





ANNUAL REPORT
OF
THE DIRECTOR
OF THE
MUSEUM OF COMPARATIVE ZOOLOGY
AT HARVARD COLLEGE
TO THE
PRESIDENT AND FELLOWS OF HARVARD COLLEGE
FOR
1923-1924.

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

1924.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE EASTERN TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM OCTOBER, 1904, TO MARCH, 1905, LIEUTENANT COMMANDER L. M. GARRETT, U. S. N., COMMANDING, IN PREPARATION:—

R. P. BIGELOW. The Stomatopods.
O. CARLGREN. The Actinaria.
W. R. COE. The Nemerteans.
H. J. HANSEN. The Cirripeds.
W. E. HOYLE. The Cephalopods.
P. KRUMBACH. The Sagittae.

G. W. MÜLLER. The Ostracods.
MARY J. RATHBUN. The Crustacea
Decapoda.
G. O. SARS. The Copepods.
— Pteropods, Heteropods.

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REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE: —

THE staff of the Museum consists of a Director, eight Curators, two Associate Curators, and a Preparator. The two Associate Curators and three of the Curators serve without remuneration, and another Curator is an officer of instruction in the University, giving somewhat more than half of his time to work not solely in the interest of the Museum.

It requires no exaggeration to show that the number of Curators is wholly inadequate if the present collections and the departments now without Curators are to be efficiently cared for and developed. The most urgent needs are active Curators for Mollusca, Crustacea, and Vertebrate Palaeontology.

The disadvantages under which much of the curatorial work is carried on, owing to lack of room and equipment, is also deplorable. To note specifically a single instance: — the collection of invertebrate fossils was considered twenty or more years ago to be well provided for a normal increase and development. Appointed Curator in 1912, Professor P. E. Raymond has by his knowledge, persistence, and in great measure by his personal field-work, so increased the collection that four large rooms are overcrowded with classified material awaiting distribution, and large accumulations as yet unstudied. These additions are not duplications, but are in large part from faunas unrepresented or poorly represented in previously acquired collections.

The same condition prevails with the collections of lower vertebrates, birds, mammals, and with many groups of invertebrates.

As noted several years ago, the only betterment of Museum research facilities involves the elimination or further curtailment of laboratory work in the Museum; a realization of the former would lessen the natural anxiety felt for the safe preservation of absolutely irreplaceable collections, collections that should be free from the dangers unavoidable with present-day experimental work.

Professor Raymond has continued his successful field-work in New England and Canada; he secured large series of fossils of the Silurian, Ordovician, and Cambrian periods; some of these prove to be undescribed, very many are rare and new to the Museum collection. An opportune discovery at Waterville, Maine, shows that the shales are of Middle Silurian age. Professors Charles Schuchert and E. H. Perkins furthered Professor Raymond's work.

During a brief stay in Bermuda, Mr. Sayles found three fossil soils, his preliminary study convincing him that "they record interglacial episodes of the Pleistocene period," but that a definite conclusion can be made only after additional field-work. In Bermuda and in the subsequent study of the material collected, Mr. Sayles had the assistance of Dr. T. H. Clark. At Ingonish, Cape Breton, Mr. Sayles found some beds of Carboniferous age that suggested a glacial origin.

Dr. Thomas Barbour spent four months, January-April, in the West Indies and Central America, mostly in the Canal Zone, (Barro Colorado Island), where, aided by Dr. Edward Wigglesworth and Mr. W. S. Brooks, large series of reptiles and amphibians were obtained.

Mr. Banks also collected insects and arachnids, "fully 8,000 specimens," during June and July, chiefly on Barro Colorado Island. Messrs. J. B. Shropshire and James Zetek, residents at Ancon, were most helpful in the work in the Canal Zone, and we have to thank the United Fruit Company for many courtesies received from its officials.

Dr. G. M. Allen completed his study for a revision of the genus *Myotis*, and his manuscript has been forwarded to Mr. G. S. Miller, Jr., the joint-author of the revision, to be issued by the United States National Museum. In continuation of his work upon the mammals collected by the Asiatic expeditions of the American Museum of Natural History, he has finished his study of the bats, insectivores, and two groups, (Cricetinae and Microtinae), of the Muridae.

In his curatorial work Dr. Allen has arranged, catalogued, and so far as possible identified the year's accessions, aided the research

work of several students, and attended to the usual loans and exchanges.

