

ANNUAL REPORT
OF
THE DIRECTOR
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY
AT HARVARD COLLEGE
TO THE
PRESIDENT OF HARVARD COLLEGE
FOR
1933-1934

CAMBRIDGE, U. S. A.:
PRINTED FOR THE MUSEUM

1934

PUBLICATIONS
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY
AT HARVARD COLLEGE

There have been published of the BULLETIN Vols. I to LXV, LXVII-LXXV, of the MEMOIRS Vols. 1 to LII, LIV.

The BULLETIN and MEMOIRS are devoted to the publication of original work by the Officers of the Museum, of investigations carried on by students and others in the different Laboratories of Natural History, and of work by specialists based upon the Museum Collections and Exploration.

These publications are issued in numbers at irregular intervals. Each number of the Bulletin and of the Memoirs is sold separately. A price list of the publications of the Museum will be sent on application to the Director of the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

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REPORT OF THE DIRECTOR

1933-1934

TO THE PRESIDENT OF HARVARD COLLEGE:

Sir:—

Since the foundation of the Museum Palaeontology here has usually meant Invertebrate Palaeontology. This was natural, because invertebrate material could be collected more economically and stored more compactly than vertebrate material and, moreover, Louis and Alexander Agassiz were both deeply interested in the invertebrate field and bought several great collections in Europe which at once established this Museum as a natural center for investigators of many invertebrate groups. Of the vertebrates the fishes were the only favored class. Here again the same reasons produced the same results and the Museum has long been noted for its resources and investigations and in recent years, especially, concerning the early and very primitive fishes. Some years ago it became obvious that our collections were badly out of balance and the needs of students interested in stratigraphic geology, as well as comparative anatomy, made it clear that we must have a better representation of the other groups and, although inadequately equipped to do so, I have been myself fussing with Palaeontology for some years. The result, however, has been eminently satisfactory inasmuch as we now have material sufficient to warrant our inviting a Vertebrate Palaeontologist interested in the higher groups to come here and work. Alfred Sherwood Romer has joined the Staff of the Museum as well as that of the Division of Biology. He offers no course this year but will spend his time organizing the collections so that they may be profitably used in connection with his teaching next year and he has some most promising investigations already under way.

I should have mentioned in my last year's report that, for a number of months, we closed the public exhibition rooms except on Saturdays and Sunday afternoons. There was unquestionably some saving of light and heat but all in all the inconvenience caused was so great and the constant complaints became so vexatious

that the scheme was abandoned and during the last year the Museum has been open as usual.

When Mr. John E. Thayer died he left the Museum that part of his collections which he had not already given the University. This consisted of his extraordinarily complete collection of North American mounted birds. In almost every case the species were represented in series. It was thus possible to divide the collection to the great satisfaction of Mrs. Thayer and her family so that an adequate North American series remains in the Thayer Museum at Lancaster, an institution of which the town is justly proud; while the balance has been moved to Cambridge and completely installed in the hall previously devoted to the Greene Smith Collection of North American birds. This collection, which was a most excellent one when it was formed, was after all an old collection and the preservation in general was not as fine as was that of the Thayer collection. With the consent of the Greene Smith heirs the whole series has been deposited by the Museum with the Phillips Andover Academy where it has been installed for public exhibition in the new natural history museum of that School. Mr. James L. Peters, Miss Margaret D. Porter and Mr. J. Augustus Griswold are to be thanked for the painstaking skill involved in moving the enormous number of delicate birds from Lancaster to Cambridge with hardly a feather disturbed.

Mr. J. Henry Blake, who is the last survivor of the group of young men who assisted Professor Louis Agassiz during his life and who accompanied him as artist on the voyage of the Haessler has, from time to time, given us a great deal of interesting historical material. This last year we have to thank him for sketches and floor plans of the Zoölogical Hall during 1867 and 1868 showing the exact arrangement of space as it was allotted to that extraordinary group of students, so many of whom became the acknowledged leaders of American Biology. The splendid series of drawings showing the external characters of many species of whales and porpoises based on observations made by Mr. Blake during his long and active life have been framed and hung in the Marine Mammal Hall. They form an unique resource and will forever bear witness to Mr. Blake's well known skill with pen and brush.

Last winter, as during several seasons past, I was enabled by the generous cooperation of Mr. Allison V. Armour again to avail myself of the opportunity which his research yacht offers to visit remote localities otherwise impossible of access. And this year, first with Mr. and Mrs. James C. Greenway and later with my wife and daughters, Julia and Louisa, we visited a great number of remote islands and cays in the Bahamas and down the coast of both Haiti and San Domingo, which countries we completely encircled. A number of papers have already appeared, based on the material secured, and several more are in preparation. The conditions in the very few undisturbed caves in the Bahamas make it quite evident that the present depauperate fauna is at least partly the result of artificial conditions; deforestation and destruction by man and feral domesticated animals. It is a tragedy that naturalists did not study the Bahamas exhaustively two hundred years ago. It is now too late ever to get the whole story, and the evidence is increasingly convincing that these islands are not the recent oceanic land masses that they have usually been considered but rather that they were parts of a once far greater whole which, for a time at least, was connected with other Antillean land masses.

After a few months in Cambridge I left with my family to visit scientific institutions and wild life preserves in Africa.

As usual Mr. Nelson has devoted himself to palaeontological preparation and the *Eporeodon* just placed on exhibition is not improbably the most perfect mount of its kind in any museum in the country. It came from the Harvard Quarry in Wyoming and represents a hitherto unknown form. So, also, does the splendid skull of *Triceratops*. It is interesting that the first Ceratopsian Dinosaur to come into our possession is the type of a new species and comes from a more recent horizon than any hitherto known to have produced Ceratopsian remains.

As usual the close alliance with the scientific work of the Ice Patrol, Bureau of Fishes and the Woods Hole Oceanographic Institution have been continued and there is no question but that the arrangements now of some years standing are helpful and satisfactory to all concerned.

In continuance of the policy established many years ago when the Boston Museum of Natural History decided to become a

museum of New England natural history and to transfer its exotic collections to the Museum of Comparative Zoölogy we have, from time to time, turned over New England material to the Boston Society of Natural History and this year we have sent a large collection of New England fishes to Boston.

William Dandridge Peck was the first Professor of Natural History in Harvard College and a re-examination of his works, published over a hundred years ago, shows that he has never received the credit due him as a most patient and skillful investigator. As is evident from his middle name, he was of distinguished family connection in Virginia and recently some of his kin, at great personal sacrifice, allowed a friend of the Museum to purchase the original portrait of Professor Peck by St. Memin for a sum indicative of the family's generous desire to see this portrait upon Harvard walls.

After a long series of delays and difficulties the memoir on the Geology of Cape Cod by Doctor Edward Wigglesworth and the late Professor J. B. Woodworth has been issued and distributed. The thanks of the Museum are due to the several persons who aided in editing and revising the manuscript and particularly to Mr. Griscom who saw it through the press, as well as to the Geological Society of America for a grant to aid publication.

The reports of the several Curators bear witness to the generosity of the Museum's friends. The year has been noteworthy, as, however, is every year, for the number of splendid gifts, those in the Department of Entomology having been particularly gratifying.

Miss E. B. Bryant, Doctor Edward Wigglesworth, Mr. Henry L. Shattuck, Mr. George R. Agassiz and Mr. B. Preston Clark, among other friends, have given financial aid which has been particularly useful in these difficult times. And, speaking of difficult times, it is worth while to add a few lines to emphasize the fact that this Museum is indeed a most fortunate institution. It has lived for generations on a most slender income, many members of its Staff serving through their lives without recompense and securing collections made at a cost of great personal hardship. This is inevitable where expeditions work with such meagre resources. Thus the specimens brought home often repre-

sent true sacrifice and I think perhaps this is why our material is cared for and cherished with such genuine affection. I have made some careful studies concerning these matters and the cost of securing much of our material is in very gratifying contrast to the costs which prevail in some other places.

REPORT ON MARINE INVERTEBRATES

BY HUBERT LYMAN CLARK

The curatorial work of the year has been chiefly devoted to the completion of the rearrangement of the study collection of echinoderms. Mrs. Karl M. Pattee has continued her invaluable work, one week in each month, of checking up the card catalogue, preparing an accession catalogue for each class, and cleaning and arranging the collection. Her assiduous devotion to the work and her notable skill in attending to the details and solving the perplexing problems which arise in such a task, call for the sincerest thanks. She has also catalogued and entered in the collection the accessions of the past five years, excepting only the large Australian collections upon which the Curator is preparing reports. As a result of Mrs. Pattee's work it is now possible to give a tabulated statement of the contents of the collection of echinoderms as it was at the close of the year.

