal life of the area. Probably the earliest attempt to found a museum was that of Charles Fothergill, who came to Upper Canada in 1816, was King's Printer from 1822-6 and represented Durham County in the Legislative Assembly from 1825-9. Fothergill, in conjunction with Dr. William Rees, a mineralogist, and Dr. William ("Tiger") Dunlop, was instrumental in petitioning the Legislative Assembly in 1833, urging the establishment of a museum at York (Toronto); his prospectus entitled *Proposed Lyceum of Natural History and the Fine Arts in the City of Toronto, U.C.* (1835) outlines his comprehensive scheme. These gentlemen succeeded in obtaining from the government a grant of land on the Garrison Commons for their museum. It was to be a "Museum of Natural and Civil History, with a botanical and zoological garden attached . . . a picture gallery, Indian antiquities, arms, dresses, utensils,

and whatever might illustrate and make permanent all that we can know of the aborigines. . . .”

Fothergill, one of the first students of natural history in this province, was a man of wide views and great intelligence, but his proposed museum was too bold in its conception and too advanced for the times. Although his project was patronized by successive Lieutenant-Governors and the site provided by Order-in-Council, it fell through on Fothergill's death in 1840 and on the destruction by fire of his collection of objects shortly afterwards.

University Natural History Collections

(1849-1890)



THE REV. WILLIAM HINCKS
PROFESSOR OF NATURAL HISTORY
1853-1871

The natural history collections which ultimately developed into the Royal Ontario Museum of Zoology had their inception in the early days of the University of Toronto. There is in the possession of the Museum an early catalogue of the collections, begun in 1857 by Professor Hincks, the first Professor of Natural History. The introductory notice on the first page of this catalogue, in Professor Hincks's handwriting, is as follows:

“From an early period in the history of the University, although no means had yet been provided for teaching the natural sciences, some efforts were made to provide a Museum. Some valuable zoological specimens were purchased, and by the exertions of Dr. Boyes,

Professor Croft and others, a good many birds, many Canadian insects and the land and fresh water shells of the neighbouring country were brought together. Of these, many still remain, but most of the mammals and a great part of the birds perished from exposure and the injuries received in various removals.

“In 1853 a Chair of Natural History having been created and Professor Hincks appointed to fill it, he was enabled to expend a

small sum in the purchase of specimens and obtained a few interesting mammals, a considerable number of birds illustrating most of the received families, a set of illustrations of genera of shells as a foundation for a collection and a valuable selection of insects. Mr. George Hadgraft, naturalist from London and an artist eminently skilled in the preparation of specimens, having settled for a time in Toronto, was employed by the Council of University College then having charge of the Museum to spend a certain portion of his time in setting up the specimens brought out by Professor Hincks, and to add such Canadian birds or quadrupeds as fresh specimens could be obtained.

“In this way, before the close of 1854, a considerable collection of birds in an excellent state of preparation was provided and many additions were made to the mammals. Mrs. Dall, a lady then resident in Toronto, liberally presented a considerable number of species of shells, many of them beautiful and valuable. Professor Croft presented to the College his collection of dried plants and Professor Hincks preserved a great number of the plants of the country and obtained from friends a good many British plants and a small collection from the southern United States. Suitable cases were provided, a good proportion of the objects had been named and arranged and the condition of the Museum might be considered as encouraging when the control of it was assumed by the Senate of the University at the close of the year 1856.

“The importance of the Catalogue being felt, Professor Hincks applied himself at the commencement of the year 1857 to this object and this volume is appropriated to it. The arrangement is that of Cuvier’s *Animal Kingdom* with various modifications. In the Class Birds, the method of Mr. George Gray is pretty exactly followed from his splendid work *The Genera of Birds*.”

Additional light on the origin and early condition of the natural history collections of the University is afforded by the following article, which appeared in the *Canadian Sportsman and Naturalist*, December 15, 1881.¹

“. . . The collections now in the Toronto University Museum were commenced about the year 1849, and in 1852, the late Wm. Hincks, a brother of Sir Francis Hincks of this city (Montreal), was appointed Professor of Natural History in the above-named institution, which at the latter date (1852) received a grant from Government to extend its Museum. Through energy and economy a large number of specimens were added, and before Mr. Hincks’

¹Canadian Museums, Toronto University, by William Couper. *Can. Sportsman and Naturalist*, Vol. 1, No. 12. 1881.

death, the Museum was considered the best then in Canada. After the appointment of the latter, the late George Hadgraft of London, England, was induced to come over to Toronto to do the Taxidermal work, and then the Museum became quickly filled up. At present it contains almost all the birds and many of the quadrupeds of Canada, together with general collections of minerals, fossils, shells and plants, which have been a source of benefit and pleasure not only to the students attending the classes of Natural History, but to their colleagues and the citizens of Toronto."

Professor Hincks was succeeded on his death in 1871 by Professor H. Alleyne Nicholson, who however remained only two years, being succeeded in 1874 by Professor R. Ramsay Wright. Some account of the Museum at this time is given in a note by Professor D. R. Keys, who wrote: "The Museum was then (1863) in what is now known as the West Hall (of University College). It impressed me as the greatest collection of stuffed birds I had met. Years after, when listening in October, 1874, to the inaugural lecture given by the late Professor R. Ramsay Wright, who came to Toronto in my freshman year, I heard him tell what his predecessor in the Chair of Natural History had said to him in reference to the Museum. 'I found it, when I came to Toronto', said Professor H. Alleyne Nicholson, 'a wilderness of stuffed birds.' This little anecdote was not at all appreciated by the Chairman, Dr. John McCaul, who looked far from pleased at the laughter that followed. The museum had been brought into more modern form during Professor Nicholson's two years' stay and was in active use during Professor Wright's early career in the Chair."

The Royal Canadian Institute

Before continuing the history of the Biological Museum, reference will be made to other agencies responsible for the development of the museum idea. One of the most important of these was the Canadian Institute (now Royal Canadian Institute) founded in 1849. The formation of a museum was one of the objects for which the Institute was established.

An indication of the museum situation in 1870 is afforded by an article by Dr. Henry Scadding,² then Librarian of the Institute. He wrote: ". . . Our own University Museum at Toronto is of course familiar ground already to our young lovers of Natural Science. It will be found a good antepast to the feasts that await

²On Museums and Other Classified Collections Temporary or Permanent as Instruments of Education in Natural Science, by Henry Scadding. Can. Jour., n.s., Vol. 13, No. 73. 1871.

them on their visits to larger establishments. It presents some good studies in Ornithology and Entomology. I wish our own small Museum, connected with the Canadian Institute, were richer in objects, but it is not wholly to be despised. . . . When an institution like the University of Toronto establishes a Scientific Museum on a good scale by the side of an humble collection like that which the Canadian Institute, with only limited resources, has been enabled to make, the latter necessarily becomes somewhat insignificant. Nevertheless, there is a field which our Museum might occupy. It might be made a repository of Canadian archaeological and historical objects. The collections in the Normal School buildings, Toronto, exist expressly for educational purposes, and repay a studious examination. . . .”

The natural history collections of the Canadian Institute which were later transferred to the Royal Ontario Museum, appear to have had their inception in 1885 when the Natural History Society of Toronto amalgamated with the Canadian Institute, bringing with it its collections of natural history material and forming the Biological Section of the Institute. The Council of the Canadian Institute in its report³ for the session 1886-7 recorded that “another pleasing feature of this year’s work is the partial completion of the Museum of Natural History and Archaeology in the third story of our building. . . . In this direction the Council desires to acknowledge the liberality of the Biological Section in guaranteeing the interest for two years on the \$1,000 borrowed for this purpose.” Later there was organized within the Biological Section an Ornithological Sub-section. In the minutes of the meetings of this sub-section, mention is made in a number of places of steps being taken to add to the bird collection.

In a report by Ami,⁴ the Canadian Institute Museum is described as follows: “The specimens belonging to the old Natural History Society of Toronto (now the Biological Section of the Institute) formed part of the Canadian Institute Museum Collection. The Zoological collections comprise the following,

Birds (Canadian).....	729 specimens
Birds’ eggs (Canadian).....	329 “
Birds (foreign).....	150 “
Mammals.....	62 “
Reptiles.....	200 “
Insects.....	2,000 “

³Appendix L of the Report of the Minister of Education for 1887.

⁴The State of the Principal Museums in Canada and Newfoundland, by Henry M. Ami. Rpt. Brit. Assoc. Adv. Sci., pp. 62-74. 1897.

The collection had probably increased little beyond this when it was transferred to the Royal Ontario Museum of Zoology in 1924.

Normal School and Provincial Museum
(1853-1933)

The Toronto Normal School was another centre of development of the museum idea in Toronto. From Mr. Fleming's history of the Normal and Model Schools of Toronto, attached to this report, we learn that the Legislature of 1852-3 appropriated £500 per annum to be used by the Museum of the Normal School for the purchase of books, publications, specimens, models, objects relating to education and other departments, which included "Artificial productions of Canada, especially referring to mineralogy, zoology, agriculture and manufacturing." Until after 1896, natural history material seems to have occupied a very subsidiary position in the collections of the Normal School. With the addition of a third storey to the building about 1896, the Museum was considerably enlarged by the addition of the archaeological material transferred from the Canadian Institute and the inclusion of a hastily-prepared collection of birds and mammals, soon replaced by better material.

In 1906, the Museum was raised to the status of Provincial Museum. Dr. William Brodie was appointed first Provincial Biologist in 1903, and his extensive collections of biological material acquired by the Museum. The old collection of animals was in part replaced by the purchase of new material.

Mr. Charles W. Nash, who became lecturer on biology for the Ontario Department of Agriculture, began in 1900 a series of check-lists of vertebrates for the Museum. This series, re-issued as *The Manual of the Vertebrates of Ontario*, was an important contribution to our knowledge of the vertebrate fauna of the province. Mr. Nash prepared a large number of casts of fish, reptiles, etc., for the Museum and in 1908 presented his private collection to the Museum. In 1910, Mr. Nash succeeded the late Dr. Brodie as Provincial Biologist. With such men as Boyle, Brodie and Nash on the staff, the Provincial Museum became the centre of information for teachers and students of natural history. Mr. Nash died in 1926, and in 1933 the Museum was closed, the archaeological and biological material coming to the Royal Ontario Museum.

The material transferred to the Royal Ontario Museum of Zoology from the Ontario Provincial Museum in 1933 was as follows: mammal skins 139, mammal skeletons 9, mammal heads and horns 37, mounted mammals 6, bird skins 1,061, bird eggs 740,

bird nests 80, mounted birds 330, reptiles 92, amphibians 27, fish 267, insects 28,000, molluscs 550, miscellaneous 150, bound books 127, pamphlets, bulletins and journals 1,980.

Practically all this material was of Ontario origin. A collection of 218 mounted foreign birds loaned to the Provincial Museum by Mr. John Maughan, Jr. but donated to the Royal Ontario Museum of Zoology was transferred at the same time.

Natural History Societies

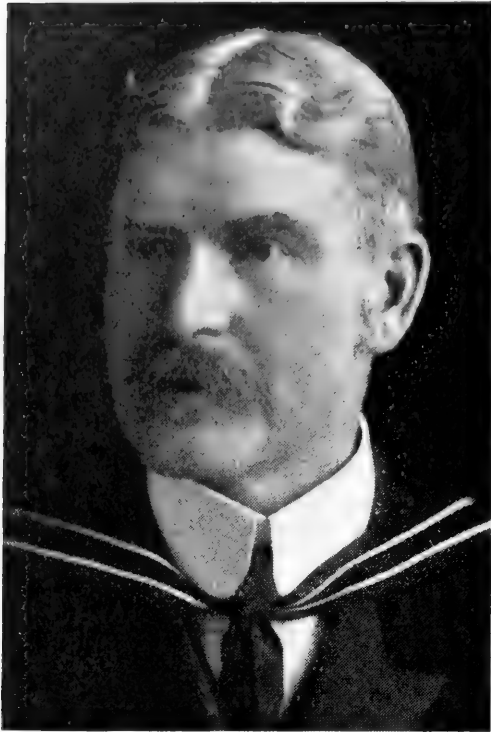
The Natural History Society of Toronto to which reference has already been made was the first society in Toronto devoted exclusively to a study of the natural sciences; it was incorporated in 1878. This society was founded by Dr. William Brodie, later (1903-9) first Provincial Biologist and Director of the Biological Department of the Ontario Provincial Museum. This group affiliated with the Canadian Institute as its Biological Section on January 23, 1886. On December 21, 1888, an ornithological subsection was formed which in 1893 drew away from the Institute and formed the Biological Society of Ontario. The latter organization accumulated a collection of bird and mammal skins which was given to the Biological Museum in 1912.

The Biological Museum (1890-1914)

Under the guidance of Professor Ramsay Wright the Biological Museum of the University developed into the finest museum of its kind to be found in Canada.

On February 14, 1890, University College in which the old Museum was located suffered a disastrous fire. The library, housed in the same building, was destroyed but the Museum suffered comparatively little. However, the collections were cleared out during the conflagration. The Biological building which had been opened in 1889 was, as a consequence of the fire, extended to include a museum wing for the reception of the University's natural history collections. Here not only biological but also mineralogical and palaeontological material was displayed until the development of separate museums of the latter two subjects. Following the fire of 1890 appeals were made to museums and other scientific institutions in various parts of the world for the donation of material towards the building up of the collection of the new Biological Museum.

In the calendar of the University of Toronto for 1894-5, it is recorded that "The collections from the old museum, especially the specimens and models of the highest educational value, are in



PROFESSOR R. RAMSAY WRIGHT
PROFESSOR OF NATURAL HISTORY
1874-1887
PROFESSOR OF BIOLOGY, 1887-1912

great part intact, and are now transferred to the new museum. Collections such as that purchased from Dr. Garnier and including about a thousand specimens, chiefly of reptilian and avian forms, and the donations from the United States Fish Commission, the Paris Museum, the Museum of Comparative Anatomy at Cambridge, Massachusetts, and other sources have very largely increased the facilities of the museum for the purposes of instruction. The cases in which the collections are arranged are dust, light and moth-proof and have been in large part adapted from the plans of those of the Dresden Museum" (designed by Dr. A. B. Meyer).

The Garnier collection consisted of approximately 2,500 specimens; 473 of these including mammals, birds, reptiles, amphibians and fishes were presented by Dr. J. H. Garnier of Lucknow in 1891, and over 2,000 purchased from Dr. Garnier the same year. It had been gathered from all parts of the world, and was especially rich in reptiles as Dr. Garnier was evidently more interested in this group than in any other. (See appendix for some account of Garnier and his collection.)

A little later it is recorded that a large series of duplicate specimens had been donated in 1901 by the Trustees of the British Museum. These included specimens of fish and invertebrates from the Challenger collection, fossil vertebrates, skins of mammals and birds, also specimens of reptiles and amphibians. A collection of fifty specimens of marine invertebrates was also presented by Dr. Anton Dohrn, Director of the Naples Zoological Station.

The calendar for 1897-8 and several subsequent years describes the Museum as follows: "The University Biological Museum forms the central portion of the Biological Building. The equipment of

the museum is now so far advanced as to permit of its being opened to the public. It is primarily intended as an educational museum for the students taking Biology as part of their University work, and is arranged in such a way as to facilitate the most elementary as well as the most advanced studies. Each specimen is furnished with a printed label indicating the most salient points which it is designed to illustrate, but it is anticipated that the Museum will also be of great interest to the general public. . . .

“. . . The interior of the Museum, which occupies two floors, is sub-divided into four rooms, seventy-five by twenty-five feet in size, amply lighted by handsome windows on the north and south sides. Three of these rooms are devoted to Animal Biology, while the fourth which is to be arranged for the illustration of Vegetable Biology is temporarily fitted up for the accommodation of the Ferrier collection of minerals.

“All the show cases are constructed of iron and plate glass, those destined for the exhibition of smaller specimens standing on wooden storage cases built of cherry and cedar, and containing skins and other specimens for private study.”

In the spring of 1899, Professor Wright was granted a year's leave of absence, which he spent travelling in Great Britain and on the continent of Europe, where he arranged for the acquisition of a considerable number of birds and mammals “which the generosity of some private individuals at home and of some public institutions abroad has enabled me to add to our collections.” These are described by Professor Wright in Numbers 2, 3 and 4 of the first volume of the *University of Toronto Monthly* (1900). They included a fine series of Birds of Paradise, purchased out of a donation by Hiram Walker and Sons; an exhibition collection of birds' eggs by A. T. Wood; a fine collection of 51 mounted birds including bowerbirds by Charles Millar; several pheasants by Dr. John Hoskin; 23 mounted mammals by J. W. Flavelle. Other important contributions and donations at this time and somewhat earlier were made by Wm. Boulton, Dr. A. R. Abbott, Wm. Davies, Wm. Christie, B. E. Walker, Joseph Kilgour, Frederic Nichols, Mrs. Jos. Copley, T. G. Blackstock, George Gooderham, Gordon Waldron, R. T. Anderson, Dr. J. B. Tyrrell and many others. Large series of specimens were also purchased in England, France and Germany out of University funds.

Most of these specimens represented old world species, although representatives of some North American forms were obtained from Europe. Little Canadian material was added to the Museum during the early years of the century. This is a reflection of the

lack of attention paid to faunal studies in this country at this time. Most of the activity in faunistics at that time was on the part of naturalists, either individually or through their societies. Reference has already been made to the Garnier collection acquired by the Museum. Much of this material was exotic but it also included many Ontario species. In 1904 Lady Gzowski presented a collection of 166 mounted Canadian birds which had been brought together by Sir Casimir Gzowski. In 1911 three collections of Canadian specimens were received. J. H. Ames presented 546 specimens, mostly from Ontario; about one-third of these were mounted. A collection of 114 mounted birds was received as a bequest of the Rev. John Doel. Victoria College dismantled its museum and turned over a fine mounted specimen of the hooded seal, 36 birds, a collection of Canadian and exotic insects and other miscellaneous material. The Biological Society in 1912 presented its collection of 1,047 bird and 16 mammal skins.

Some idea of the rate of growth of the collections may be had from statements of the number of specimens in the Museum at different stages of its development. An early catalogue indicates that 735 specimens were in the Museum in 1870. In 1897, according to Ami,⁵ "The Biological Museum contains between 15,000 and 20,000 specimens, of which the geological department includes about 12,000 specimens. The zoological collections alone number 8,000 specimens, and include specimens of living and fossil representatives of the various classes and orders of the animal kingdom, as well as a large series of models for educational purposes."

In the 1901-2 report of the President of the University, Professor Wright reports that a card catalogue of the contents of the Museum had been started: "already upwards of 6000 cards have been entered. Of these, 1000 refer to 357 species and 217 genera of mammals; 4000 to 1400 species and 750 genera of birds and nearly 1000 to 320 species and 150 genera of reptiles." No statement of the final total of cards in this index was published so far as we have been able to determine.

In 1903-4, it was reported that Dr. E. M. Walker was supervising the preparation of the catalogue and the arrangement of the insect collection, and urged that "some permanent provision must be made in the near future for the diagnosis, cataloguing, arrangement and display of our zoological collections. The time of the various members of the staff being wholly occupied by the largely increased demands in teaching." A catalogue of accessions for

⁵The State of the Principal Museums in Canada and Newfoundland, by Henry M. Ami. *Op. cit.*

1900-12 (inclusive) lists 4,900 specimens received during that period.

A statement prepared by Mr. J. B. Williams in April, 1909, gives the total number of specimens in the Biological Museum at that date as 20,349, not including certain material stored in the basement and attic. Mr. Williams was employed as cataloguer in the Biological Museum from 1906 until his death in 1916.⁶

The Biological Museum at the time of the establishment of the Royal Ontario Museum of Zoology contained mounted skeletons of many species of birds and mammals. Most of these, including all the larger mammal material, were the work of Mr. Alexander Pride who at the time of his death in 1923 had been in the employ of the University for fifty-one years.

A memorandum of amounts expended on account of the Biological Museum from January 1, 1851 to December 31, 1889, gives the total as \$23,222.08.

In many of his reports, Professor Wright points out that the Biological Museum was designed primarily for the teaching of Biology to University students. That the need for a more popular type of museum was being felt is indicated in the report for 1904-5 as follows: "The circumstance that 'Nature Study' has been given a prominent place in the Educational programme for the public and high schools of Ontario renders it necessary that a special collection of the natural history of Ontario arranged from this point of view should be made. Such a collection would primarily be of service to those students who are preparing themselves as specialists in the high schools but would also be very useful to the students of the summer session who are, in many cases, public school teachers seeking to qualify themselves to carry out the educational programme in its entirety, and I may add that it would also be very instructive to the numerous pupils of the public and secondary schools of the city who visit the museum in increasing numbers."

By 1910-11, plans for the Royal Ontario Museum were definitely in mind, for in the report of that year Professor Wright said, "The foregoing collections (Canadian birds) will be especially useful when transferred to the New Museum where an effort will no doubt be made to have a large and systematic collection illustrative of the Canadian fauna."

⁶John Bickerton Williams, F.Z.S. *Can. Ent.*, Vol. 48, p. 248. 1916.

Establishment of the Royal Ontario Museum of Zoology

Professor Ramsay Wright retired in 1912 and was succeeded as head of the Department of Biology by Dr. B. A. Bensley, and it was at Dr. Bensley's request that the Board of Trustees established the Royal Ontario Museum of Zoology.

This was the last of the constituent museums established under the authority conferred on the Board of Trustees by the Act establishing the Royal Ontario Museum. By resolution of the Board dated October 16, 1913, there was created a section known as the Royal Ontario Museum of Natural History. The name was changed on April 24, 1914, to Royal Ontario Museum of Zoology. The zoological collections were given a gallery 104×62 feet at the north end of the upper floor of the original museum building. A small bay of 105 square feet was used as the Director's office and another room about 18×20 feet cut off as a cataloguing and storage room for research collections. A basement room of 540 square feet floor area served as laboratory for all phases of preparation.

Since the Museum of Zoology was created so much later than the others, no zoological exhibits had been installed when the Royal Ontario Museum was formally opened in March, 1914. It was not until May, 1915, that as a nucleus of exhibition material, several hundred specimens were transferred from the Biological Museum. In the selection of this material, preference was given to Canadian animals, although such brilliant and striking exotics as birds of paradise, parrots and humming birds were included, also a collection of foreign game birds. The exhibit thus assembled included a fairly representative collection of the birds of Canada, a much less adequate representation of Canadian mammals, twelve cases of insects, chiefly Canadian. Fishes, amphibians, reptiles and invertebrates other than insects were poorly represented, although there were included casts of the five species of Pacific salmon presented by the Government of British Columbia. An idea of the kind and amount of material contributed by the Biological Museum may be had from the following list of mounted Canadian mammals transferred to the new Museum: muskox, pair of Dall's mountain sheep, northern fur seal, hooded seal, wolverene, otter, pair of Arctic foxes, red fox, raccoon, Rocky Mountain goat, beaver, cougar and badger.

The needs of a public museum such as those of the Royal Ontario Museum could not be adequately met either in the amount or nature of material available in the Biological Museum and steps were soon taken to augment it by the preparation of

specimens specially suited to the needs of the new Museum. Additions to the mammal collection were made through the mounting of such species as wolves and deer by taxidermists employed on a temporary basis. Using material from the University Department of Biology, systematic series of many invertebrate groups were prepared by Dr. Walker and Mr. Kurata. Many of these, including spiders, crustaceans, worms, etc., were mounted in alcohol in cylindrical museum jars, but a collection of mollusc shells and dried starfish was displayed in table cases.

Contributions of material from public bodies and private individuals were soon forthcoming. Among the donors of material at this time should be mentioned Algonquin Provincial Park and the Toronto Parks Department. Private donations which helped to expand the exhibits included the Patton collection of 51 pairs of antlers of the European roe deer showing the variations in growth and symmetry in that species. These were the property of the late Dr. Wm. R. Patton of Toronto and were donated by his niece, Miss Annie L. Carlyle. There were also the Boddy and Tregarthen collections of the horns of African Antelopes. The former was loaned by Captain A. W. Boddy and the latter presented by William Coulson Tregarthen to Trinity College. Specimens of tropical game fish including sailfish, dolphin, yellowtail and California rockfish were presented by Messrs. E. R. Wood and W. H. Brouse. Other donations were white moose by J. B. Tudhope, a collection of Ontario birds of prey and ducks, mounted by George Pearce and donated by Z. A. Lash, a mounted pelican by Col. G. T. Denison and numerous others.

The 1931 Extension

The galleries, storage and research rooms and other facilities of the original Royal Ontario Museum building were soon found to be inadequate. This was especially true in the Museum of Zoology which, instituted after the Museum had been organized on the basis of only four components—Archaeology, Geology, Mineralogy and Palaeontology,—could be given only very limited space. As a matter of fact, it was only after moving into the 1931 extension that the Museum of Zoology was able to organize on the basis of a properly constituted museum. It was in March, 1932, that a few of the storage rooms in the new building became available; but it was not until May that installation of exhibition material was possible. On December 28, 1932, the zoological galleries as well as those of Geology, Mineralogy and Palaeontology



A view of the gallery in the first wing (1915-1932).
The miscellaneous character of the exhibits at this time is well illustrated.