	<i>Genera</i>	<i>Species</i>	<i>Varieties</i>	<i>Specimens</i>
Crinoids	83	160	3	3,041
Asteroids	176	627	20	13,975
Ophiurans	156	828	15	25,393
Echini	166	520	19	25,891
Holothurians	75	385	8	5,752
Totals	656	2,520	65	74,052

Comparing this table with the last one published (1922-23) one is struck at once with the great increase in number of genera (21%), the relatively small increase in species (only a trifle over 5% even when the 65 varieties are counted as species) and the very great decrease in the number of specimens (nearly 25%). The increase in genera is very largely due to the revisional work that has been done in the past ten years by workers on crinoids, asteroids and echini, the catalogue being kept abreast of the best work published so far as feasible. The small increase in species is due to the elimination from the catalogue of a considerable num-

ber of dubious or misidentified forms, critical study of which has relegated to forms already in the collection. The great decrease in the number of specimens has been caused by removing some ten bushels of common sea-urchins, chiefly American, a considerable proportion of which was sent to nineteen museums in various parts of the world. (See Report M. C. Z. for 1930-31, p. 14.) Aside from the echini there has been an increase of 835 in the number of specimens in the collection. Besides the work on the study collection no little time was devoted to the echinoderms on exhibition. There are 760 of these representing 413 different species. Particular attention was given to the Coral Reef room where new labels were prepared and placed on the crustaceans and worms as well as on the echinoderms.

During several weeks in August and September, the Curator visited the biological laboratories of the Pacific Coast, at Nanaimo, B. C., Friday Harbor, Washington and at Pacific Grove, Corona del Mar and La Jolla, California. At Friday Harbor and Corona del Mar some collecting was done, thanks to the kindness of the Directors, Professors T. G. Thompson and G. E. MacGinitie. The latter supplemented the collection made at Corona del Mar with a considerable series of the local brittle-stars which was awaiting critical examination. Most of November was devoted to the study of this Pacific Coast material and a report on it is now in press. After Christmas, an extended study of the holothurians of the genus *Caudina* was made, as an exceptional amount of material is available in our collection. This study was provoked by several controversial papers on the Japanese species of *Caudina* and the results have gone to press. A third paper, dealing with fossil echini from Jamaica collected by the late Benjamin Walworth Arnold, prepared in collaboration with him, was put into final form in April and is now awaiting publication. The remaining time available for research has been devoted to the large collection of Australian holothurians which has proved even more interesting than was expected.

No little time has been given during the year to answering inquiries, identifying specimens and sending out material on loan or in exchange. A considerable series was identified for the San Diego Museum and this led to a small exchange which yielded us

a very extraordinary sea-urchin. During November and part of December, Mr. Fred Zieshenne of the University of Southern California was working here on a collection of echinoderms from the Hancock expeditions to the Galapagos Islands and Central America, using our study collections for comparison. Several valuable specimens were presented to us in consequence. An exchange with New York State Museum yielded us considerable West Indian material in return for echinoderms occurring on the coast of Long Island, New York. Crustaceans have been loaned to Dr. Mary J. Rathbun at the National Museum, and to Mr. M. D. Burkenroad at Yale; this material has been returned. Our oligochaete worms have been used by Dr. G. E. Gates and at his suggestion a small collection of some 75 specimens was sent to Dr. W. Michaelsen of Hamburg, who is now preparing a report thereon; this material is still abroad. Recent echinoderms have been named for the Charleston Museum and fossil sea-urchins for Dr. R. H. Palmer of Havana, Cuba.

Accessions during the year have been neither numerous nor notable. The most important was received from Mr. Beresford E. Bardwell of Broome, Western Australia, encouraged by a financial contribution from this Museum. Mr. Bardwell visited the inhospitable and little known coast of northwestern Australia lying to the east of King Sound, a region where no marine zoölogist has ever been. In spite of great difficulties which prevented dredging and balked his efforts to reach areas he had hoped to examine, he secured a very valuable collection of echinoderms, including a number of species not previously known from northwestern Australia. This material supplements in a most important way the collections made by the Curator at Broome in 1929 and 1932. Echinoderms have also been received from the Australian Museum, the Charleston Museum and Mr. R. W. Foster. Crustaceans have been presented by Messrs. P. de Mesa and R. C. Bolling. Thanks are extended to all these donors:

REPORT ON OCEANOGRAPHY

BY HENRY B. BIGELOW

The cooperation, in Oceanographic investigation, between the Museum and the Woods Hole Oceanographic Institution, and several governmental establishments, referred to in previous Annual Reports, necessitated a trip to St. Andrews in September, to preside at the Annual Meeting of the North American Council for Fisheries Investigation.

Mr. Iselin was in residence at Woods Hole during the whole year with only occasional visits to Cambridge, this arrangement being made necessary by the fact that the research ship "Atlantis" of the Woods Hole Oceanographic Institution has been carrying out monthly chemical surveys of the Gulf of Maine, needing his supervision. When not at sea, he has continued his study of the circulation of the waters of the Western North Atlantic, more particularly of the Florida Current. His general report on the subject nears completion.

Dr. Mary Sears has continued to act as my assistant. During the winter she completed the geographic section of the report on the "Thor" siphonophores and made good progress on her study of the plankton communities, Cape Cod to Chesapeake Bay, which is to form one part of the general report on that sector of the coastal waters. In April she sailed for Copenhagen, where she remained until the end of July, supervising the sorting and making arrangements for the later transportation to the Museum of the siphonophores collected by the late Dr. Johannes Schmidt on the cruise of the "Dana" around the world, 1928-1930, which I have undertaken to study. This is one of the most extensive collections of the group that has ever been made. The expenses of her trip were met from a grant from the Milton Fund. On her journey homewards, she also was able to visit the biological laboratories in Oslo and Plymouth.

Three graduate students have worked in Oceanographic subjects in the Museum: Lieutenant R. M. Hoyle, Ice Observation

Officer of the International Ice Patrol, prepared his report on the current Patrol season. He also made dynamic studies on the Grand Banks region based on data obtained by the Coast Guard cutters, prepared dynamic contour charts of the waters of the Gulf of Maine from data from recent "Atlantis" cruises, and calculated the velocities on the "Atlantis" April, 1932, profile from Chesapeake Bay to Bermuda. Lieutenant Hoyle's term of service with the Ice Patrol terminates this year, and his successor, Lieutenant G. Van A. Graves, spent some time in the Museum familiarizing himself with the scientific aspects of the Patrol.

Mr. Benjamin B. Leavitt completed the measurement and sorting of the plankton collected during the previous summer in a series of closing net hauls by "Atlantis" in deep water off Woods Hole, and worked on a report on the same for publication. During the winter improvements were devised in the mechanism of the closing nets and of the tripping device. The field work on this problem was continued in June, when we succeeded in using four closing nets in series on the wire, simultaneously, and in making horizontal hauls with them at 200 meter intervals from a depth of 200 down to 3000 meters. So far as I know this is the first reliable picture that has been obtained of the quantitative distribution of pelagic animals down to so great a depth.

Mr. Lionel A. Walford completed his study of the production and dispersal of haddock eggs and larvae on Georges Bank. His report is to serve on his Ph. D. thesis.

Mr. W. C. Schroeder, in such time as could be spared from his duties as Business Manager of the Woods Hole Oceanographic Institution, continued work on his report on the life history of the cod in the Gulf of Maine, based on previous tagging experiments by the U. S. Bureau of Fisheries.

Mr. Henry Sears worked from March 20th to June 1st preparing charts and graphs for the report on salinity mentioned below.

My own time, as last year, has been divided between the Museum and the Woods Hole Oceanographic Institution. A course in Oceanic Biology (Zoölogy 12), first given in 1932, was repeated during the past year, jointly with Professors Redfield and Macdonald. An account of Temperature, forming the first section of a study of the coast waters, Cape Cod to Chesapeake Bay, has

been published. And a report on the Salinity is in preparation. I have also prepared the drawings and descriptive matter for the systematic section for the forthcoming report on the "Thor" siphonophores.

REPORT ON ENTOMOLOGY

BY NATHAN BANKS

Accessions: Three large collections were added during the year so that the accessions, as for the past few years, exceed 100,000 specimens. Doctor William M. Wheeler gave the bulk of his collection of Formicidae, fully 30,000 pinned specimens and many thousand more in vials. The first set of the pinned material, by previous agreement, was sent to the American Museum of Natural History. It is needless to emphasize the great value of this unrivalled series of ants. Doctor Wheeler is having his assistant, Mrs. Bartlett, transfer it to our boxes. It includes many hundreds of types and a fuller report will be published when it is all transferred.

After the death of Doctor G. Gehring his widow presented his collection of Coleoptera to us. It contains about 35 to 40,000 specimens, a few thousand unmounted. Much of it is from the West or Southwest and often adds species as well as series to our collection. Through the generosity of friends the S. E. Cassino collection of Geometridae was purchased for the Museum. There are fully 30,000 specimens, and over 5000 slides of genitalia. It contains types of two or three hundred species and a great many specimens compared with types, and photographs of types in other collections.

About 1,500 specimens were collected, largely by Mr. and Mrs. Greenway, on the Allison Armour Utowana Expedition in the Bahamas, over 400 being Lepidoptera.

About 3,000 specimens were collected by Mr. R. Stadelmann in Honduras.

Fully 2,000 miscellaneous insects collected in Sumatra by Mr. V. Jourin, were donated by the Director.

Mr. P. J. Darlington presented over 2,000 Colombian Carabidae and several thousand other Neotropical Coleopters.

Over 1,000 Syrphidae, mostly named, were given by Doctor J. Bequaert.

Mr. M. Bates gave about 1,500 miscellaneous insects from Florida.

Messrs. C. H. Paige and E. M. Davis sent about 1,000 Odonata and many other insects from Florida.

At least six species of dragon flies were thus added to our collection, and to others a series. Most of the dragon flies have been placed in envelopes and filed as duplicates. Mr. N. Weber gave the miscellaneous insects he obtained in Cuba.