A view of the north gallery in the new wing (1932).
This gallery is largely devoted to Canadian animals.

were first opened to the public. The official opening took place on October 12, 1933.

On the third floor of the new building, a gallery 196×58 feet was provided for Canadian exhibits and one 146×28 feet for foreign material. In addition 6,678 square feet of space on the third floor and in the tower was allotted for library, offices, laboratories and research collections of mammals, birds, insects and molluscs, while 4,982 square feet on the ground floor is used for other laboratories, research material preserved in alcohol, preparation rooms, a photographic room and various storage rooms.

Progress in Exhibition

Methods of museum exhibition have undergone a revolution during the past quarter of a century. In the early days of the Royal Ontario Museum, the methods of display were those carried over from the Biological Museum. These are typified by rows of birds mounted on walnut bases arranged on glass shelves. Another feature of the older museums was the exhibition of long series of animals of interest chiefly to students of the various groups; sometimes they bore only their scientific names. It is not suggested that the Royal Ontario Museum of Zoology gallery was ever of this extreme type, and it must be recognized, too, that in arranging an exhibit for the opening of the new Museum, it was necessary to use the materials at hand. The Great War, which broke out soon after the opening, also delayed museum expansion for several years.

The trend in museum exhibition has been in the direction of making the exhibit tell its own story with the minimum of descriptive label. This is accomplished in part by the provision of accessory material designed to suggest something of the habitat in which the animals live. That such a development was contemplated in the establishment of the Royal Ontario Museum is shown by a statement made by Sir Edmund Walker⁷ in 1899. "These museums," he said, "should contain . . . the fresh water and sea fishes, mounted after the modern methods; the fur-bearing animals, the game birds, and the birds of our forests, fields and sea-coasts, many of them mounted so as to tell a child their habits at a glance; the reptiles, crustaceans, insects, plants, indeed as complete a record of the fauna and flora of the country as possible. . . ." To direct the development of exhibition and other

⁷Canadian Surveys and Museums and the Need of Increased Expenditures Thereon, by B. E. Walker. Proc. Can. Inst., n.s., Vol. 2, Pt. 3. 1900.

phases of museum work in line with modern methods, Mr. L. L. Snyder was appointed to the staff in September, 1917.

The trend in museum exhibition here discussed has culminated in the habitat group which depicts an animal amid a representation of its natural surroundings. Usually such a group includes a panoramic picture as a background. The desirability of including such exhibits in the new Museum was early realized but lack of space and the small size of the staff placed definite limits on the size and number of habitat groups to be attempted. The first groups of this type were undertaken in 1919 and were quite small each occupying a space 3 feet wide, 2 feet from back to front and 40 inches high. Twelve were accommodated together in one cabinet, three upper and three lower on each side. One cabinet of twelve groups was constructed using material obtained during a collecting expedition to Port Sydney, Muskoka District, during the summer of 1919. A second cabinet included specimens collected during the summer of 1920 at Point Pelee, the southernmost mainland point in Canada.

In 1922, a more ambitious habitat group representing a family of black bears in their natural surroundings was undertaken. The materials for this group were collected during the summer of 1922 at Brent in Algonquin Park. This group, completed in 1923, occupied a case 11 feet long, 8 feet high and $7\frac{1}{2}$ feet from back to front. A male and female and two cubs were included in the group. The background was painted by Mr. Roy Fisher, who accompanied the Museum party to the field for the purpose of securing sketches for use in the painting.

A second large habitat group was constructed in 1934 when increased space became available in the new wing. This depicted the passenger pigeon, a bird formerly occurring in summer in uncounted millions in north-eastern North America but now totally extinct. In the construction of this group Mr. Snyder had the assistance of Mr. T. M. Shortt. The background was again painted by Mr. Fisher.

In 1937, still another type of exhibit was devised. These exhibits are to illustrate biological principles, and historical and economic phases of zoology. Those constructed to date deal with the role of the bird of prey, food chains, periodic fluctuations in animal numbers, the economic value of Canada's fisheries, the contribution of the beaver to the development of Canada and the processing of muskrat to Hudson seal. These exhibits are in the nature of three-dimensional posters, the treatment used being based on the belief that pleasing colour and composition are

desirable in presenting subjects which might otherwise be uninteresting to the average museum visitor.

A type of exhibit especially adapted to illustrate the structure of animals, in particular those of small size, is the large-scale model. Those of this type completed to date include a grasshopper (ten times natural size), woodlouse (twenty-five times natural size), spider (fifty times natural size) and housefly (fifty times natural size).

Exhibits of living animals in the aquarium installed in the rotunda between the two galleries are now a permanent exhibition feature. Living animals are always more interesting than ordinary museum specimens, but naturally there is a limit to the number of live specimens that can be included in a museum. The exhibits are changed from time to time so that in the course of a year, a wide variety of fishes, both native and tropical, frogs, salamanders, snakes, turtles, lizards, molluscs, crayfish, etc., are shown.

Temporary exhibits are placed in the gallery from time to time. These include such exhibits as nature photographs by local naturalists, an annual exhibit of tropical fish by the Toronto Aquarium Society, animal drawings made in the gallery by art students, tropical moths and butterflies, projects by children, Australian shells, works of early naturalists, bird paintings, important accessions and specimens secured by the Museum's various summer expeditions.

The exhibition collection, as has already been pointed out, was at first largely confined to illustrating the natural history of Canada, particularly of the Province of Ontario. Because of limitations of space in the original building, it was impossible to accommodate many of the larger mammals of Canada or to introduce much in the way of foreign material. The foreign collection consists largely of specimens transferred from the Biological Museum in preparation for the opening of the new galleries in 1933. Most of the specimens constituting this collection are now quite old and must, as soon as possible, be replaced by new and better mounted material.

The first need on acquiring larger exhibition space was, however, the provision of representatives of the larger mammals of Canada. This was made possible through the Reuben Wells Leonard bequest, from the funds of which a skilled sculptor-taxidermist, Mr. Knud Nielsen, was employed in 1933. The animals thus added to our collection include moose, elk (wapiti), bison, polar bear, black bear, cinnamon bear, glacier bear, Kermode's bear, a pair of Bighorn sheep, Stone's mountain sheep,

buffalo calf, elk fawn, coyote, brush wolf, three timber wolves (black, white and grey), cougar, mink, prong-horn antelope, barren ground caribou, mule deer, mountain caribou, Columbia black-tail deer, grizzly bear and albino porcupine. Foreign and other specimens added include an adult male, immature male and female lions, tiger, leopard, snow leopard, cheetah, panda, takin, wallaby, Tasmanian devil, saluki hound, English bull dog, beagle hound, Kerry blue terrier, kinkajou and marmoset monkey. In securing specimens, the Museum has had the co-operation of such organizations as the National Parks Bureau, Ottawa, Ontario Department of Game and Fisheries, and Toronto Parks Department.

In the gallery devoted to Canadian birds, each specimen has been mounted on a replica of a rock, block of mud, tree branch, or other base to represent something of the habitat in which the species lives, each base including the various plumages of the species. By this means, some hint is given of the bird's manner of life. The hanging of the bases on the vertical panels and the elimination of shelves make possible a much more pleasing and artistic arrangement of the specimen in the case than is possible when all are mounted on uniform bases and arranged in rows on glass shelves. Unfortunately, it has not yet been possible to get away from the latter type of exhibition in the case of the foreign birds.

The fishes, amphibians and reptiles of Canada are represented by realistically coloured replicas of actual specimens. These replicas are cast usually in plaster, sometimes in wax, from moulds made from freshly killed specimens. The life-like colours are reproduced, either from living specimens or from sketches made from life.

The collection of invertebrate material is now under revision in an effort to interpret life histories, inter-relationships and as much of the relationships as may be of interest to the average museum visitor. This will involve eliminating most of the long series of specimens arranged in systematic order characteristic of the older type of exhibition.

Research Collections

Not all a museum's specimens are on exhibition; in every large natural history museum, there are hundreds of specimens preserved as a research collection for every one on exhibition in the public galleries. The research collections are accumulated for study in connection with many phases of zoology. Not all this study is

carried on by members of the museum staff. University investigators often base their studies in whole or in part on museum research material. Specimens are also loaned to other institutions. As our collections increase in size and the Museum becomes more widely known, the use made of our research collections is increasing. Our Museum is now regarded as the centre of research material on the animal life of Ontario and in some groups for the whole of Canada. During 1938, three graduate students of the University of Toronto were working in the Museum using material preserved in the research collection of fishes. Specimens were loaned during the same year to the following institutions: Mammals to Bureau of Biological Survey, United States Department of Agriculture; Department of Zoology, University of California; British Columbia Provincial Museum. Birds to Bureau of Biological Survey, United States Department of Agriculture; National Museum of Canada; University of California. Fishes to Museum of Zoology, University of Michigan. Reptiles and amphibians to Carnegie Museum, Pittsburgh; Toledo Zoological Society; Philadelphia Zoological Society; College of Puget Sound. Insects to University of British Columbia; Department of Agriculture, Ottawa; Academy of Natural Sciences, Philadelphia; State College of Washington. Molluscs to Academy of Natural Sciences, Philadelphia.

Research based on specimens preserved in zoological museums is of two main types, taxonomic and distributional. In Ontario and other parts of Canada, problems of distribution are of particular interest. The present animals of Ontario have occupied the areas in which they are now found in comparatively recent geological times, that is, since the retreat of the last ice sheet which covered this area. Study of their present distribution and a comparison of the characteristics of animals of the same species from different parts of the range promises to throw light on several zoogeographical problems. The first step in zoogeographical research is the mapping of ranges. Information on the distribution of birds, mammals, reptiles, amphibians, fish and other animals is being recorded in the Museum of Zoology on large maps of the province prepared for this purpose. The information as to distribution recorded on these maps is being secured from specimens in the Museum and from published and unpublished sources. These maps serve to show graphically what is known about the distribution of the various species in the province and are also guides to future work, indicating as they do the blanks in our knowledge of the various species.

In the case of birds and mammals, research material consists

largely of skins filled with cotton wool, each bearing a label giving the date and locality of collection, sex, measurements of certain body parts and other miscellaneous data. The mammal skin is always accompanied by the skull. Reptiles, amphibians, fish, crustaceans, many molluscs, spiders and most other invertebrates are preserved in alcohol. Most insects, however, are pinned in the dry condition. A representative collection of the skeletons of vertebrate animals is also maintained. All specimens are accompanied by complete data as in the case of bird and mammal skins.

The research collections are obtained as a result of collections made by Museum expeditions while on field work, also by donation, by purchase and by exchange. The extent of the material in the different divisions obtained by each of these means for the year October 1, 1937 to September 30, 1938, was as follows:

	Donated	Collected	Purchased	Exchanged	Total
Mammals.....	500	1,140	164	72	1,876
Birds.....	1,453	842	612	62	2,969
Birds' eggs (sets).....	58	36	0	30	124
Birds' nests.....	16	31	0	0	47
Amphibians.....	120	101	0	0	221
Reptiles.....	51	34	0	0	85
Fish*.....	706	461	17	0	1,184
Insects.....	9,082	8,110	0	0	17,192
Spiders.....	32	13,160	0	0	13,192
Molluscs and other invertebrates*.....	1,621	605	1,100	16	3,342

*In the case of fish and molluscs, the numbers given indicate the number of lots.

Following are brief accounts of the growth and present extent of the research collections in the various divisions.

Mammals. The Biological Museum contained roughly 200 mammal skins, chiefly foreign and a similar number of skulls and skeletons. At the end of 1939, the research collection of mammals in the Royal Ontario Museum of Zoology included about 12,000 specimens, including skins, skeletons and alcoholics. Most of these are skins, although there is a representative collection of skeletons of Canadian forms. This collection represents 207 genera and 520 species, most of it being of Canadian origin. It has been obtained largely as a result of field collecting by staff members, although small collections have been purchased from time to time.

Birds. An account of the development of the Museum's research collection of birds was published in *Contributions of the*

Royal Ontario Museum of Zoology, Number 12, 1938. The Biological Museum contained about 5,000 specimens of birds when the Royal Ontario Museum of Zoology was established. At the end of 1939, the collections numbered 33,372. The collection contains representatives of 160 of the 165 recognized families, 1,707 genera and 3,525 species. Additions to the collection have come from the following sources: collected by the staff in field work, 7,149; purchased, 9,200; exchanged, 446; the rest have been donated. There is also a collection of approximately 3,055 sets of eggs and nests.