P. de Mesa sent several lots of Mindoro insects, including over 500 Lepidoptera.

Mr. G. Fairchild presented several hundred insects collected in Cape Breton, and about 2,000 Lepidoptera from Java, Sumatra, Ceylon and Nova Scotia.

About 1,200 Korean butterflies were obtained from Mr. L. H. Snyder and about 100 Coleoptera and Cicadas; nearly 3,000 Honduran Lepidoptera were received from Mr. J. B. Edwards, and about 85 purchased from Haiti. From Miss Lilly Perkins of Jamaica we purchased about 200 Hymenoptera and Diptera and 135 Lepidoptera.

Through the Director 108 valuable Sphingidae were presented by B. Preston Clark; the Director also gave two small lots of especially fine exotic Phasmidae.

About 300 Odonata, Carabidae, and Diptera from Santa Catherina, Brazil, were obtained from Bruno Pohl.

Several thousand exotic Buprestidae were obtained, partly by exchange, from Mr. Alan Nicolay, a considerable increase to the family.

Prof. T. D. A. Cockerell gave us a further lot of foreign bees, including some paratypes.

From Mr. J. L. Gressirt we purchased 500 Formosan insects (Neuroptera, Diptera, Hymenoptera), and from Mr. W. Heron we purchased several lots of Australian insects.

Mr. W. J. Brown gave us a set of paratypes of his new species of *Dalopius* (partly in exchange).

Colonel J. C. Fraser sent a small lot of Indian Neuroptera, Mr. A. P. Morse some western *Bombus*, Mr. C. B. Garrett some named Diptera (including paratypes) from British Columbia, about 25 butterflies from Brownsville, Texas were secured from Mr. R. S.

Armstrong, and Prof. H. F. Wickham sent a valuable collection of fossil Neuroptera.

A part of Mr. Loveridge's present East African expedition was received, but not yet mounted.

Miss E. B. Bryant obtained insects as well as spiders on her trip to Jamaica.

There have been numerous accessions in the Arachnida, and some in Coleoptera, Diptera, and Neuroptera in return for identifying specimens or for comparing insects with types.

Work of staff members: Mr. P. J. Darlington prepared a large paper on the Carabidae of Cuba (now in press). Based on our own collections he examined also the material of several other museums and private collectors. He also finished several smaller papers, continued the arrangement of the Coleoptera, assorted much mixed material, mounted and labeled many thousand Coleoptera, sent over 6,000 beetles to various specialists for identification, named some small lots of native Coleoptera, fumigated the LeConte collection, and attended to the work of one of the student workers.

Miss E. B. Bryant completed her large paper on Cuban spiders, describing 60 new species and illustrating over 100. She spent two months collecting in Jamaica. She worked over a large collection of spiders made by Mr. H. K. Wallace at Gainesville, Florida, described the several new species and retained some duplicates. She has filled vials where necessary and studied further shipments of New Zealand spiders.

Mr. M. Bates finished his revision of Cuban Rhopalocera, attended to the mounting by two students of many Lepidoptera, assorted and partly identified the New Guinea butterflies, continued the arrangement of Neotropical Lepidoptera and worked over several lots of Trypetidae sent in for identification. He has also assisted in the comparison of Diptera with types.

Mr. F. Carpenter of the Palaeontology Department who has continued his studies of fossil insects, described a few recent Neuroptera and is now engaged in a revision of our Raphidiidae, utilizing the collections of various other museums as well as our own.

The Curator finished a supplementary paper on the Neurop-

tera of the Malay Peninsula and Mt. Kinabalu, Borneo, and prepared several smaller articles on Neuroptera. About 15,000 specimens of miscellaneous insects were mounted, labeled, and assorted, and put in the collection. He has split by faunal regions the Derolle collections of Cerambycidae and Curculionidae, made a temporary arrangement of the Nearctic, Neotropic, and Ethiopian Cerambycidae; written and put on many thousands of species labels, marked and catalogued 3,465 types (over 3,000 being in the Bowditch Chrysomelidae). Duplicate Orthoptera have been sent to the Carnegie Museum, to the Museum of the University of Colorado, and to the Ohio State Museum. Part of the Johnson Diptera have been incorporated in the regular collection, the boxes gained from reducing the Odonata, and placing many of the latter in envelopes. The Johnson boxes freed will be used to house the Bowditch Cryptocephalinae, Cassidinae, and Hispinae, the Bowditch Chrysomelidae thus brought into one series.

The Curator determined Central American Neuroptera for the Philadelphia Academy of Sciences, Neuroptera and Psammocharidae for the Porto Rico Experiment Station. Psammocharidae for the University of Colorado Museum, and Professor O. Stevens, and revised our material in Neotropic and Malayan Chrysopidae. A set of native Psammocharidae and Scoliidae was sent to the University of Colorado Museum in exchange for foreign bees.

Four students have assisted during the year. Two spent most of their time on Lepidoptera, spreading, transferring, and labeling specimens. One spent part time helping Dr. Carpenter in cataloguing fossils. One helped Dr. Darlington by labeling the Gehring collection and the Australian material, and in fumigation; another has assorted cards, filled vials in alcoholic collection, and transferred part of the Emerton spiders to our vials.

Equipment. About 200 new boxes have been added, more than half for the ants, a new cabinet holding over 500 boxes has been built in the Lepidoptera room, several thousand vials have been added, and trays to hold them in the alcoholic collection.

More new boxes can now be utilized for the Weeks butterflies and the Cassino Geometridae.

For some weeks Mr. G. J. Maydell has worked on our unnamed Meloidae, and determined many of them.

At present there are types of 19,666 insects marked and catalogued besides others in Arachnida, Myriopoda, etc. The Wheeler ants and the Cassino Geometrodæ are still to be marked.

The visitors were Mr. W. Sanderson (Dryopidae), Mr. Chenfu Wu (Neuroptera); A. L. Melander (Empidae), W. J. Brown (Elateridae), F. M. Hull (Syrphidae), J. N. Knull (Coleoptera); L. A. Carruth (Meloidae), Mrs. Doris Blake (Chrysomelidae), G. J. Maydell (Meloidae). At the Christmas vacation, due to the A.A.A.S. meeting, there were over 25 visitors, some of whom spent part of their time studying our collections.

Appendix on loans. The material on loan is extensive; Dr. P. J. Darlington has prepared a list of the Coleoptera. Several loans, made years ago, have not been returned or only partly returned. For the sake of record these are hereafter listed.

Prof. F. Silvestri has had the Mann Brazilian termites for over 18 years, not yet returned.

Prof. R. V. Chamberlin has an unknown number of Arachnida for over 8 years.

Prof. P. P. Calvert has still a few Odonata, that were loaned him over 10 years ago, most of the loan has been returned; he reports he will return the balance this autumn.

All of the Scudder Orthoptera that can be traced have been returned by Mr. M. Hebard.

Prof. L. Taylor who has had our Chrysidæ for more than 10 years reports he will return them this fall, partly named.

Prof. Z. P. Metcalf who has had the Panama Fulgoridæ for about 6 years reports the work is nearly finished and that they will be returned in a few months. He has previously worked and returned our native Fulgoridæ.

Mr. C. H. Curran who has had part of the Panama Diptera for 7 years reports he cannot finish them for several months; he has on two occasions returned a part of the loan.

Prof. J. Chester Bradley has had most of our exotic Scoliidæ for four years; says he is still working on the material.

Prof. Clarence E. Mickel, who has our Neotropic Mutillidæ for three years reports that it may take several years to finish them, he has similar material from other Museums.

Mr. E. T. Cresson, Jr., who has had part of our Ephydridæ

for six years has still 130 specimens which he says he can return in the fall; he has returned most of the original loan.

Mr. J. G. Rehn borrowed several hundred African Orthoptera six years ago, and last year some Honduran Orthoptera; a paper recently published includes these Honduran forms. He is at present in Africa.

Mr. G. Stuart Walley who has had our Corixidae for two years reports that he has practically finished determination and will return them soon.

Mr. H. G. Barber, who had our Neotropic Reduviidae for some years, returned all but one genus upon which he is still working.

Mr. E. P. Van Duzee has had for two years 450 Hemiptera from the Fiji Islands (Mann coll.); no report.

Prof. Alfred Emerson has had 5 vials of termites for nearly three years; no report.

Mr. F. D. Klyver has had 295 Psyllidae for two years; no report.

Mr. E. A. Maynard has had 65 vials of Collembola for two years; no report.

Mr. V. S. L. Pate has 115 Oxybelidae for four years; he is still working on them, and has similar material from other Museums.

Mr. J. H. Roberts has 56 Trichoptera for three years; no report.

Mr. Frank M. Hull has 482 Syrphidae, they are due September, 1934.

Prof. H. B. Hungerford has 74 Australian Aquatic Hemiptera due December, 1934.

Miss H. Exline has six spiders, due July, 1934.

Mr. H. F. Loomis has some West Indian millipedes, due December, 1934.

Mr. C. W. Sabrasky has 230 Chloropidae, due February, 1935.

Twenty-one loans have been returned during the year.