An important adjunct to the collections of the bird division is the collection of birds' stomachs. The stomachs of all birds collected in connection with the Museum's surveys are preserved. On the analysis of the contents of the stomachs of specimens taken from different habitats, at different seasons and from the entire range of a bird, information on the food and interrelationships of each species is obtained.

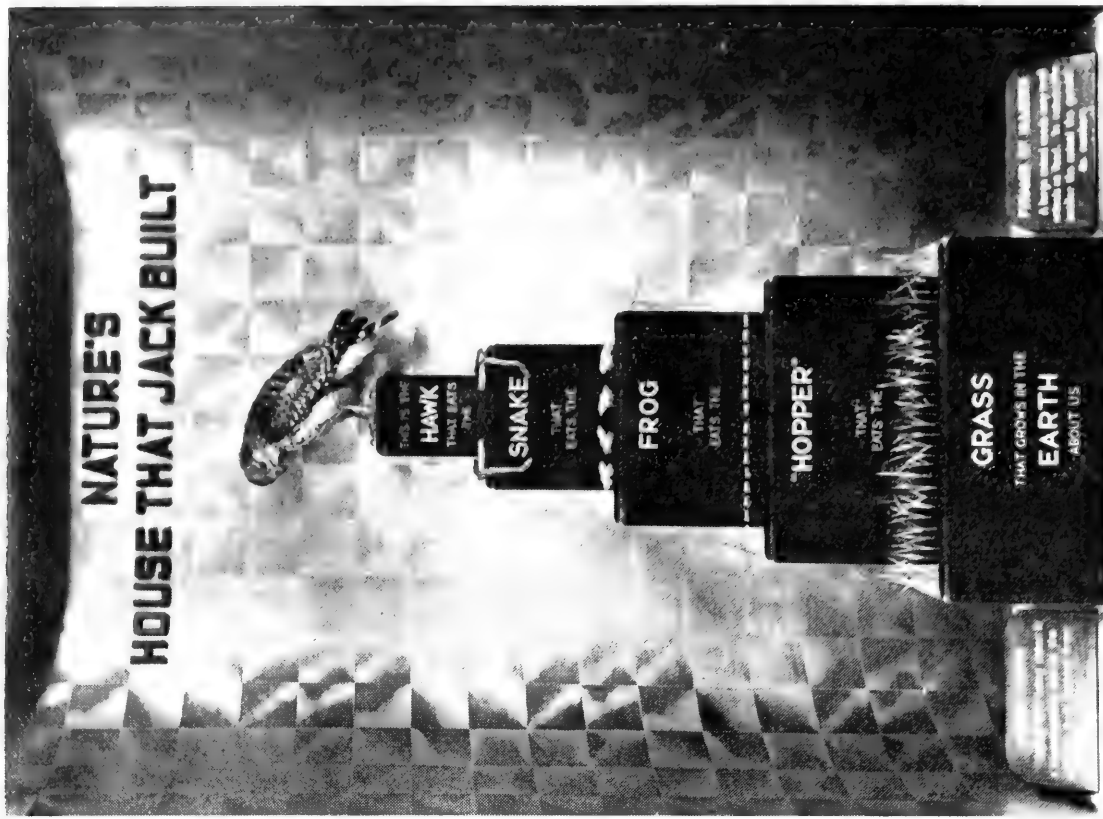
Reptiles and Amphibians. The principal material in this division transferred from the Biological Museum was the Garnier collection, to which reference has already been made. This collection consisted largely of foreign material, although there were included a number of specimens from Ontario. These are of considerable value since they were collected at such an early date in Ontario. During the years between its acquisition by the Biological Museum in 1891 and its transfer to the Royal Ontario Museum of Zoology in 1932, quite a number of the Garnier specimens were lost due to lack of continuous supervision. The Garnier collection still constitutes a separate collection, since all the time that it has been possible to give to a study of reptiles and amphibians since the organization of the Royal Ontario Museum of Zoology has been devoted to the Canadian fauna.

The number of specimens, apart from the foreign material in the Garnier collection, in our collection at the end of 1939 was 1,680 reptiles and 4,979 amphibians, representing 80 species of reptiles and 35 of amphibians. Most of this material has been collected by staff members on field work and hence is largely of Ontario origin. There are, however, small collections from most of the other provinces. Of these, British Columbia is best represented.

Fishes. The collection of fishes at the end of 1939 contained 10,371 catalogued numbers. In the case of small specimens, one number sometimes refers to several hundred specimens of the



LEFT. One of the first habitat groups, constructed in 1919. Realism is the objective in such displays.



RIGHT. One of the recent attempts to illustrate graphically certain biological subjects. These exhibits depend on colour and pleasing composition to arrest attention. The subject is presented as simply as possible.

same species collected in the same place at the same time. In the case of larger specimens, each is given an individual number of its own. The actual number of specimens in the collection is therefore many times the number indicated. The collection contains representatives of 359 North American species, largely of Canadian origin, and 231 species from outside North America. In the latter case, most species are represented by single specimens, whereas most Canadian species are represented by many lots. For instance, we have 2,104 specimens of lake herrings of the genus *Leucichthys*, 818 *Salmo*, 373 *Coregonus*, 301 *Salvelinus* and 146 *Cristivomer*. As suggested by these figures, the collection is especially rich in Salmonidae (salmon and trout) and Coregonidae (whitefishes and lake herrings). Our collection of material from the far north is especially important.

Much of the collection has resulted from the field work of the Ontario Fisheries Research Laboratory of the University Department of Biology, but field work undertaken by members of the staff in connection with the Museum's faunal surveys and for the Biological Board of Canada has added much valuable material. Donations have also been important, especially from out-of-the-way localities.

The foreign material came largely from the Biological Museum, to which most of it was donated by the British Museum (Natural History) and the United States Fish Commission.

Insects and Spiders. The insect collection, which now totals about 250,000 specimens, has been largely assembled since the establishment of the Royal Ontario Museum of Zoology. The 1909 catalogue of the Biological Museum included only 8,240 insects.

Most of the present collection has been collected by staff members but there have been many important donations and a few collections have been acquired by purchase. Some account of the more important donations and purchases is given in the *Canadian Entomologist* for April, 1938. Of the 28,000 specimens transferred from the Ontario Provincial Museum, 25,000 were collected by Dr. Wm. Brodie and 3,000 by C. W. Nash.

The field of entomology is such a vast one that a museum such as ours must limit itself to certain groups. Obviously we must specialize on the insects of Ontario. We cannot, however, ignore the insects of other regions or groups not represented in our area. Because of our concern with education, both through the University and through our public galleries, it is necessary to interest ourselves in certain general entomological problems. Also because

of the special interest of the Department of Biology, University of Toronto, in aquatic biology, it seems advisable for us to devote special attention to aquatic insects.

The number of specimens at present in some of the orders is as follows: Lepidoptera, 38,000; Coleoptera, 41,750; Diptera, 27,000; Orthoptera, 16,000; Hemiptera, 6,500. The collection of Odonata brought together by Dr. E. M. Walker is outstanding. The mounted collection occupies six cabinets of 124 drawers and in addition contains a considerable collection of nymphs and exuviae. All of the species reported for Canada are represented in this collection.

The spider collection totals 4,496 lots including 12,988 specimens and is largely the work of Mr. T. B. Kurata.

Molluscs. Until space became available in the new wing in 1932, it was impossible to do anything towards sorting out, cataloguing and storing in systematic order the mollusc material which had accumulated in the Biological Museum and several collections which had come as donations and as a result of field work since the establishment of the Royal Ontario Museum of Zoology. In the intervening years, it has been impossible to overtake the arrears of cataloguing and arrangement. The number of catalogued lots at the end of 1939 was 8,260 in the case of Canadian material and 4,946 foreign, while there were still uncatalogued approximately 9,000 lots of Canadian material and 2,637 foreign. About 90 per cent of the catalogued material is in the form of dry shells; 10 per cent is preserved in alcohol. A "lot" includes a number of specimens belonging to one species, collected in the same place at the same time.

The Canadian material belongs to 371 species, of which 212 are land and freshwater and the rest marine. The foreign material belongs to 1,273 species. The Canadian material is largely the result of staff collecting but there have been some important donations and a few purchases. Much valuable United States material has been obtained through exchange with museums in that country. Material from outside North America came largely through the purchase in 1919 of a collection belonging to Mr. C. A. Snazelle and the donation in 1932 of a valuable collection by Mr. E. V. Rippon.

Other Invertebrates. Although considerable material has accumulated in some of the other invertebrate groups, such collections have not developed as rapidly as in the case of those described because no one has been able to devote continuous attention to them. Temporary assistance is secured from time to time to

catalogue and arrange material coming in as a result of Museum expeditions and donations, but it requires continuous oversight to develop properly a museum collection in any group of animals. The provision of systematists in some of these groups of "other invertebrates" will no doubt be a development of the future.

The number of specimens or lots catalogued at the end of 1939 was 2,164 representing 790 species made up as follows: Porifera, 16 species; Coelenterata, 69; Platyhelminthes, 32; Nemathelminthes, 36; Annelida, 110; Echinodermata, 50; Crustacea, 350; Miscellaneous, 127.

Field Work

In the development of a museum, not all of the staff's activities are limited to the confines of the museum's building. It is necessary from time to time to make expeditions to obtain specimens and data for exhibits. The first field work undertaken by this Museum was for such a purpose. The best exhibits are formed from new material, collected by those concerned with its preparation. This is especially true and essential if the exhibit is to be a realistic one such as the habitat group where numerous out-of-doors details are reproduced. Also, because we are concerned with organic and consequently perishable material, special and immediate care by experts is necessary. A number of expeditions had the collecting of exhibition material as a primary or secondary purpose.

Collecting for exhibits is not the only purpose of field work. Equally or perhaps more important is the collecting of specimens and information on which to base a study of the animal life of the region in which the Museum is interested.

Up to the time of the founding of the Royal Ontario Museum of Zoology the fauna of our vast Province of Ontario had received some, but rather casual and sporadic study by individuals. An institution was needed to systematize, promote and conduct faunal survey work in this area. Compared to more densely populated regions in North America, the fauna of Ontario, its composition and distribution, were largely unknown. At least nine-tenths of the published information on our animals pertained to those of the southern one-tenth of our provincial area. Virtually no collection had been made beyond the older settled districts and even there thorough and systematic surveys were needed. Consequently there was no necessity to look far afield for areas to study, or regions in which to explore and collect. Although the Museum's zoological scope is world-wide and collections are being accumu-

lated by gift and purchase from far countries, the need for investigations near at hand was, and still is, recognized. Need for expeditions to secure collections outside our area will arise from time to time, but these will probably be to expand or substantiate our understanding of Ontario's fauna.

A table of field work by members of the Museum staff since its inception will be found in the appendix.

The field work has been largely financed out of Museum funds but outside assistance has been received on a number of occasions. The fishes collected during the years 1921-5, 1927 and 1930-6 resulted from the studies of Professor Dymond while associated with the field work of the Ontario Fisheries Research Laboratory of the Department of Biology. The fish collections of 1926 and 1928 resulted from studies made under the Biological Board of Canada. The expeditions to the Favourable Lake and Attawapiskat Lake regions in 1938 and 1939 respectively were financed out of the Reuben Wells Leonard bequest. The Temiskaming and Northern Ontario Railway gave transportation between Cochrane and Moosonee to five members of the field party of 1939.

Publications

Museum publications are of two types: (1) scientific publications describing the results of Museum researches in the field and in the Museum proper; (2) publications of a more popular kind, interpreting for the general public the results of zoological studies, whether carried out in our own Museum or elsewhere.

Following is a list of publications in various series issued by the Royal Ontario Museum of Zoology.

The bulletins are mailed to Museum correspondents and to those donating material to the Museum. Other series are sent free only to institutions with which exchange arrangements have been made. To others the price has been made as low as possible, in order to permit anyone interested to obtain copies. The Museum has no special publication fund and depends for the issuing of additional publications, in part at least, on receipts from the sales of those previously issued.

The CONTRIBUTIONS contain reports of Museum studies, including faunal surveys. Except where otherwise stated, the price is twenty-five cents a copy.