COLEOPTERA ON LOAN FROM M. C. Z., July, 1934

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- 1,609 Old World Buprestidae, to A. Thery, due July, 1935.
- 432 North American Heteroceridae, to R. Mamitza, due July, 1935.
- 374 Central American Aphodiini, to H. E. Hinton, due June, 1935.
- 7 Central American Dryopidae, to H. E. Hinton, due June, 1935.
- 143 *Trechus* of the *T. hydropicus* Group, to J. M. Valentine, due June, 1935.
- 93 South American Cicindelidae, to W. Horn, due May, 1935.
- 373 African Buprestidae (addit. to above), to A. Thery, due May, 1935.
- 64 North American *Ludius*, to W. J. Brown, due May, 1935.
- 32 *Calendra* (Deyr. Coll.), to A. F. Satterthwait, due May, 1935.
- 149 *Calendra* (addit. to above), to Satterthwait, due March, 1935.
- 301 *Trichius* from North America, to C. H. Hoffman, due March, 1935.
- 726 *Calendra* (addit. to above), to Satterthwait, due January, 1935.
- 13 Bostrychidae, to J. N. Belkin, due January, 1935.
- 45 Nemognathinae from North America, to L. A. Carruth, due January, 1935.
- 418 Nemognathinae (addit. to above), to L. A. Carruth, due October, 1935.
- 100 (about) W. I. Elateridae, to Quirsfeld, account for June, 1933.

- 1 *Ptomophagus* (Silphidae) from Cuba, to Jeannel, due December, 1934.
- 4 paratypes Cuban Dryopidae, P. H. Musgrave, due April, 1934.
- 18 (about) Cuban Carabidae, to Rene Oberthur, for comparison with types in his collection, due last winter but not recently heard from.
- 4 Cuban *Chelonarium* to Oberthur at his request, due now.

REPORT ON MAMMALS

BY GLOVER M. ALLEN

In the formation of a collection representative of the mammals of the world, where progress must depend largely on chance opportunities rather than on systematic efforts, chief interest centers in the yearly accessions. These in the past twelve months are as follows:— (1) a collection of several hundred skins and skulls as well as specimens in alcohol made by A. M. Olalla at several localities in the central Amazon valley. This collection is by far the most important yet acquired from South America, for, coming from an area practically unrepresented in the department, it contains series of opossums, monkeys, carnivores, bats, and rodents, many of the genera and species of which are new for us, or at best were represented by old or poor material. The cataloguing and identification of these specimens is in progress but by no means finished. The larger hides are being tanned and the skulls cleaned for filing and future study. (2) A splendid series of skins and skulls from East Africa (Kenya Colony and Uganda) is due to the skilled field work of Mr. Arthur Loveridge, who in the course of his study of relict forest areas in Kenya Colony during the year past made a special effort to secure topotypes of as many species of mammals as possible, with his usual brilliant success. The first consignment, numbering several hundred specimens, has had as yet but a preliminary examination. (3) Supplementing this, the Museum was able to purchase from Rev. Finley McC. Grissett, a collection chiefly of skulls, representing various of the larger species of the Cameroons, West Africa. These included a splendid lot of skulls showing all ages of the red river hog, various duiker antelopes, leopards, monkeys and others, which coming from a circumscribed area are valuable in a study of variation in local forms. (4) An interesting series of well-made skins with skulls from Wyoming, southern California, and the Hawaiian Islands, collected and prepared by Miss Barbara Lawrence, Assistant in the department. These include several species welcome to the collection, such as the "native rat" of the Hawaiian group. (5) A

number of mammals from northeast Greenland were obtained by purchase, and include seals, arctic fox, weasels, arctic hares and muskox. The hares of this area have lately been named by E. W. Nelson as a distinct race. (6) A number of Chinese mammals were received from Mr. Brooke Dolan III, collected by his expedition to West China in 1931, and include specimens of Blue Sheep, Tibetan Gazelle, Wild Dog and others. (7) To the generosity of Dr. John C. Phillips is due a series of four fine specimens of the Dwarf Elk (*Cervus mannodes*) of California, collected by special permission. (8) From Colonel Theodore Roosevelt, two skins with skulls of the Philippine dwarf buffalo or tamarao were received, collected by himself during his residence in the Philippines as Governor General. (9) A series of armadillos and anteaters from São Paulo, Brazil, was purchased from Dr. G. W. D. Hamlett, who secured them in the course of his investigations of the embryogeny of these animals.

An unusually acceptable gift came from the Trustees of the British Museum in the shape of a practically complete skeleton of a False Killer Whale (*Pseudorca crassidens*), one of the large school stranded in 1927 at Dornoch Firth, Scotland, all of which were secured and prepared by the British Museum. This large delphinid has long been on our list of desiderata as one of the few genera of Delphinidae lacking in our collection.

Other donations are gratefully acknowledged, as follows:— Robert Le Moyne Barrett, a well-prepared hide and skull of the wild huanaco from Argentina; H. A. Carter, a Carolinian Beaver and jumping mouse from Georgia; Harold J. Coolidge, Jr., two West African bats and two dwarf squirrels (*Myosciurus*); Dr. C. S. Coon, an Arabian genet; J. R. Dymond, three little brown bats from Ontario; S. G. Emilio, a color variant of the gray squirrel; Professor M. L. Fernald, a common mole from Cape Cod; James C. Greenway, two Bahama raccoons; Augustus J. Griswold, several small mammals and a female roe deer from Jugoslavia; Pedro de Mesa, bats and two dugong skulls from the Philippines; George Nelson, specimens from Florida; James L. Peters, local species; R. S. Pierrepont, Jr., several rodents; Dr. Gouverneur M. Phelps, an African klipspringer; Pinehaven Fur Farm, a young mink; W. A. Schofield, skulls of various mammals from Ceylon;

and from Frederic Winthrop, a splendid specimen, skin and skull, of the Korean Wild Boar.

In all, nearly 1,200 specimens have been catalogued. Material for study has been loaned to eight institutions. The identifying, labeling and cataloguing of specimens as well as the preparation of skulls is a time-consuming process. In this fortunately I have had the efficient help of Miss Barbara Lawrence for four months of the year. It is a pleasure also to acknowledge the volunteer aid from time to time of Mrs. Harold J. Coolidge, Jr., Mrs. Dean Sage, Miss Natalie Petersen, Miss F. Ingraham and Miss Elizabeth Hone, to all of whom grateful thanks are due. Mrs. Coolidge and Mrs. Sage have been helpful in adding to the card catalogue of the collection, the specimens entered in the accession catalogue, while Miss Petersen has been of great assistance in transferring skulls from open trays to tight paper boxes with outside typewritten labels, an improvement begun two years ago and already proving of great benefit in housing this material. By arrangement with the college, the part-time assistance of three undergraduate students has been made use of; Messrs. Sapienza and Sewall have practically completed the work of copying the card catalogue of the collection, so that it is now neatly typewritten instead of in manuscript, adding to its clarity and usefulness, while at the same time advantage was taken of the opportunity to bring the Latin names of the species up to date on the cards. Mr. White has put up label holders and nearly completed arranging the collection of pamphlets. In the ever-present work of cleaning skulls and skeletal material French and Gilbert have latterly borne a helpful hand, developing some skill. There has been, too, considerable rearranging and respacing of the collection to accommodate new accessions and to relieve the crowded condition of some of the cases. In addition three new storage cases have been built which will provide room for the new collections received and allow for better spacing. Several lots of larger skins have been sent away for tanning, some 103 in all, thus making them available for use. The past accumulation of tannable hides has now been caught up with, only the later accessions remaining as well as a number that will eventually have to be given special attention on account of faulty preparation in the field.

The Assistant Curator, Mr. Harold J. Coolidge, Jr., has continued his special studies of the chimpanzee group, with interesting results, some of which have appeared during the year in the shape of an account of the Pygmy Chimpanzee, *Pan paniscus*. With the aid of a grant from the Milton Fund, he has visited the colonies of living chimpanzees maintained by Yale University at New Haven and in Florida, and studied the extensive skeletal material at Western Reserve University. Under his supervision the African Room has now been completely relabeled and he has devised a system of painted guide lines in the Systematic Room, to serve in illustrating the wall chart of mammalian relationships. He has helped in the organization of several expeditions, two of which have already added to the museum collections, and in the collecting and recording of measurements for a new edition of the records of American Big Game edited by Prentiss Gray of New York. At the request of the President of the University he has devoted much time this spring to the organizing and installing of the Harvard Film Foundation. Other routine work has included skull-cleaning, labeling storage cases, care of the storage collection of hides and other incidental matters.

While the Curator has had little time for research, with the press of other matters, he has begun a special study of the genus *Pipistrellus*, small bats of worldwide distribution, which are in need of revisionary treatment. Last summer, with the aid of a grant from the Milton Fund he was able to spend several weeks in study at the British Museum examining types and other material especially of Chinese mammals, work which proved of value in connection with the preparation of the final report on the mammals of Mongolia and China, now nearing completion, and on which, by arrangement with the American Museum of Natural History, a certain amount of time has been spent for several years.

Miss Lawrence, in addition to her very efficient help in the routine of cataloguing, preparing and labeling, has continued her studies of South American monkeys, particularly the identification of the species represented in the Olalla collection, previously mentioned. Her review of the Howler Monkeys of the *palliata* group, prepared last year, has since been published. In the course

of her absence in the West during part of the year she collected a number of species of small mammals for the Museum.

Mammals still out on loan, July 30, 1934.

<i>Borrower</i>	<i>Date Borrowed</i>	<i>Specimens</i>
Field Museum of N. H.	July 23, 1934	Hide of clouded leopard
Field Museum of N. H.	July 20, 1934	Micronycteris minuta, 4153
Dr. E. W. Nelson, U.S.N.M.	May 2, 1934	Arctic Hare skulls
Dr. E. W. Nelson, U.S.N.M.	March 5, 1934	Arctic Hare skins and skulls
Prof. H. Pohle, Berlin	Jan. 18, 1934	New Guinea rodents
E. W. Nelson & E. A. Goldman	Jan. 5, 1934	Mexican Thomomys & Cratogeomys
Calif, Inst. Tech., Pasadena, Calif.	Dec. 12, 1933	Tapir skull
Dr. L. R. Dice, Univ. Mich.	1933	Centr. American Squirrels
G. S. Miller, Jr., U.S.N.M.	Dec. 27, 1932	Skins and alc. Noctilio
Dr. L. R. Dice, Univ. Mich.	Oct. 13, 1932	5 Sylvilagus f. aztecus
Roland K. Ross, So. Pasadena	Apr. 1, 1932	Snow Goose skeletons
Dr. R. Kellogg, U.S.N.M.	Nov. 26, 1930	9 Prodelphinus crania and jaws

REPORT ON THE BIRDS

BY JAMES L. PETERS

The number of accessions in this department might be termed about those for a normal year; the total number of skins received amounted to 5,658. By far the largest single item, 4,023 skins is accounted for by the purchase of the splendid collection made by the experienced Olalla Brothers on the Rio Tapajóz in central Brazil. This collection has been assigned to Mr. Griscom, assisted by Mr. Greenway, for study and report; whether it contains any novelties will not be known until their work is completed, likewise the number of forms new to the Museum collection cannot be stated at present.

The birds from the latest of the series of expeditions conducted jointly by the Museum and the Museu Paulista amounted to 632 specimens,—200 from the Brazilian State of São Paulo and 432 from the State of Bahia. The last named is the type locality of many birds first described from South America and the series of topotypes contained in the collection is of great importance in work on South American birds.

The first installment of the birds collected in Kenya Colony by Mr. Loveridge amounted to 335 skins, chiefly from Mt. Elgon; pending the return of Mr. Loveridge with the balance of the collection, no attempt has been made to study and report on this material.

During the first half of the 9th cruise of the *Utowana*, Mr. Greenway accompanied Dr. Barbour as the guest of Mr. Allison V. Armour and collected 46 birds in the southern Bahamas; on the second half of the cruise which included not only islands in the southern part of the Bahamas, but the small islands off the southern coast of Hispaniola as well, Mr. Barbour shot 41 birds which were kept frozen in the ship's icebox and upon the return of the yacht were sent to Cambridge where the members of the bird room staff prepared them.

Mr. Griswold spent about five weeks (27 August to 4 October)

at Pekre, Jugoslavia, where he collected 53 specimens of birds which he has generously presented to the Museum.

Mr. Barbour has donated 43 skins, all of them either species entirely lacking in the collection, or inadequately represented previously. From Professor Oscar Neumann of Berlin, 71 skins, including five types, have been purchased. Two species new to the collection were most generously presented by the Academy of Natural Sciences of Philadelphia. By exchange we have added 371 skins.

No less than forty-two requests for the loan of material have been received and in every case such requests were granted. The total number of skins loaned amounts to 742 this year as against 1,042 last, but the number of requests nearly doubled, 22 being the number received last year. About the first of July a check-up was made on all loans outstanding for three months or over, with the result that the material either was returned or request for an extension of time was made.

The total number of birds entered on the card catalogue was a few under 5,000; this decrease over last year is due to various other demands on Miss Porter's time. Nevertheless this number includes all of the series of the Families Cotingidae, Phytotomidae, Pittidae, Atrichornithidae and Hirundinidae, in addition to material belonging to groups carded previously.

Of our specific desiderata, 106 were secured, giving us 12,127 of the forms recognized in Sharpe's Hand-list; only one of our generic desiderata has been added, leaving 48 still desired.

During the year 36 types have been added to the collection; some by purchase, some novelties in recently received collections, others based on revisionary work.

The regular staff in the bird room remains the same, *i.e.* Mr. Greenway, Miss Porter, Mr. Griswold and myself. Mr. Griswold's status, however, has changed from part time volunteer to full time salaried beginning October 15, 1933. An undergraduate working under the student employment system worked six hours a week, totalling 160 hours during the college year. With this extra assistance back cataloguing was brought up to date and a card index prepared of the various volumes, pamphlets and separates that go to make up the bird department library.

In addition to the usual routine connected with the operation and maintenance of the study collection, the responsibility for the packing, moving and installation of the Thayer mounted birds [mentioned more specifically in the Director's Report] was naturally assumed by the bird room staff. I spent five days in May at Lancaster designating the 1,200 odd mounts that were to come to Cambridge; Miss Porter was engaged for the better part of two weeks in packing the birds for moving, and so well were they packed that despite their fragile nature injury was at a minimum; and Mr. Griswold drove the Museum truck the dozen or more round trips required to move the birds from Lancaster to Cambridge. He also went over the individual birds after they had been placed in their new cases, removing signs of wear and travel. Mr. Griswold also took charge of moving the old Greene Smith collection and installing it in its new quarters at Andover.

Miss Porter left about July 1st to accompany Mr. and Mrs. Barbour on a trip to South Africa,— she will resume her work in the bird department about October 1st.

Two new three-section wall cases built in the upper hallway late last summer by the College Maintenance Department have allowed a general expansion of the passerine birds from room 504, greatly increasing the workability of that part of the collection. A single three-section wall case, to replace some of the old "Cambridge cans" has just been completed in the Thayer Room. A large case, also in the hallway, formerly used for mammals, was turned over to the bird department and proved just the right size to take the Cranes. The space left vacant by these birds was used to expand the shorebirds, this opportunity was also utilized to rearrange the latter group in the order of Peter's "Check-List." The great need at present is for a type of case with trays intermediate in size between those in use in the wall cases and those in the wood and zinc-lined cabinets. A battery of such a type of case could be installed in room 507, replacing some of the larger size tin cases, and would prove an economical storage unit for medium sized birds.

REPORT ON THE MOLLUSKS

BY WILLIAM J. CLENCH

At the suggestion of Mr. Calvin Goodrich, Curator of Mollusks at the University of Michigan, I made a survey of the Cahaba River in south central Alabama. Accompanied by Dr. Henry Vander Schalie, now Assistant Curator in that Institution, I collected along some 75 miles of this river from its mouth near Selma north to near Blockton. Mollusks were obtained in fair number from several stations at intervals of approximately 10 miles. The ecology of each station was studied to determine whether or not certain physical factors had any bearing on the variation of the mollusks. Some 500 lots were obtained, shared equally by both institutions.

Mr. and Mrs. Barbour and Mr. and Mrs. Greenway collected a very large series of mollusks in the Bahama Islands while guests on Mr. Allison V. Armour's Research Yacht "Utowana." Many islands and cays were visited from which no mollusks were known heretofore. A report on the Cerions collected is now in press. Many of these were collected by Miss Julia and Louisa Barbour.

With the aid of a Milton Fund grant, Dr. Joseph Bequaert made a trip to Europe to study the types of African land and fresh-water mollusks deposited in the museums of Belgium, England, France, Germany and Sweden. We are particularly indebted to Dr. H. Schouteden, Director of the Congo Museum for a very large collection of African mollusks, many specimens of which were from type series.

Mr. B. E. Bardwell of Broome, Australia, made a trip to the northern part of Western Australia for both mollusks and echinoderms. The Museum paid a portion of Mr. Bardwell's expenses for which it received a very fine series of the material collected.

Exchanges were carried on extensively, as in previous years, with museums and collectors in many parts of the world. Much new material has been added in this manner.

Mr. Henry D. Russell enrolled as a student in the department and started his study of the Nudebranchs.

Our series of African land and fresh-water shells has been completely revised and much new material added during the past year.

Dr. Bequaert donated to the Museum his private collection of shells which contained more than 800 lots of carefully selected specimens.

The student assistants have done a great deal of valuable routine work in the department during the past academic year. Our cataloguing has doubled that of any previous year and many other chores, too numerous to mention here, have been attended to. Thanks are due them for their interest and care in their work.

As in past years much volunteer work has been done by Messrs. Banks, Bequaert, Blake and this year also by Alden Cheever and Richard Foster. Thanks are due them also for a large amount of necessary, but not always interesting, work.

The department is indebted to a host of friends who have generously donated specimens during the past year. Gifts of this sort have added materially to the steady growth and wealth of the collection. The total amount of such gifts each year is surprisingly large.

A résumé of the collection follows:

Number of accessions for the year	4,574
Catalogued entries in the collection	80,324
Number of species in the collection	22,081

REPORT OF THE RESEARCH CURATOR IN ZOÖLOGY

BY LUDLOW GRISCOM

Once more I must begin my report with the remark that the continuation of the depression has still further curtailed the Museum's funds. It will be recalled that we had been carrying on thanks largely to two special funds, derived from the sale of publications and outside gifts from friends. In September it became evident that such gifts could no longer be counted upon as they had been for many years past. Representations were made to Mr. Lowes, the new Vice President of the University, and thanks largely to his sympathetic understanding of the Museum's situation, the consent of the President and Fellows was obtained greatly to increase the operating deficit already allowed on our budget. Without this arrangement, it would have been impossible for the Museum to function in any normal manner, to have maintained its staff, or to have cared properly for its collections, as no further economies were possible, which would not have affected seriously one or more of these fundamental duties.