1. A Faunal Survey of the Lake Nipigon Region, Ontario, by J. R. Dymond, L. L. Snyder and E. B. S. Logier. 1928.

2. A Faunal Survey of the Lake Abitibi Region, Ontario, by the staff of the Royal Ontario Museum of Zoology. 1928.
3. A Faunal Investigation of King Township, York County, Ontario, by L. L. Snyder and E. B. S. Logier. 1930.
4. A Faunal Investigation of Long Point and Vicinity, Norfolk County, Ontario, by L. L. Snyder and E. B. S. Logier. 1931.
5. Some Account of the Amphibians and Reptiles of British Columbia, by E. B. S. Logier. 1932.
6. A Study of the Sharp-tailed Grouse, by L. L. Snyder. 1935.
7. The Passenger Pigeon in Ontario, by Margaret H. Mitchell. Records of the history of the now extinct wild pigeon (*Ectopistes migratorius*) in Ontario. 1935. Paper \$1.00, cloth \$1.50.
8. The Distribution of Breeding Birds in Ontario, by James L. Baillie, Jr., and Paul Harrington. 1936-7.
9. Some Freshwater Fishes of British Columbia, by J. R. Dymond. 1936.
10. The Birds of the Lake St. Martin Region, Manitoba, by T. M. Shortt and Sam Waller. 1937.
11. Baird's Sparrow, by B. W. Cartwright, T. M. Shortt and R. D. Harris. 1937.
12. Ontario and its Avifauna, by L. L. Snyder, and The Museum's Bird Collection, by J. L. Baillie. 1938.
13. Birds of Algonquin Provincial Park, Ontario, by D. A. MacLulich. 1938.
14. A Faunal Investigation of Western Rainy River District, Ontario, by L. L. Snyder. 1938.
15. The Fishes of the Ottawa Region, by J. R. Dymond. 1939.
16. The Birds of the Vicinity of Lake Nipissing, Ontario, by W. E. Ricker and C. H. D. Clarke. 1939.
17. The Summer Birds of Yakutat Bay, Alaska, by T. M. Shortt. 1939.

The OCCASIONAL PAPERS are brief reports of scientific work not extensive enough for inclusion in the Contribution series. Price, 10 cents a copy.

1. A New Genus and Species of Flightless Duck from Campbell Island, by J. H. Fleming. 1935.
2. A Revision of the Sharp-tailed Grouse with a Description of a New Race, by L. L. Snyder. 1935.
3. A Summary of Data Relative to a Recent Invasion of Willow Ptarmigan, by L. L. Snyder and T. M. Shortt. 1936.

4. The Northwest Coast Sharp-shinned Hawk, by L. L. Snyder. 1938.
5. On *Melospiza melodia* in Ontario, by J. H. Fleming and L. L. Snyder. 1939.

HANDBOOKS as the name suggests, include brief, popular accounts of the subjects dealt with. They are intended as guides to the study of the groups discussed. Each includes a number of illustrations.

Unnumbered. Guide to the Game Fishes of Canada.

1. The Mammals of Ontario, by E. C. Cross and J. R. Dymond. 25 cents.
2. The Hawks and Owls of Ontario, by L. L. Snyder. 35 cents.
3. The Amphibians of Ontario, by E. B. S. Logier. 25 cents.
4. The Reptiles of Ontario, by E. B. S. Logier. 35 cents.

The LEAFLETS, with the exception of Number 2, are four pages. They are intended for use in schools but should be of interest to anyone desiring a brief popular account of the subject discussed. Single copies are sold at 5 cents or three for 10 cents; in lots of 25 or more they are 1 cent each.

1. Winter Birds.
2. Twelve Canadian Birds. (To accompany the second series of reproductions of bird paintings by Allan Brooks.)
3. The Passenger Pigeon Habitat Group.
4. The Starling in Ontario.
5. Teaching Conservation.
6. The Eastern Speckled Trout.
7. Wild Life Conservation.
8. The Humane Treatment of Animals.
9. About Birds in Winter.
10. Bats.
11. Beginning Bird Study.

The BULLETINS contain reports of Museum work, accessions, gallery exhibits, surveys, studies and publications. They are distributed free only to Museum correspondents who regularly supply the Museum with information on wild life conditions in their areas. The price to others is 10 cents per copy.

1. 1928. Published by the Department of University Extension

2. Jan., 1929. Published by the Department of University Extension
3. June, 1929. Published by the Department of University Extension
4. 1930. Published by the Department of University Extension
5. 1935. Published by the Royal Ontario Museum of Zoology
6. 1936. Published by the Royal Ontario Museum of Zoology
7. Jan., 1938. Published by the Royal Ontario Museum of Zoology
8. Nov., 1938. Published by the Royal Ontario Museum of Zoology

Two sets of BIRD PICTURES have been distributed by the Museum, each consisting of twelve coloured reproductions of bird paintings by the Canadian artist, Allan Brooks. These pictures, which are 9 by 11 inches in size, are beautifully reproduced and are suitable for framing for school or home. The birds represented in the first set are Baltimore oriole, ruby-throated hummingbird, goldfinch, blue jay, loon, ruffed grouse, screech owl, flicker, chickadee and white-breasted nuthatch, belted kingfisher, scarlet tanager, and bluebird. The second series represents horned grebe, herring gull and common tern, great blue heron, mourning dove, osprey, downy woodpecker, nighthawk, kingbird, purple finch, barn and cliff swallow, redstart, house wren and winter wren. These were originally sold at \$1.00 for each set, but the second set was later reduced to 50 cents per set.

FIELD-CHECKING LISTS. 5 cents a single copy, 3 for 10 cents, 1 cent each in lots of 25 or more.

BIRDS. A 4-page folder $3\frac{1}{2} \times 6$ inches, containing a list of 311 birds that have been identified in the Toronto region; useful almost anywhere in Ontario for recording observations.

MAMMALS. Similar to above, listing 44 species of Ontario mammals; specially useful for recording trapping results.

A thirteen-page mimeographed circular on The Keeping of Fish, Reptiles and Amphibians in Aquaria and Terraria has recently been issued. It is planned to publish this later as a Handbook.

Two publications issued before the above series were instituted do not belong to any of the categories listed above.

Royal Ontario Museum of Zoology, What It Offers and How You Can Help. Published by the Director of University Extension, University of Toronto, Toronto, 1923.



Specimens of cougar, grizzly bear, and giant panda recently added to the exhibition series.
These represent the quality of mounts produced by modern preparation methods.

The Heming Paintings of Northern Life. Doubleday, Page and Company, Garden City, N.Y. and Toronto, 1923. Price 30 cents. Contains a description and reproductions in colour of twelve paintings by Arthur Heming, ten of them donated to the Museum by Sir Joseph Flavelle, Bart.

Members of the Museum staff have also contributed 213 papers to scientific journals.

Education and Extension

The Museum of Zoology co-operates in the general educational work of the Royal Ontario Museum.

In 1935, the Museum of Zoology was enabled through a donation by Mrs. B. A. Bensley to employ an instructor for classes and other groups visiting the zoological galleries. Later the Board of Trustees made it possible to add the instructor to the permanent staff in Zoology. Mr. F. A. Urquhart, who has been our instructor since this work was instituted, arranges for classes from the secondary schools of Toronto and vicinity, private schools and any others who wish instruction in zoology. He also looks after classes arranged by the general Museum department of instruction, who wish to visit the zoological galleries.

The Museum of Zoology is assisting in the study and appreciation of animal life through its contacts with organizations of naturalists and sportsmen and with individuals interested in wild life, not only throughout Ontario but in all parts of Canada. Various members of the staff have taken active parts in such organizations as the Royal Canadian Institute, Federation of Ontario Naturalists, Ontario Federation of Anglers, Ontario Hunters and Sportsmen's Association, Brodie Club, Toronto Field Naturalists' Club, Toronto Ornithological Club and Toronto Aquarium Society. Several of these organizations meet regularly in the Museum; the Toronto Aquarium Society has held an exhibition in the Museum at Easter time in each year beginning in 1935.

The Museum of Zoology in its public relation has the whole province, and not the city of Toronto only, in mind. Each year, beginning December, 1931, the Museum has obtained from correspondents throughout Ontario information on changes in the numbers of various species of animals. In turn, reports on the results of these surveys and other natural history information is sent our correspondents. Most of these persons are actively interested in natural history and are centres of information on animal life in their localities; many of them come to take a keen

personal interest in the Museum and call when they are in Toronto. Through these contacts with individuals and organizations we spread the Museum's information and influence widely throughout the province.

Through such contacts with naturalists and sportsmen, donations to the Museum have been greatly stimulated. The rapid increase in the number of persons donating material to the Museum is referred to under Benefactors. From examination of the reports of other museums, we believe ours is unique in the number of persons who take an active interest in its work. Many other museums are more successful in securing the support of more wealthy patrons, especially for foreign surveys and exotic material, but we believe that the duty of the Royal Ontario Museum of Zoology is primarily to interest our own people in the animal life of our own area.

Library

No space was available for the accumulation of a zoological library in the original Museum building, but with the completion of the 1931 extension, the development of a library was immediately undertaken. By the end of 1939, this library contained 2,745 bound books and 22,702 pamphlets, journals and other unbound publications. The library is recognized as a branch library of the University of Toronto Library and there have been transferred to it on that basis 791 bound volumes and 593 unbound publications, which are included in the above total. Our own material has been almost entirely acquired by donation. Current publications of a large number of museums and other scientific institutions throughout the world are now being received in exchange for our own series of Museum publications.

The library still lacks a great deal of literature necessary to the proper functioning of a modern museum of zoology. Especially we should aim to have everything that has ever been published bearing on the zoology of Canada.

Photographs and Lantern Slides

The Museum has developed a collection of photographs and lantern slides. The lantern slide collection consists of 2,170 slides illustrating mammals, birds, reptiles, amphibians, fish, insects and miscellaneous zoological topics. Many of these are coloured. The collection has been developed largely for the use of the staff in illustrating public and university lectures, but slides are loaned to others on condition that the borrower pay transportation charges and replace slides broken while in his possession.

The Museum also has a collection of 3,330 original photographic negatives. These are of animals mounted in the Museum and photographs taken on Museum expeditions. There is also a large collection of reproductions of animal photographs which are used not only in mounting animals in the Museum but by artists and others requiring illustrations of living animals.

The Museum also possesses a collection of several hundred original colour sketches and drawings made by members of the staff illustrating animals collected or observed in the field.

Identification Service

The identification of specimens collected by investigators in connection with life history, ecological and distributional studies is an important museum service. Heretofore most material collected in Canada in connection with such studies has had to be sent to the United States to be identified. With the growth of the collections of the Royal Ontario Museum of Zoology, it has been possible to undertake the identification of Canadian material in several groups. Our ability to undertake this type of service and the need for it will increase with the further development of Canadian zoology.

The Museum and the University

Although the Royal Ontario Museum is essentially a public museum rather than a university museum, it has close connections with the University. The Chairman of the Board of Governors of the University is *ex-officio* a member of the Board of Trustees of the Museum and three of the other members are appointed by the Governors of the University. The Directors of the Museum of Zoology and of the other Museums have always been members of the teaching staff of the University.

The amount of University teaching carried on in the Museum is much greater in the case of graduate students than in that of undergraduates. A graduate course in ichthyology using Museum materials is now regularly offered. Such subjects as Zoogeography and Taxonomy also draw on the Museum for illustrative material. Many graduate students have based some or all of their special studies on Museum collections. To date, most of these graduate studies have concerned insects or fishes.

Benefactors

While the Museum has had no benefactors who have given large sums or extensive collections, it has enlisted the support of

large numbers of donors, some of whom have made donations of considerable importance.

An indication of the spread of interest in the Museum and its work is given by a consideration of the number of individuals and institutions who have donated specimens to the collection. The following list gives at three year intervals the number of persons and institutions making donations. These figures are the number of donors for the year ending April 30 of the year indicated.

1926.....	40
1929.....	88
1932.....	113
1935.....	242
1938.....	268

It is obviously impossible to list the names of all the hundreds of persons who have given material to the Royal Ontario Museum of Zoology during the first twenty-five years of its existence. Some of the larger donations are indicated in the following list.