Again as the result of vigilance and some unexpected private aid the deficit actually incurred was well under the amount allowed. The receipts from the sale of publications happily did not decline below those of the preceding year. This is largely due to the steady sale of Brues and Melander's *Classification of Insects* as a college text book, which offsets the few sales of long runs of back bulletins and memoirs. Early in the winter the edition of this work was almost exhausted, and a second and final printing was ordered and the type distributed. This is, I believe, the first time that any Museum publication was ever kept in type and had a second printing.

The normal number of Bulletin articles were issued during the year, two with colored plates for the first time in several years, thanks to a Milton Fund Grant. The real milestone in our publication activity was, however, the issue of Woodworth and Wigglesworth's great memoir on the Geology of Cape Cod one week before

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the close of the fiscal year. Its publication was finally made possible by the receipt of the grant from the Geological Society of America and I feel sure that author, editor and printer heaved sighs of relief at the completion of the job after long years of delays, difficulties and mishaps with manuscript, illustrations and funds.

Over a month in the early autumn was devoted to identifying Underwood's last collection on Honduras birds, and I spent many pleasant days with Mr. A. J. van Rossem of the California Institute of Technology, now one of the leading authorities on the birds of Middle America, who spent nearly a month in the Museum studying our collections from Mexico and Central America. During the winter and early spring I continued the rewriting of my Nicaraguan report, and engaged in various monographic studies, the Savannah Sparrows with Mr. Peters, and the Crossbills and Pine Grosbeaks of North American alone, work which involved visiting the museums in New York and Washington.

Late in September I went to southeastern Virginia with Professor M. L. Fernald on a brief botanical reconnaissance. The results in the way of new species and varieties and notable range extensions proved astonishing, and we are still engaged in the critical study of our collections.

During the course of this work study of old types in London and Paris became imperative. For years also I had been accumulating a long list of Central American birds in the same institutions which needed critical re-examination. Accordingly I received permission to spend the month of July in Europe. The first week I attended the International Ornithological Congress at Oxford. The next two weeks were spent in the British Museum and the Linnaean Society rooms in London, and July 31st was my fifth and last day in the Museum at Paris. I am much indebted to the authorities of these great institutions for their courtesy and helpfulness.

REPORT ON REPTILES AND AMPHIBIANS

BY A. LOVERIDGE

During my absence in East Africa from September 5, 1933 to September 5, 1934 Mr. Benjamin Shreve took charge of the department. He unpacked and checked all incoming collections, and identified much material apart from his own studies. I am deeply indebted to him for the good order in which everything was kept, for his handling of numerous loans, and for continuing the refilling of the jars containing the turtle collections, when evaporation made this necessary.

Registration, tagging of new material, and card-indexing have been suspended for the year, but will receive early attention.

A varied selection of reptiles and amphibians from almost all corners of the globe were received and the department is grateful to numerous friends and donors who have assisted in this way. Collections from the Bahamas and Hayti brought back by Mr. Barbour proved exceptionally rich in new forms. The balance of the Chapman Grant collection from Porto Rico and vicinity was received; it consisted of turtles and snakes. Mr. Bangham continued to send consignments from Sumatra. Dr. Herbert Clark shipped a large amount of material from the Canal Zone, and we are indebted to Mr. C. C. Lui for a welcome selection of Chinese amphibia. To Dr. Carlton H. Coon we are indebted for examples of a rare genus of amphibians new to the collections, for he obtained a series of *Mocquardia abyssinica* during his stay at Adis Abeba, Ethiopia.

Nearly a score of loans, several very extensive ones, were made to fellow workers requesting material. These included Miss D. Cochran, Dr. E. R. Dunn, Mrs. H. T. Gaige, Messrs. L. M. Klauber, J. W. Large, C. C. Lui, R. T. Moore, H. W. Parker, K. P. Schmidt, and Dr. L. Stejneger.

Among a number of herpetologists who visited the museum and utilized the collections, one might mention Drs. H. L. Babcock, E. R. Dunn, H. K. Gloyd, C. C. Lui, G. K. Noble, C. H. Pope, and T. I. Storer.

REPORT ON INVERTEBRATE PALEONTOLOGY

BY PERCY E. RAYMOND

The past year has been devoted almost entirely to curatorial work. No member of the department has been in the field during this time, and the only accession by collection was a quantity of Eocene and Cretaceous material from southern Alabama (largely from the famous locality at Claiborne), received through the kindness of Mr. W. J. Clench.

The curator has spent much of his time studying an important collection from the Upper Cambrian and Lower Ordovician of Vermont submitted by Prof. Charles Schuchert of Yale. As a result of this study, the Museum will receive paratypes of several new genera and species.

Mr. Schevill was occupied by routine work, chiefly among the cephalopods; cataloguing has been carried forward to a considerable extent, also among the arthropods. Much time was also spent on the preliminary sorting of the three truck loads of fossils brought out from the Boston Society of Natural History. This practically completes the exchange, begun many years ago, whereby this Museum receives all extra-New-England fossils from the Society; it is expected that a few more specimens may turn up in Boston, but it is believed that the bulk of the material has now been received.

Doctor Carpenter has continued the organization of the Tertiary insects in the Scudder Collection, and has nearly completed the indexing of the types of fossil insects in the Museum. His research activities have included the completion of the seventh of his series of papers dealing with the Kansas Permian, this part dealing with the Protoperlaria and Neuroptera. He has also begun work on a large collection of Eocene insects loaned by the Carnegie Museum.

Two graduate students, Messrs. Fred Phleger and David M. Delo, have studied parts of the collection during the winter. Mr. Phleger has worked on some Russian Ordovician cystids; Mr. Delo has continued his revision of the Phacopidae.

The following loans are now outstanding:

Professor T. H. Clark, McGill University,—invertebrate fossils from the Middle Ordovician of Quebec, Pennsylvania, and Virginia;

Mr. Edward Leith, Peabody Museum, Yale University,—a large number of Ordovician cephalopods from Newfoundland;

Prof. Carey Croneis, University of Chicago,—a small collection from the Mississippian of Arkansas.

The following accessions have been received during the year:

Received by gift:

Dr. Teiichi Kobayashi—specimens and casts of Cambrian and Ordovician Trilobites from Manchuria and Korea;

The Curator,—Mid-Devonian fossils from near Thedford, Ontario (purchased of Charles Southworth);

Mr. E. E. Halvorsen—Tertiary molluscs from Coalinga, California;

Doctor W. H. Shideler of Oxford, Ohio—8 *Astraeospongia meniscus* from Perry County, Tennessee;

Mr. Wallace de Laguna—interesting problematica from Prince William Sound, Alaska;

Doctor Hoyt Rodney Gale—Cretaceous fossils from western Texas.

By exchange:

From Princeton University (Dr. B. Howell)—a lot of identified topotypical trilobites from the Cambrian of Pennsylvania;

From the University of Michigan (Professor G. M. Ehlers)—a lot of named topotypes from the Devonian of Michigan and Ohio;

From the Boston Society of Natural History—an additional very large instalment of fossils;

From the United States National Museum (Doctor Charles E. Resser)—a number of Cambrian trilobites.

By purchase:

Of Charles Sternberg—a large Pachydiscus from Lower California.

By collection:

Four trays of material from the Eocene and Cretaceous of Alabama—W. J. Clench.

REPORT ON VERTEBRATE PALAEONTOLOGY

BY H. C. STETSON

Accessions to the collection of vertebrate fossils have continued to come in at the same steady rate that had characterized the last few years. Doctors Schlaikjer and White were both in the field in the summer of 1933, the former on an expedition sponsored by a friend of the Museum, and the latter on a joint expedition of the Museum and the University of Michigan.

Doctor Schlaikjer worked the Goshen Hole region and the Harvard quarry at Torrington, Wyoming, and secured much material both for study and exhibition, notably a beautiful skeleton of a new Miocene Eoporeodon.

Doctor White worked the Permian of Archer County, Texas and was rewarded by finding the most complete series of skulls of the amphibian, *Trimerorachis*, that has ever been discovered. For our share we received a slab with several perfect skulls on it which has been mounted and placed on exhibition, as well as a very large skull of *Eryops*. Doctor White has continued the preparation of the delicate *Seymouria* material which he found in the study collections and with the assistance of Mr. Frederick Emery finished the restoration and mounting of *Euowenia*, as well as a large Miocene turtle.

Mr. Nelson has continued to devote his entire time to the preparation of vertebrate fossils. Through the generosity of a friend we received an unusually perfect specimen of *Anogmius* which required much careful preparation before it was placed on exhibition. The Plesiosaur, acquired from Tufts College two years ago, has consumed the major part of Mr. Nelson's time. The inroads of pyrite disease and the hardness of the matrix combine to make the preparation of this specimen a slow process. In addition he has nearly finished mounting the Eoporeodon mentioned above.

The skull of *Triceratops*, collected two years ago by Doctor Schlaikjer, was mounted by Charles Lang and is now on exhibition in the front hall, adding greatly to its appearance.