- Andrews, H. V.—1,214 butterflies and moths.
 Atwood, C. E.—5,000 insects.
 Bailey, Rev. C. L. W.—60 mammals, 59 birds and other miscellaneous material from Baffin Island.
 Beattie, F. Norman—240 birds, 14 mammals, books, pamphlets and other miscellaneous material.
 Beupre, Edwin—650 sets of birds' eggs, 50 nests, 24 birds, 6 personal journals of natural history observations.
 Bethune, Miss B. M.—61 books and 183 pamphlets from the library of her father, Dr. C. J. S. Bethune.
 Boggs, O. D.—471 birds, 109 sets of eggs, 10 nests, 2 mammals, 316 butterflies and moths from Peru and Ecuador.
 Boyd, John—220 birds, 4 mammals.
 Boyd, Mossom—43 volumes Jardine's Naturalists' Library, 119 volumes Buffon's Histoire Naturelle.
 Brooks, Major Allan—58 birds and 6 nests. Major Brooks was also instrumental in acquiring for the Museum the Strong and Kelso collections.
 Brown, A. W. A.—1,922 insects, 50 molluscs and 135 vials of other invertebrates.
 Brown, H. H.—289 birds and many miscellaneous natural history specimens and publications; personal journals, 1886-97; minute book of ornithological sub-section of Biological Section of Canadian Institute, 1890-3.
 Campbell, Dr. J. A.—has been instrumental in securing for the Museum 6 champion dogs of various breeds, as well as representative specimens of many other breeds.
 Coventry, Professor A. F.—814 mammals, 308 specimens of birds, reptiles, amphibians, molluscs, etc.
 Deeks, D. B.—4,000 feet of motion picture film, 76 birds.
 Doan, K. H.—364 lots of fishes and 244 specimens of other groups.
 Dwight, Mrs. Jonathan—160 coloured drawings of the soft parts of birds by Allan Brooks.
 Edmonds, John—377 birds, 110 mammals and other miscellaneous material.
 Entomological Society of Ontario—2,500 insects.

- Flavelle, Sir Joseph—10 paintings by Arthur Heming.
- Fleming, J. H.—306 mammals, 179 birds and many other miscellaneous specimens, publications, etc.
- Fletcher, J. F. S.—229 birds, 63 mammals and 163 specimens of various other groups.
- Fothergill, Charles, Elizabeth and George—Donation of Passenger Pigeon and sale at nominal price of Catesby's two volume Natural History of Carolina.
- Goad, Mrs. V. E. A.—An angling library of 220 volumes, the property of the late Victor E. A. Goad.
- Goddard, Wm.—82 mammals, 62 birds, 19 fish and other miscellaneous material.
- Goldie, James—736 birds and a volume on hummingbirds.
- Gow, Alex.—476 birds and 12 mammals.
- Hahn, Paul—77 birds, including 54 passenger pigeons. A collection of butterflies, moths and other insects and much additional miscellaneous material. Mr. Hahn was also instrumental in acquiring for the Museum Catesby's Natural History of Carolina and Charles Fothergill's natural history journal.
- Harrington, Dr. Paul—207 sets of eggs, 6 nests, 40 birds, 10 mammals and other miscellaneous specimens and publications.
- Herrington, Rev. H. B.—851 lots of molluscs.
- Holden, A. P.—16 mm. motion picture of hummingbirds feeding young in nest.
- Hope, C. E.—1,116 insects, 225 birds, 91 nests, 69 sets of eggs, 27 mammals, 2 amphibians.
- Hurlburt, Dr. W. E.—161 birds and other miscellaneous specimens.
- Ide, Dr. F. P.—2,825 insects and other miscellaneous specimens.
- Kelso, J. E. H.—596 birds, 6 nests and a series of pamphlets.
- Kerr, Charles J.—17 journals of John W. Kerr and Fred Kerr, being a record of their activities as fisheries inspectors from 1864 to 1898.
- Lang, K. H.—145 fish and 6 mammals.
- Learmonth, L. A.—58 birds.
- Leonard, Reuben Wells Estate—Financed mounting of 44 large mammals, publication of contributions 7, 10, 12, 13, 14, 15, 16 and 17, expeditions to Favourable Lake and Lake Attawapiskat areas of Patricia District and purchase of 1,345 birds.
- Lindsay, R. V.—177 mammals, 156 birds, 134 amphibians and reptiles and much other miscellaneous material.
- Lunn, W. H.—25 mammals, 171 birds, some nests and eggs.
- McGillivray, G. A.—Journal of his great grandfather, Charles Fothergill, 1816-37.
- McIlwraith, Professor T. F.—12 mounted birds, many of them first records and of considerable historical interest, collected by his grandfather, Thomas McIlwraith.
- McIntyre, H. V.—272 sets of birds' eggs, 63 nests, 18 reptile eggs.
- MacLulich, Dr. D. A.—233 mammals, 42 birds and other miscellaneous material.
- McMurrich, Miss Kathleen—3 books and 2,500 pamphlets from library of her father, the late Professor J. P. McMurrich.
- Marsh, The Rev. D. B.—37 mammals including barren ground caribou, and many birds, fish, insects, spiders and other invertebrates.
- Maughan, J., Jr.—808 birds, 9 mammals and 6 fish.
- Merriman, Ida—Diaries of her brother, R. Owen Merriman, 1921-34.
- Miner, Jack—251 birds, a large lake sturgeon and 16 other specimens.
- National Parks Bureau, Ottawa—Choice specimens of the following animals mounted for our exhibition series came from the National Parks: bison, elk, mule deer, mountain caribou, a pair of bighorn sheep, grizzly bear and mountain lion.
- Oakley, E. A.—Collection of Coleoptera including many hundreds of named and classified specimens.
- Ontario Department of Game and Fisheries—53 birds and 2 mammals.
- Ontario Department of Lands and Forests—White-tailed deer, beaver, fisher and marten for mounting.

- Osler, H. S.—Mounted shoebill stork, heads of common and white rhinoceroses and skins of 180 African birds.
- Pooler, E. H.—133 birds, 12 mammals and other miscellaneous material collected in India.
- Quentin, Rev. A. P. and Peter—130 birds and 2 mammals collected in China.
- Rippon, E. V.—Several thousand molluscs and a considerable collection of books and pamphlets including 27 parts of Seitz' *Macrolepidoptera* and 97 numbers of the *Microlepidoptera of the World*; minute books of Natural History Society of Toronto, later the Biological Section of Canadian Institute, for period 1884-91.
- Robb, W. H.—65 paintings of Canadian birds by Allan Brooks, Seton's *Lives of Game Animals*, Roberts' *Birds of Minnesota*, complete set of *Ottawa Naturalist* and *Canadian Field-Naturalist*, Bent's *Diving Birds*, 35 other books, numerous pamphlets, as well as several specimens of birds, mammals, reptiles, amphibians, etc.
- Robertson, Wm.—Fund for publication of Contribution No. 2.
- Royal Canadian Institute—670 birds, 2,400 molluscs, 324 periodicals and other miscellaneous material.
- Rutter, R. J.—189 birds, 96 mammals and 16 other specimens.
- Saunders, H. S.—3,000 insects.
- Saunders, Dr. W. E.—312 birds, set of *Ornithologist and Oologist* (4 vols.), journal of Great Lakes Ornithological Club (1905-27), diaries of Robert Elliott (1887-1901).
- Shortt, T. M.—187 birds.
- Southam, H. H.—139 birds and 24 miscellaneous specimens.
- Stark, W. P.—722 periodicals including *Journal of Mammalogy*, *Zoologist* and *Irish Naturalist*.
- Strong, Dr. W. D.—145 birds.
- Summers, Miss E.—128 birds and 1 mammal.
- Temiskaming and Northern Ontario Railway—Transportation for five members of field party, Cochrane to Moosonee.
- Thacker, T. L.—871 pamphlets.
- Thompson, S. L.—Red fox for mounting, 54 birds and 130 specimens of mammals, reptiles, insects, etc.
- Toner, G. C.—114 mammals, 33 birds, 2 nests, 198 lots of fish, 43 reptiles, 52 amphibians, miscellaneous invertebrates and various publications.
- Toronto Aviaries—121 exotic cagebirds.
- Toronto Parks Department—100 mammals, 191 birds, 15 reptiles and other miscellaneous material.
- Walker, Sir Edmund—Four volumes Richardson's *Fauna Boreali-Americana*, Studer's *North American Birds* and a collection of tropical butterflies.
- Walker, Dr. E. M.—A complete set of *Canadian Naturalist* and *Geologist*, large collections of insects, molluscs and other miscellaneous material.
- Walkinshaw, C. A.—Two volumes Sharpe's *Monograph of the Turdidae*.
- Waller, Sam—547 birds, 96 mammals and many specimens of nests, eggs, reptiles, amphibians, fish and invertebrates.
- Warren, Mrs. H. D.—A collection of 200 coloured lantern slides of birds and mammals.
- Warwick, F. W.—285 sets of eggs, 523 insects and other miscellaneous material.
- Whelan, R. V.—146 mammals, 59 birds, 2,851 insects and a considerable variety of material of other groups.
- White, Mrs. David—34 books, 142 pamphlets, 205 prints, charts, etc., the property of her husband's father, David White, once on the staff of the British Museum (Natural History).
- Young, Rev. C. J.—136 sets of eggs and 4 birds.

Staff

The development that has taken place in the various phases of Museum work would have been impossible without a corresponding increase in staff.

Professor B. A. Bensley, Head of the Department of Biology of the University, was appointed Director of the Royal Ontario Museum of Zoology on October 16, 1913. It was under his supervision that material was chosen from the Biological Museum and transferred to the Royal Ontario Museum of Zoology to constitute its first exhibition. Although burdened with the administration of a large University department, Dr. Bensley continued to direct the development of the Museum and to supervise its growing activities until his death on January 20, 1934.

Professor E. M. Walker, of the University Department of Biology, was appointed Assistant Director of the Museum of Zoology in 1918, and served in this capacity until his resignation in 1931, when he was appointed Honorary Curator of Invertebrate Zoology. Dr. Walker had much to do with the preparation and arrangement of exhibits, especially during the early years of the Museum's existence, and still continues to take an active interest in its development.

Professor J. R. Dymond became Secretary in 1922, Assistant Director in 1931 and Director on the death of Dr. Bensley in 1934. In addition to his administrative duties, Professor Dymond has been in direct charge of the development of the Fish Division.

L. L. Snyder joined the staff as technologist in 1917, became Curator, Division of Birds, in 1935 and Assistant Director in 1938. Mr. Snyder has been responsible for the development in methods of exhibition in birds and mammals, including the habitat groups. He has also directed the field work in birds and also in mammals until the appointment of Mr. Cross in 1936.

T. B. Kurata was transferred to the staff of the Royal Ontario Museum of Zoology on July 1, 1914; previous to that he had been in the Department of Biology for three years. It was Mr. Kurata, assisted by Mr. J. B. Williams, cataloguer of the Biological Museum, who transferred the material from the latter Museum and installed it as the first material exhibited in the Royal Ontario Museum of Zoology. With the growth of the staff, it became possible for Mr. Kurata to specialize in the preparation of lower vertebrates and invertebrates.

E. B. S. Logier has been a member of the staff since 1915 as artist and herpetologist. The colouring of the collection of casts of fishes, amphibians and reptiles is the work of Mr. Logier. He

has also been responsible for the development of the Amphibian and Reptile Division.

J. L. Baillie was appointed as assistant on July 1, 1922. Since 1927 he has been cataloguer, at first for birds and mammals but for birds alone since 1936. Mr. Baillie's flair for historical research has been of great value in bringing together much scattered information on the early natural history of Ontario. He has accompanied field-parties during fourteen summers.

T. M. Shortt joined the staff in 1930. His combination of artistic ability and ornithological knowledge has been of great service in the preparation of exhibits. He has also done valuable field work, his visits to Alaska and the eastern Canadian Arctic being especially noteworthy.

C. E. Hope joined the staff in 1932 as a preparator. His work is now confined almost entirely to birds. He has taken part in a number of field expeditions and directed the parties which studied the Favourable Lake and Lake Attawapiskat regions of Patricia District in 1938 and 1939.

J. G. Oughton was appointed in 1934 in charge of the Mollusc Division. In the absence of anyone to look after invertebrate material other than insects and spiders, Mr. Oughton has had to look after this material as well.

F. A. Urquhart was first appointed in 1935 as lecturer to develop the work with private and secondary school classes in the zoological galleries. In addition to this educational work, Mr. Urquhart has undertaken to oversee the entomological work of the Museum.

E. C. Cross, who holds an appointment in the Department of Biology of the University, was appointed Acting Curator of Mammals in 1936 and is devoting himself to developing the Museum work in this Division.

E. G. McDougall has given his services as librarian since 1934. The financial allowance made him has been merely nominal.

C. E. Corfe, although paid for only part time, has given valuable assistance since 1931 in arranging and labelling the study collection of insects.

Knud Nielsen, employed from May, 1933 to 1938 under the Reuben Wells Leonard bequest and since July, 1938, as a regular member of the Museum staff, has mounted many large mammals and is continuing in his capacity as sculptor-taxidermist to add to gallery exhibits.

Leslie A. Prince has been engaged in the preparation of mammal study material both in the laboratory and in the field since 1934.