A large exchange was arranged through Doctor C. C. Young of the Geological Survey of China, whereby we are to receive a representative series of Chinese Cenozoic vertebrates.

Accessions to the collections of fossil fishes include some fine specimens of *Palaeospondylus* and a *Dipterus* from the Museum of Cambridge University, England, through Doctor Foster Cooper. From the Boston Society of Natural History we received several lots from the Green River Shales, some odd specimens from the Old Red of Scotland, and the two lost types from the Albert Mines locality. As a further result of Doctor White's trip to the Permian of Archer County, Texas, we received considerable material of *Pleuracanthus*.

Three expeditions are at present in the field. Doctors Schlaikjer and White have returned to their old localities and Mr. Seton is working in the Eocene of Wyoming.

Doctor C. W. Gilmore has on loan the small amount of fossil snake material which we possess.

With the able assistance of Mr. Robert Cummin the task was continued of labeling specimens and bringing up to date the catalogue of fossil fishes from the point at which it was dropped twenty odd years ago.

I have continued my investigations of factors affecting the transportation and deposition of marine sediments and the rôle of environment in sedimentation through the Woods Hole Oceanographic Institution.

REPORT ON HELMINTHS

BY J. H. SANDGROUND

The following brief report is written on the eve of my departure for the Belgian Congo to serve as Helminthologist on Dr. R. P. Strong's expedition for the study of Onchocerciasis. The report consequently covers the eight months of my stewardship as Curator of Helminthology since the last Annual Report was written.

I spent two months last summer as guest investigator at the Douglas Lake Biological Station of the University of Michigan where I gathered together a small but quite desirable series of helminths for our collection. A large proportion of the specimens consisted of trematodes wherein our helminthological collection was previously poor.

Some 750 items are now accessioned in our catalogue. This represents an increase of about 80 species since the commencement of the academic year, and includes the type or paratype specimens of several new species. Very few specimens in the collection now remain unidentified.

We are constantly receiving requests for the loan of material from outside workers, indicating that helminthologists are becoming familiar with the development of this subject in the Museum. During the period under review, I have also been called upon for the identification of parasites found by workers in the Laboratory of Comparative Pathology of the Philadelphia Zoölogical Society as well as by zoölogists in various universities.

To the following gentlemen we are indebted for recent additions to our collection: Mr. R. Stadelman of Guatamala; Dr. G. W. D. Hamlett of the Department of Anatomy, and Dr. G. W. Smillie of the Department of Public Health Administration, Harvard Medical School; Dr. Allen MacIntosh, Bureau of Animal Industry, Washington; Dr. P. D. Harwood, Vanderbilt University, Tennessee and Dr. Lothar Szidat, Rositten, Germany.

REPORT ON FISHES

BY N. BORODIN

Type specimens. Many type specimens in the collection have been card catalogued and can now be easily and quickly found. The catalogue includes 1,168 cards (42 more than in 1933). In addition to these types the Museum received in exchange with the Leiden Museum a very valuable collection of 132 specimens of 76 species described by Bleeker and compared with the Bleeker's types by Dr. Koumans, Curator of Fishes of the Leiden Museum. These belong to the Lutianidae, Haemulidae, Labridae and Gobiidae.

Research work was continued on the anabiosis of fishes. A complete report appeared in *Zoölogischen Jahrbücher*, v. 53, Abtheilung für Allgemeine Zoologie und Physiologie, 1934, pp. 313-342.

New accessions. A collection of fishes collected by W. K. Vanderbilt in his Mediterranean cruise of 1933 was identified by the Curator. Six duplicates (including one cotype) of a new species of fish from this collection have been generously presented by Mr. Vanderbilt to the Museum. The annotated list of fishes with the description of one new genus and four new species is to be published in the *Bulletin of the Vanderbilt Marine Museum*, v. I, art. 4, 1934.

Other accessions were: by exchange—132 specimens received from Leiden Museum. The exchange with this Museum is continued and we expect to receive in the near future the third lot of Bleeker's species, in exchange for North and South American species. Other accessions were 1 Dr. V. D. Vladykov, 1 Mr. Thomas Barbour, 9 H. Stevens, 1 Dr. P. Carpenter, 25 Dr. Deichmann, 2 Dr. Clark, 1 James Zetek, 34 P. de Mesa, 5 Dr. C. T. Brues, 10 Dr. Brown, 6 Dr. J. C. Phillips, 7 George Schwab, 38 Raymond Stadelman.

By request of the Director of the Museum 91 lots, each lot containing one to many specimens of New England fishes were

picked out of the Museum of Comparative Zoölogy collection and given to the Boston Society of Natural History in exchange for palaeontological specimens received previously from the named Society.

Loans. A large collection of flatfishes (112 specimens) has been loaned to the British Museum (see previous report p. 45); the great majority having already been returned to the Museum. They were studied and identified by Norman who has published already a valuable monograph of flatfishes.

The flatfishes of the family Soleidae of the same loan have been transferred for identification to Dr. P. Chabanaud of Paris Museum. Another large loan was sent to the British Museum for Mr. Frazer-Brunner, 190 specimens of plectognath fishes. The above named scientist is preparing a monograph of fishes belonging to the plectognath order. This loan was due March, 1934, but by the request of Mr. Frazer-Brunner it was renewed till the end of the summer 1934. Other outstanding loans are: Dr. G. Myers 83 specimens of cyprinodontoid fishes sent February, 1930 through Stanford University, due June, 1930; second loan made in 1933 (17 more cyprinodontoids) due August, 1933. Dr. C. Hubbs 75 specimens borrowed in 1928. Dr. C. Hubbs 16 specimens of cyprinodontoid fishes borrowed in 1931, due February, 1932. Dr. A. Parr 22 bottles of Cyclothones, due May, 1929. They were sent for identification, which is not yet completed. U. S. Bureau of Fisheries 1 specimen gobioid fish, May 22, 1934, due June 14. Mr. J. T. Nichols, 19 flying fishes, May 17, 1932, due September 15, 1932. Mr. Nichols wrote me that is waiting for some new comparative material and asked to prolong the loan. Mr. J. Tee-Van, borrowed 24 specimens of Bermuda fishes, due May 1, 1932. Several short time loans of Salmonoid fishes were made to the Toronto Zoölogical Museum and the fishes were returned in due time.

Visitors. Professor W. H. Longley of Goucher College worked in the Museum about two weeks in December, 1933. He examined particularly Floridian and West Indian fishes in connection with his Check List of Tortuga's fishes, in process of preparation.

Dr. A. E. Parr visited the Museum twice to study the types of Stomiatidae, Gonostomidae and Myctophidae.

REPORT ON BIRDS' EGGS AND NESTS

BY W. S. BROOKS

In the course of the year I worked about eight weeks in the Museum completing card catalogue of the collection and incorporating the recent accessions.

REPORT ON THE FOSSIL ECHINODERMS

BY ROBERT T. JACKSON

The Curator spent much time in revising and labelling the Mesozoic and Tertiary Echini, this work being in continuation of that reported last year. Owing to the Curator's protracted illness little work was accomplished in the second half year.

The most important accession in the year was the gift of an extensive collection of fossil Echini from Jamaica. This collection, which includes some 4,000 specimens and fills 17 Museum trays, was collected in Jamaica by the late Mr. Benjamin Walworth Arnold, of Albany, New York, and was given to the Museum by Mrs. Arnold, his widow. The collection is especially valuable to the Museum in view of the Memoir on Jamaican Fossil Echini by Benjamin Walworth Arnold and Hubert Lyman Clark published by the Museum as Vol. L. no. 1, 1927, and also a supplementary Memoir by the same authors which is now in press. This collection of Jamaican Echini is in addition to a large collection received from Mr. Arnold in 1927, and which included the types of Arnold and Clark's Memoirs.

A very choice specimen of *Lovenechinus nobilis*, from the Lower Carboniferous of Oklahoma, was received as a gift from Mr. John Newton Flint of Miami, Oklahoma. Gifts of three choice Cretaceous Echini from Texas were received from Mr. J. B. Litsey of Dallas, Texas, and 12 Cretaceous Echini from Texas were received from the Curator. A few Tertiary Echini from Fresno, California were received as a gift from Mr. C. E. Halvorsen.

A large series of fossil Echinoderms including some very fine material, was received from the Boston Society of Natural History. This collection being in addition to the material received from that institution last year and in 1918. The material just received includes some 24 Cystoids, 77 Blastoids, 200 Crinoids, 9 Asteroids, and 147 Echini.

A lot of eleven valuable Cystoids, collected at Iswos, Russia, by Professor Percy E. Raymond, on a Shaler Memorial Expedi-

tion was received from Professor Raymond. A collection of 12 lots of Blastoids was received as an exchange from the Walker Museum of Chicago, through Professor Percy E. Raymond.

A choice lot of 50 Cretaceous Echini from Texas was purchased by J. B. Litsey from the William Barbour fund. The many lots of Cretaceous Echini from Texas acquired during the past several years gives the Museum a fine selection of material from that state.

Mr. Hoyt Rodney Gale kindly gave the Museum 10 Echini from the Georgetown Limestone, Cretaceous, of Kent, Texas.

Mr. Frederick Thompson of Des Moines, Iowa, gave to the Museum a fine slab of crinoids from the Iowa carboniferous of Le Grand, Iowa. This gentleman, it may be mentioned, has previously and most generously sent to the Botanical Museum an extensive collection of carboniferous plants from the Wilmington Strip mine of Will County, Illinois.

There is no outstanding loan material.

REPORT ON COELENTERATES AND SPONGES

BY E. DEICHMANN

The greater part of the time during the year has been spent working in the sponge collection. With the assistance of Mr. Allan Russell about 1,000 sponges have been catalogued and the genera arranged in alphabetical order. The collections are at the present moment installed on the fifth floor but the alcoholic part of the material will be transferred to the basement as soon as possible.

The collection has proved to be of great interest because it includes a large number of the types from Oskar Schmidt's monograph "Die Spongien des Meerbusen von Mexico" of 1879, one of the fundamental works dealing with this group and also one of the earliest, which means that future workers in this group will have to depend on these types which, according to Dr. M. Burton, British Museum, up to now have been regarded as hopelessly lost. A set of duplicates is now being selected to be sent to the British Museum in exchange for a collection of identified forms from the Eastern Atlantic, the collecting grounds of Bowerbank, another of the early sponge authorities.

The ordinary routine work has been continued as usual, the filling of bottles, relabelling and verifying of older doubtful identifications. A good sized collection of West Indian Alcyonarians, recently collected by the Johnson Smithsonian expedition to Porto Rico has been examined and a report is in preparation. In spare moments, a paper on the Holothurians of the west coast of North America which was written six years ago, has been brought up-to-date and made ready for publication.

A number of Alcyonarians belonging to the Peabody Museum in Yale have been identified and returned. During her visit to Yale in this connection, the Curator went through a large number of the stony corals in the hope of finding some lost types. The search was in vain but a few Alcyonarians which hitherto were considered lost were finally located.

The Curator returned to Denmark for her vacation and during

this month she visited the Zoölogical Museum in Copenhagen and that in Gothenburg, Sweden; in both places establishing cordial relations and making arrangements for future exchanges.

In connection with her vacation she made a study trip to various other museums. During May she spent four weeks in Amsterdam, studying the Holothurians of the Siboga Expedition and making arrangements for exchanges of Alcyonarians and Stony Corals. The friendliness and helpfulness which she met in her work is gratefully acknowledged. Everybody, from the Director, Dr. F. L. deBeaufort, and the Curators in charge, Dr. H. Engel and Miss T. v. B. Jutting to Mr. vanAmstel (who had to spend hours opening museum jars) did what was in their power to make the visit as fruitful as possible. A short visit was made to Leiden to meet Dr. H. Boschma, the new Director of the Zoölogical Museum, and make arrangements for exchange of certain Stony Corals, belonging to the genus *Acropora*. She also found occasion to visit the Zoölogical Museum in Brussels and examine the collection of East Indian corals which Dr. V. vanStraelen collected during King Leopold II's travels in the Dutch East Indies. A set of Horny Corals took me to the Congo Museum where an unidentified collection of West African Alcyonarians was discovered, and made arrangements to have this material transferred to the Museum of Comparative Zoölogy for study.

On the way back to the United States the Curator stopped for about two weeks at the British Museum and studied their rich collection of Alcyonarians in connection with previous work done on the same group. The Curator, Captain A. K. Totton gave every possible assistance. Also here extensive plans were made for exchanges of Alcyonarians as well as of sponges, which are under the care of Dr. M. Burton.

While staying in England, the Curator had the privilege of meeting Professor S. J. Hickson, the authority on Alcyonarians. She spent a long time going over his collections, discussing many problems with him and out of his fifty years' experience he gave without stint. When she left he presented her with certain Alcyonarians which are not represented in the Museum of Comparative Zoölogy collections.

Since her return in July, the labelling and rearranging of the

Stony Corals, Alcyonarians and Sponges in the Coral Reef Room which was begun two weeks before the Curator left, has been continued.

The following accessions have been received: A number of Horny Corals from the west coast of Central America and the Galapagos Islands, collected by Dr. Waldo L. Schmidt and Mr. Fred Ziesenhenné, received through Dr. I. McCulloch, University of Southern California, Los Angeles; a *Spongodes* sp., from the Philippines, collected by Senor P. de Mesa, and a *Pocillopora* sp., from Hawaii, collected by Mr. R. W. Foster, both received through Mr. W. J. Clench; a solitary coral from the "Albatross II," sta. 21,170, through Mr. W. C. Schroeder; two deep sea corals from the western part of the Atlantic Ocean, through Captain H. M. Bloomer, of the cable steamer "Lord Kelvin," Halifax and some Alcyonarians from Professor S. J. Hickson, Cambridge, England.

REPORT ON THE LIBRARY

BY E. S. PETERS

We have been occupied chiefly with routine matters during the past year, and have finished several pieces of work begun some two or three years ago. The work on Doctor Wheeler's large collection of pamphlets is done. The shelf-listing begun by a student worker two years ago was continued this year by another, Mr. Paul J. Allen, assigned to the library for the college year; with his help practically the entire collection of separate publications has been gone over shelf by shelf. With similar help during the coming year we hope to go over the files of serials. We have worked on the state geological survey publications of the United States, finding some duplicates and some things which had never been properly catalogued. After checking over our set of the publications of the Geological Survey of Great Britain we ordered from England most of the parts which are not here in the University, to be purchased with Whitney funds.

Professor William Morris Davis, who died in California in February, has for years given us a large number of serials as well as reprints and separates. As a member of many American and foreign scientific societies he has received their publications and turned them over to our library. Now that we shall no longer be receiving these, we have subscribed ourselves to a few constantly used here by our staff; a good number of the rest are received regularly at Widener Library or in Boston.

About two years ago the Department of Geology transferred to us some of the late Professor Jay B. Woodworth's books and pamphlets. These were sorted, classified and catalogued during the year.

While we are still unable, for want of funds, to purchase as many books as we did a few years ago, our accessions continue at about their normal rate due to generous friends, both within and without the Museum, and to our exchanges. Mr. Barbour and many others of the Museum Staff continued to turn over regularly

to the library certain journals and many reprints; from the college library we received over four hundred volumes and pamphlets. Mrs. John E. Thayer gave us a number of pamphlets, chiefly on birds, and several old oölogy journals, which belonged to Mr. Thayer. In addition to many other purchases for the library Dr. Barbour bought for us a copy of Ognev's "Mammals of Eastern Europe and of Northern Asia," a two-volume work in Russian, rare in this country.

The last of our "travel books" to be deposited in the Geographical Institute were sent over to them in January—245 volumes in this lot, bringing the total to 595.

We bound a few more books than last year, 369 volumes in all; nearly all of them were current serials, but a few were the much-used text books which showed signs of hard use. The number of books which we kept "on reserve" during the reading periods was larger this year than ever—nearly 175.

Members of the Museum Staff borrowed 1,437 books this year, students and professors 4,914, and other libraries 62—making our total circulation, 6,413.

Accessions from August 1, 1933 to July 31, 1934 were 1,161 volumes and 2,996 pamphlets; our present total is now 75,060 volumes 93,063 pamphlets.

PUBLICATIONS

FOR THE YEAR 1933-1934

(1 August, 1933-31 July, 1934)

Museum of Comparative Zoölogy

Publications.—The following have been printed during the year.**BULLETIN:** —

Vol. LXXIV

No. 7. Reports on the Scientific Results of an Expedition to the Southwestern Highlands of Tanganyika Territory. VII. Herpetology. By Arthur Loveridge. 221 pp., 3 pls. October, 1933.

Vol. LXXV

No. 6. Reports on the Scientific Results of an Expedition to the Southwestern Highlands of Tanganyika Territory. VI. Parasitic Nematodes from East Africa and Southern Rhodesia. By J. H. Sandground. 34 pp., August, 1933.

No. 7. Bird Remains from the Oligocene Deposits of Torrington, Wyoming. By Alexander Wetmore. 18 pp., October, 1933.

No. 8. Howler Monkeys of the Palliata Group. By Barbara Lawrence. 42 pp., November, 1933.

No. 9. Three New Cuban Millipeds with Notes on Two Little-known Species. By H. F. Loomis. 10 pp., 1 pl. November, 1933.

No. 10. The Ornithology of Guerrero, Mexico. By Ludlow Griscom. 57 pp., 1 pl. January, 1934.

Vol. LXXVI

No. 1. Contributions to the Stratigraphy and Palaeontology of the Goshen Hole Area, Wyoming. I. A Detailed Study of the Structure and Relationships of a New Zalambdodont Insectivore from the Middle Oligocene. By Erich M. Schlaikjer. 27 pp., 1 pl. November, 1933.

No. 2. Studies of Myctophinae in the Museum of Comparative Zoölogy. I. Revision of Type Specimens. II. Myctophinae Collected by C. O'D. Iselin in the North Atlantic in 1928. By A. E. Parr. 28 pp., May, 1934.

No. 3. A Second Revision of the Ants of the Genus *Leptomyrmex* Mayr. By William Morton Wheeler. 52 pp., June, 1934.

No. 4. The Anoles. II. The Mainland Species from Mexico Southward. By Thomas Barbour. 37 pp., June, 1934.

MEMOIRS: —

Vol. LII

Geography and Geology of the Region Including Cape Cod, The Elizabeth Islands, Nantucket, Marthas Vineyard, No Mans Land and Block Island. By J. B. Woodworth and Edward Wigglesworth. 338 pp., 38 pl. July, 1934.

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