S. C. Downing has been cataloguer in the Division of Mammals since 1936. He also takes part in summer field work.

Mrs. Phyllis Oughton was secretary from 1934 to 1937 and later part-time secretarial assistant.

Miss Edna Boissonneau has been secretary since 1937.

Mrs. Audrey Shortt has been engaged on a part time basis since 1932 in photographic work, including colouring lantern slides and the care of the Museum's collection of photographs and slides.

Dr. Mildred Campbell Attridge has been engaged on a part time basis in the classification and cataloguing of Crustacea since 1933.

Mr. J. H. Fleming has been Honorary Curator of Ornithology since 1927. Mr. Fleming's wide knowledge of ornithology and ornithologists and his life-long interest in museums have been of great value in the development of the Royal Ontario Museum of Zoology.

Mr. John Edmonds, who has been Honorary Associate in Ornithology since 1929, has given valuable assistance, particularly in cataloguing the collection of birds' eggs and nests.

APPENDIX

Garnier and His Collection

In a letter to Professor R. Ramsay Wright, dated January 12, 1891, Dr. Garnier lists the specimens in his collection as follows: poisonous snakes, 138; colubrine snakes, innocent, 400; lizards, 360; Bufonidae and Ranidae, 384; Urodelidae, 166; turtles, etc., 59; mammal skins, 117; bird skins, 612; skulls and bones of birds, 127; mammals in alcohol, 53; fishes in alcohol, 28; Indian relics, etc., 164; mounted birds, 200; miscellaneous, 250; mounted and sent you, 124; total, 3,182. He adds "and nearly as many more in duplicates which lot has cost me many years' study and years of labour and many thousands of dollars in cash."

As illustrating a type of naturalist who contributed to the development of natural history during the latter half of the nineteenth century, a brief account of Dr. Garnier may not be out of place. Dr. John Hutchinson Garnier (1823-98) was a physician who lived for many years at Lucknow, Ontario. He was born in Scotland, but of Irish descent, and was educated in Dublin. After graduation, Dr. Garnier spent several years in travel, including some time in India and Cape Colony, and in the early fifties came to Canada. He practised for a few years at Hagersville, Ontario, but about the year 1860 removed to Lucknow, in Bruce County, where the rest of his life was spent. In 1860 the Counties of Huron and Bruce, then known as "the Queen's bush" were an almost unbroken forest, abounding in game, and Dr. Garnier spent much time in those early days hunting through this area. Until the later years of his life, he spent some time almost every year, spring and fall, at the St. Clair Flats, where he had a house-boat anchored at the mouth of the Snye Cartier, the easternmost channel of the St. Clair River.

Dr. Garnier's collection was gathered from all parts of the world. It was especially rich in reptiles, as he was evidently more interested in this group than in any other. In another letter he says, "as I have given a great deal of attention to the life-history of our reptiles, I have taken many notes and should wish to embody these in book form for publication on 'The Reptiles of Ontario.' There is no such work and this would be a great addition to the literature of this branch of scientific research. I am willing to undertake it under directions of the department of Agriculture and Education." So far as known, this work was never published but Dr. Garnier contributed a number of articles on herpetology to scientific periodicals.

In presenting to the library of the Academy of Medicine a copy of *Prince Pedro*, a tragedy which Dr. Garnier published in 1877, Dr. A. J. McKenzie of Toronto spoke as follows:

"As a boy I knew Dr. Garnier as a sort of country legend, a strange eccentric that we mixed up with the fays and wraiths of the Highland legend still heard among the Gaelic farm people, a name to awe the childish mind as one who wielded a power, if not supernatural, at least eerie. We saw him drive past with his fast pair, his hounds running behind his buggy, his gun on the seat beside him with which he would bring down a bird on the wing; we knew of the collection of snakes in bottles in his study with which he would awe and impress the nervous woman who came to consult him about her stomach; a legend was abroad of the most miraculous cures he wrought when called as a last resort here and there throughout two counties, almost as startling as the stories of charm dealt in by the wise old Irish and Scotch women. I know little of his real ability but believe he must have possessed an acumen akin to genius, for all his reputation was not founded on his oddities or the profanity with which he shocked a God-fearing community.

“My friend, Dr. Fred Colling, who was a schoolboy in the village, tells of his bursting out in a lurid expletive storm on a group of urchins who were stealing his apples and capturing him (Dr. Colling), bringing him in, shivering in dread of strange tortures and showing him all the entrancing treasures of his collection of snakes and frogs, and enlisting his services in capturing specimens in the adjacent swamp. I remember hearing of his shooting from his window a neighbour’s pig that dared to make its way into his garden, and sending a shower of duck shot about the legs of a worthy citizen who tried a short cut among his flowers.

“But I did not know, and the simple villagers did not recognize that he was their chief citizen, their proudest flower of civilization, because he dared to swear like a cattledrover and never went to church. He was a lover of flowers, one of the first importers of bulbs from abroad, and his garden was a place of rare beauty.”

Contents of Biological Museum in 1909

The following statement, prepared by Mr. J. B. Williams, gives the number of specimens of all kinds, including specimens in alcohol, skulls, models, etc., in the Biological Museum in April, 1909.

<i>Mammals</i>		
On exhibition.....	611	
In cupboards.....	421	
	Total.....	1,032
<i>Birds</i>		
On exhibition.....	1,123	
In cupboards.....	2,424	
	Total.....	3,547
<i>Reptiles and Amphibians</i>		
On exhibition.....	317	
In cupboards.....	55	
	Total.....	372
<i>Fishes, Tunicata, etc.</i>		
On exhibition.....	313	
In cupboards.....	142	
	Total.....	455
<i>Mollusca</i>		
On exhibition.....	824	
In cupboards.....	4,021	
	Total.....	4,845
<i>Insects</i>		
On exhibition.....	2,350	
In cupboards.....	5,890	
	Total.....	8,240
<i>Crustacea, Spiders, etc.</i>		
On exhibition.....	331	
In cupboards.....	32	
	Total.....	363

<i>Echinodermata</i>	
On exhibition.....	178
In cupboards.....	218
Total.....	396
<i>Vermes, Polyzoa and Brachiopods</i>	
On exhibition.....	174
In cupboards.....	199
Total.....	373
<i>Corals, Sponges and Hydrozoa</i>	
On exhibition.....	419
In cupboards.....	257
Total.....	676
<i>Protozoa exhibited</i>	
Models.....	42
Real specimens.....	28
Total.....	70
GRAND TOTAL.....	20,369

It is noted that the list does not include specimens stored away in basement and attic of the building.

The Normal and Model Schools of Toronto and Their Relationship to the Provincial Museum

By J. H. FLEMING

In 1850, seven and one-half acres were purchased for £4,500; this was a square bounded by Gerrard, Gould, Victoria and Church Streets, and afterwards became known as St. James Square. The Normal and Model Schools and the Provincial Department of Education were housed in one building having a frontage of 184' 4" and a depth of 85', opened in November, 1852, the buildings having cost £9,000 and the fittings £1,500. As yet, the Museum of the Department of Education had not come into existence; additions in the rear of the main building finished probably in 1857 allowed the removal of the two schools, the Normal and Model, and room became available for a museum, which was opened to the public in 1858. The grounds on the south half were planted with trees that were then unusual in Toronto; tulip trees, copper beech, catalpa and double-flowering white cherry are some that survive. The north half of the square was laid out as playing fields for the school and contained two magnificent elms. The whole square was surrounded by a particularly ugly wooden fence.

A writer of fifty years ago remarks: "There is no prettier spot in all Toronto in which to pass a summer morning, to sit under the trees, the public being rather rigorously excluded from the lawn. There you may often see the ladies and children of the vicinity sitting on the iron benches beneath the trees, and watching the robins whom the Department has not excluded from tripping over the close-shaven grass."

The benches were of cast iron in rustic design, also iron deer were placed in strategic positions about the grounds. The gates were carefully locked on Sundays.

At the laying of the corner stone in 1851, it was stated in the address to the Earl of Elgin that two acres of the ground were to be devoted to a botanical garden, but beyond the rare trees and shrubs planted in the south front of the grounds, the idea got no further.

The Department of Education had at its head as superintendent a very remarkable man, the Reverend Doctor Egerton Ryerson, generally regarded as the founder of the present system of education in Ontario and whose statue stands in the Normal School Grounds facing Gould Street. Dr. Ryerson made several trips to Europe in pursuance of his plans for a modern system of education in Ontario, or Canada West, as it then was.

In the *Documentary History of Education*, there is recorded among the Acts of Legislature of 1852-3 one making an appropriation of £500 per annum to be used by the Museum of the Normal School buildings, the amount to be expended by the Chief Superintendent of Education for the purchase of books, publications, specimens, models, objects relating to education and other departments, which included "artificial productions of Canada, especially referring to mineralogy, zoology, agriculture and manufacturing."

While in Europe in 1854 and 1856, Dr. Ryerson, under authority of the Government, commenced the collection of objects of art for the Educational Museum. That the selection of the exhibits was done with good judgment and on disinterested advice is evident from the rather meagre details in *The Story of My Life*, printed after Dr. Ryerson's death.

The main entrance to the buildings led directly to a central hall open above, with a gallery around the second storey. Wide corridors to the right and left on the ground floor gave access to the offices of the Superintendent of Education and the library. A theatre entered from the central hall had a seating capacity of 470, and a gallery, since removed, seated 150. The second storey was occupied entirely by the Museum, reached by staircases on either side of the central hall. There were in all eight galleries, devoted to casts of statuary, casts of Egyptian and Assyrian antiquities, copies of paintings, school apparatus and numerous busts of historical interest. A small collection of Canadian birds was also included but disappeared within a few years.

The original arrangement of the collections was undertaken by Dr. S. P. May, the Curator, and he is credited with the selection of the excellent series of prints.

The Museum when opened was exactly what it was intended to be by its founder, Dr. Ryerson; it was well housed, well arranged, and by the use of reproductions the history and art of the Old World were brought to the teacher and student at a time when the opportunities of travel abroad were few.

The Museum remained undisturbed till after 1890, in which year Dr. May published a catalogue of the exhibits. The growing importance of the Archaeological Museum founded by David Boyle, then housed in the Canadian Institute, with the need for additional accommodation by the Department of Education and the Art Schools, resulted in the addition of a third storey to the building. This was finished about 1896 at a cost of \$20,000.

The rearrangement of the art collections, still under Dr. May's superintendence, within the space available on the second floor of the building now restricted by the need for departmental office space, left the exhibits badly crowded, a condition the Museum never recovered from. The third floor was reserved for the incoming Museum of Archaeology, and for a new department of biology; a hastily prepared collection of birds and animals was put on exhibition, fortunately soon to be replaced.

The archaeological material transferred at this time to the Normal School had

been brought together in the Canadian Institute building at 58 Richmond Street, East. The nucleus of the collection was the private collection of David Boyle which had been presented to the Institute and incorporated in the Museum of Natural History and Archaeology. This Museum was opened in the third storey of the Institute's building on the occasion of the annual conversazione for the session 1887-8.

Archaeology quickly assumed a dominant position in the Museum; the annual reports by Mr. Boyle long issued from the Canadian Institute were continued and the collections grew in importance. In 1901, Mr. Boyle was made Superintendent of the Museum of the Education Department of Ontario, in succession to the late Dr. S. P. May, and in 1906 the Museum was raised to the status of Provincial Museum, which name it retained to the end.

Dr. William Brodie was appointed first Provincial Biologist in 1903, and his extensive collections of biological material were acquired for the Museum. The old collection of birds and animals had already in part been replaced by the purchase of new material from Mr. John Maughan, Jr., and Mr. Maughan was commissioned to complete the exhibition collections, and to prepare photographic illustrations suitable for lectures.

Mr. Charles W. Nash had become lecturer on biology for the Ontario Department of Agriculture, and issued a series of pamphlets on the economic value of birds to agriculture, beginning in 1898, and in 1900 began a series of check-lists of vertebrates for the Museum, reissued as *The Manual of the Vertebrates of Ontario*. Mr. Nash prepared a large number of casts of fish, reptiles, etc., for the Museum and in 1908 presented his private collection of biology to the Museum. In 1910, Mr. Nash succeeded the late Dr. Brodie as Provincial Biologist.

The Museum with such men as Boyle, Brodie, Nash and Maughan on the staff became the centre of information for teachers and students of natural history and the art Museum fell into neglect. Dr. Rowland B. Orr was appointed Director of the Provincial Museum in 1911, in succession to Dr. David Boyle,⁸ and continued the *Archaeological Reports* to the thirty-sixth and last in 1928. Mr. Nash died in 1926 and in 1933 on the death of Dr. Orr, the Museum was closed, the archaeological and biological material going to the Royal Ontario Museum, and part of the art collections to the Ontario College of Art. The Department of Education took possession of the space left vacant and the Provincial Museum ceased as an entity.

The Provincial Museum suffered in its later years from official neglect. The Minister of Education had moved from the building, but the Department continued to encroach on the space allotted to the Museum, the building was not fire proof, and the safety of the great archaeological collection was a matter of concern to those who had watched its growth under its founder, Dr. David Boyle.

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MULVANY, C. P. Toronto Past and Present, Toronto, 1884.
MAY, S. P. Catalogue, Museum of the Department of Education, Ontario, Toronto, 1890.
Annual Reports of the Canadian Institute for the sessions 1886-7 and 1887-8 in the Report of the Minister of Education for Ontario.

⁸LL.D. (hon.) University of Toronto, 1909. This was granted after Dr. Boyle had, through illness, ceased to administer the Museum.

TABLE OF FIELD WORK

Carried out by the Royal Ontario Museum of Zoology

Year	Duration	Locality	Objective	Personnel
1919	June 14-Aug. 25	Port Sydney, Muskoka District, Ontario	EXHIBITS: Small Mammals, Birds RESEARCH: Insects	Bigelow, N. K. Logier, E. B. S. Snyder, L. L. Walker, E. M.
1920	June 10-Aug. 10	Point Pelee, Essex County, Ontario	EXHIBITS: Birds, Reptiles, Fish RESEARCH: Insects	Bigelow, N. K. Kurata, T. B. Logier, E. B. S. Snyder, L. L. Walker, E. M.
1921	July 13-Aug. 30	Lake Nipigon, Ontario	RESEARCH: Fish	Dymond, J. R.
1922	July 3-Aug. 31	Cedar Lake, Algonquin Park, Ontario	EXHIBITS: Black Bear Group	Baillie, J. L. Fisher, R. Logier, E. B. S. Snyder, L. L.
	May 24-Aug. 22	Lake Nipigon, Ontario	RESEARCH: Fish	Dymond, J. R.
1923	June 6-Sept. 17	Lake Nipigon, Ontario	RESEARCH: Mammals, Birds, Fish, Insects	Bigelow, N. K. Dymond, J. R. Snyder, L. L.
	June 22-Aug. 23	St. Andrews, New Brunswick	EXHIBITS: Fish	Kurata, T. B. Logier, E. B. S.
	July 11-Sept. 9	Toronto, vicinity	RESEARCH: Mammals, Birds	Baillie, J. L. Le Ray, W. J.
1924	May 31-Aug. 9	Lake Nipigon, Ontario	EXHIBITS: Fish RESEARCH: Mammals, Birds, Reptiles, Amphibians, Fish, Insects	Baillie, J. L. Bigelow, N. K. Dymond, J. R. Kurata, T. B. Logier, E. B. S. Snyder, L. L.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1925	May 16-Aug. 22	St. Andrews, New Brunswick	EXHIBITS: Fish	Kurata, T. B. Logier, E. B. S. Walker, E. M.
	May 31-Aug. 3	Lake Abitibi, Ontario	RESEARCH: Mammals, Birds, Reptiles, Amphibians, Fish, Insects, Spiders	Baillie, J. L. Bigelow, N. K. Dymond, J. R. Le Ray, W. J. Logier, E. B. S. Snyder, L. L. Walker, E. M.
1926	May 26-Aug. 9	King Township, York County, Ontario	RESEARCH: Mammals, Birds, Reptiles, Amphibians	Baillie, J. L. Jones, N. T. Logier, E. B. S. Snyder, L. L.
	June 1-Aug. 25	Prince Rupert and Nanaimo, British Columbia	EXHIBITS: Fish RESEARCH: Fish, Insects	Dymond, J. R. Kurata, T. B. Walker, E. M.
1927	May 25-July 26	Long Point, Norfolk County, Ontario	RESEARCH: Mammals, Birds, Reptiles, Amphibians, Insects	Baillie, J. L. Edmonds, J. Logier, E. B. S. Snyder, L. L. Stovell, H. P. Walker, E. M.
	June 3-Aug. 31	Lake Ontario at Port Credit, Ontario	RESEARCH: Fish	Dymond, J. R.
	June 30-Aug. 28	Bruce Peninsula, Bruce County, Ontario	RESEARCH: Mammals, Reptiles, Amphibians	Cross, E. C. Le Ray, W. J.
	July 3-10	Lac Cassette, Quebec	EXHIBITS: Fish	Kurata, T. B. Logier, E. B. S.
	Sept. 17-23	Lake St. John, Quebec	EXHIBITS: Fish	Kurata, T. B. Logier, E. B. S.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1928	April 30-May 31	Long Point, Norfolk County, Ontario	RESEARCH: Mammals, Birds	Edmonds, J. Snyder, L. L. Stovell, H. P.
	May 1-31	Fisherman's Island, Toronto, Ontario	RESEARCH: Birds	Baillie, J. L.
	June 1-Aug. 30	Kaslo, Nelson, Christina Lake, Okanagan Lake, Nanaimo, southern British Columbia	EXHIBITS: Reptiles, Amphibians, Fish RESEARCH: Reptiles, Amphibians, Fish, Spiders	Dymond, J. R. Kurata, T. B. Logier, E. B. S.
1929	May 31-Aug. 10	Western Rainy River District, Ontario	RESEARCH: Mammals, Birds	Baillie, J. L. Snyder, L. L. Stovell, H. P.
	June 15-29	Lake Erie—Lake St. Clair, Ontario	RESEARCH: Reptiles, Amphibians	Le Ray, W. J. Logier, E. B. S.
1930	May 17-June 14	Bruce Peninsula, Bruce County, Ontario	RESEARCH: Mammals, Birds	Baillie, J. L. Cross, E. C.
	May 20-July 20	Prince Edward County, Ontario	RESEARCH: Mammals, Birds, Reptiles, Amphibians, Spiders	Baillie, J. L. Kurata, T. B. Logier, E. B. S. Snyder, L. L. Stovell, H. P.
	June 24-Aug. 25	Lake Nipissing, Ontario	RESEARCH: Fish	Dymond, J. R.
	Aug. 1-Sept. 2	Bruce Peninsula, Bruce County, Ontario	RESEARCH: Birds	Baillie, J. L.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1931	June 1-July 28	Sault Ste. Marie region, Ontario	RESEARCH: Mammals, Birds, Reptiles, Amphibians	Baillie, J. L. Coventry, A. F. Edmonds, J. Logier, E. B. S. MacLulich, D. A. Shortt, T. M. Snyder, L. L.
	July 1-Aug. 7	Treesbank to The Pas, Manitoba— Minaki and Lake Nipissing, Ontario	RESEARCH: Insects, Spiders	Kurata, T. B. Walker, E. M.
	July 5-Sept. 4	Lake Nipissing, Ontario	RESEARCH: Fish	Dymond, J. R.
1932	May 11-18	Singhampton, Simcoe County, Ontario	EXHIBITS: Fish	Kurata, T. B.
	July 1-Aug. 31	Lake Nipissing, Ontario	RESEARCH: Fish	Dymond, J. R.
1933	April 11-29	Caledon, Peel County and Pottageville, York County, Ontario	EXHIBITS: Passenger Pigeon Group	Fisher, R. Hope, C. E. Shortt, T. M. Snyder, L. L.
	May 15-June 2	Turkey Point, Norfolk County, Ontario	EXHIBITS: Reptiles, Amphibians RESEARCH: Reptiles, Amphibians	Logier, E. B. S.
	June 27-July 28	Bruce Peninsula, Bruce County, Ontario	RESEARCH: Mammals, Birds	Baillie, J. L. Cross, E. C.
	July 5-Aug. 30	Lake Nipissing, Ontario	RESEARCH: Fish	Dymond, J. R.
1934	June 14-27	Lake St. Martin, Manitoba	RESEARCH: Birds	Shortt, T. M.
	July 1-Aug. 31	Lake Nipissing, Ontario	RESEARCH: Fish	Dymond, J. R.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1935	June 1-July 6	Southern Ontario— Lambton County, to Georgian Bay to Ottawa River to Lake Nipissing	RESEARCH: Birds	Hope, C. E. Shortt, T. M. Snyder, L. L.
	June 8-18	Penetanguishene, Simcoe County, Ontario	RESEARCH: Mammals	Cross, E. C. Prince, L. A.
	Aug. 9-20	Lake St. Clair— Lake Huron drainage, Ontario	RESEARCH: Insects, Molluscs	Oughton, J. G. Walker, E. M.
	June 29-Sept. 2	Cache Lake, Algonquin Park, Ontario	RESEARCH: Fish	Dymond, J. R.
1936	May 13-Aug. 24	Yakutat, Alaska	RESEARCH: Birds	Shortt, T. M.
	May 25-July 8	Central Ontario— Rosspport, Peninsula, Amyot	RESEARCH Mammals, Birds	Baillie, J. L. Downing, S. C. Hope, C. E. Prince, L. A.
	June 18-30	Lake Ontario— St. Lawrence and Ottawa Rivers drainage	RESEARCH: Insects, Molluscs	Oughton, J. G. Walker, E. M.
	July 1-26	Ottawa Valley, Renfrew County, Ontario	RESEARCH: Mammals	Cross, E. C.
	July 2-Aug. 27	Lake Traverse, Cedar Lake to Cache Lake, Algonquin Park, Ontario	RESEARCH: Fish	Dymond, J. R.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1937	April 17-May 14	St. Lawrence region and Ottawa Valley region, Quebec	RESEARCH: Mammals	Cross, E. C. Downing, S. C. Prince, L. A.
	May 30-Aug. 11	Central Ontario—Chapleau, Biscotasing, Bigwood	RESEARCH: Mammals, Birds	Baillie, J. L. Downing, S. C. Hope, C. E. Prince, L. A.
	May 31-July 28	Western Ontario—Ingolf, Wabigoon, Savanne, Murillo	RESEARCH: Mammals, Birds	Miller, J. Shortt, T. M. Snyder, L. L.
	June 14-July 28	Temagami, Ontario	RESEARCH: Molluscs	Oughton, J. G.
	July 1-Aug. 31	Algonquin Park, Ontario	RESEARCH: Mammals	Cross, E. C.
	Aug. 13-Sept. 12	Ottawa River drainage—New Liskeard to Ottawa, Ontario	RESEARCH: Spiders	Kurata, T. B.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1938	May 16-Aug. 3	Champlain and Quebec Counties, Quebec	RESEARCH: Mammals	Cross, E. C. Downing, S. C. Scott, B.
	May 30-Aug. 6	Favourable Lake, Patricia portion, Kenora District, Ontario	RESEARCH: Mammals, Birds, Reptiles, Amphibians, Fish, Insects, Molluscs, etc.	Hope, C. E. Neal, G. M. Prince, L. A.
	May 31-June 29	Manitoulin District, Ontario	RESEARCH: Birds	Baillie, J. L.
	June 5-Sept. 30	Point Pelee, Essex County, Ontario	RESEARCH: Insects, Spiders	Kurata, T. B. Urquhart, F. A.
	July 9-Sept. 30	Eastern Arctic "Nascopie" Patrol	RESEARCH: Birds	Shortt, T. M.
	July 15-Sept. 12	Temagami, Ontario	RESEARCH: Molluscs	Oughton, J. G.
	Nov. 7-26	Algonquin Park, Ontario	EXHIBITS: Mammals	Nielsen, K.

TABLE OF FIELD WORK—(Continued)

Year	Duration	Locality	Objective	Personnel
1939	May 29-Aug. 23	Cochrane District: Genier, Fraserdale, Onakawana, Moosonee	RESEARCH: Mammals, Birds, etc.	Clawson, G. Deeks, D. B. Downing, S. C. Kirk, M. D. Shortt, T. M. Snyder, L. L.
	June 4-Aug. 25	Lake Attawapiskat, Patricia portion, Kenora District, Ontario	RESEARCH: Mammals, Birds, Fish, etc.	Hope, C. E. Prince, L. A. Scott, B.
	June 24-Aug. 25	Manitoulin District, Ontario	RESEARCH: Spiders	Kurata, T. B.
	July 8-Sept. 24	Eastern Arctic "Nascopie" Patrol	RESEARCH: Molluscs, etc.	Oughton, J. G.
	August	Algonquin Park, Ontario	RESEARCH: Mammals	Cross, E. C.
	Aug. 4-22	Prince Edward County and St. Lawrence Valley, Ontario	RESEARCH: Insects	Urquhart, F. A.





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