Mr. James L. Peters has entered in the card catalogue of the skins of recent birds, begun in March, 1923, the Museum series of 14 families, 319 species, and 10,064 specimens; the total catalogued to 1 August, 1924 is 36 families, 791 species, and 17,600 specimens. Mr. Peters has also aided Mr. Bangs in the general work of the ornithological department.

Dr. H. L. Clark's work for the Museum was transferred from Cambridge to London, where for many weeks, April-July, he was given every possible courtesy and facility for the study of the collection of Recent Echini in the British Museum. He will prepare for publication an illustrated catalogue of their collection. It is hoped to give other Curators from time to time a similar opportunity for study in British and Continental museums.

The time of the Museum Preparator has been occupied, as usual, with the taxidermic, mechanical, and photographic work incidental to his position. A finely mounted specimen of the Lake Sunapee Trout, (*Salvelinus aureolus* Bean), a gift of Dr. E. P. Stickney, has been added to the exhibition collection of North American fishes; Mr. Nelson's principal work, however, has been the mounting of the large fossil ungulate, *Moropus elatus* Marsh; this work is well under way and the specimen will be a notable addition to the Museum's inadequate series of Tertiary mammals.

The Museum is indebted to Miss E. B. Bryant and Mr. T. E. Penard for their work upon the collections of spiders and birds.

By far the most valuable single accession of the year is a finely mounted specimen of the Great Auk, (*Plautus impennis* Linné), the gift of Dr. Thomas Barbour. This specimen, (7 of Grieve's record), belonged to the Hoy collection for many years at Boyle Court, Essex, England; it supplies the one lacuna in the Museum's Great Auk material, the collection already containing a unique mummy, an excellent egg, (65 of Grieve's record), a cast of the "Troughton" (Garvagh) egg, painted by Archibald Thorburn, an unrivalled series of skeletons, and a very large series of skeletal remains. To the research series of birds Dr. Barbour has given several large and well-identified collections, as well as very many

rare and desirable single specimens; among the former, series from China, East Africa, and Argentina, collections of Sun-birds, of Humming-birds, and the Swann collection of Accipitres may be mentioned. His other donations include mammals from the phosphate beds of South Carolina, (given jointly with the Misses and the Rev. F. de J. Frost), from Porto Rico, and from Panama, and large series of reptiles, amphibians, and insects.

The Museum has to thank Miss Elizabeth Harris for much interesting entomological correspondence addressed to her father, the late Dr. T. W. Harris; especially to be noted is the holographic manuscript of John Abbot of Bullock Co., Georgia, entitled "Notes on my Life."

A letter of Frédéric de La Fresnaye, the gift of Mr. W. L. Sclater, is gratefully acknowledged.

The Museum is also indebted to

Mr. Arthur Loveridge for considerable series of mammals, fishes, also insects, and other invertebrates mostly from eastern Africa.

To the American Museum of Natural History for a fine series of teeth and limb-bones of Miocene and Pliocene horses.

To the U. S. Biological Survey for a skin and skull of the rare Laysan Seal, *Monachus schauinslandi* Matschie.

To Mr. F. H. Kennard for a valuable Mastodon tooth, (the "Aurora tooth" of Dr. J. C. Warren's *Mastodon giganteus*).

To Mr. R. H. Homer for an albino Pronghorn.

To Mr. John E. Thayer for many skins of birds, including a fine series of *Anas novimexicana* Huber.

To Mr. R. J. Tillyard for a finely mounted specimen of *Apteryx haasti* Potts.

To Dr. W. C. van Hearn for a series of skins of birds from Holland.

To Dr. Afranio do Amaral for many Brazilian snakes.

To Mr. A. S. Campbell for Chinese invertebrates.

To Prof. A. C. Kinsey for a series of Cynipidae.

To Mr. F. C. Bowditch for very many leaf-beetles, Chrysomelidae.

To Prof. J. W. Folsom for types of new species of Collembola.

To Mr. D. R. Pack-Beresford for a series of Irish spiders.

To Mr. C. B. Wilson for an identified series of Copepods.

To Mr. W. F. Clapp for types of recently described species of *Teredo*.

To the Bishop Museum, Echinoderms.

To the South African Fisheries Board, Echini.

To Dr. T. H. Clark for the types of nine genera and 45 species of Cambrian and Ordovician invertebrates.

To Mr. J. A. MacDowell for fossils from the Pennsylvanian and Ordovician of Oklahoma.

To Dr. Edward Wigglesworth for Tertiary fossils from the Canal Zone.

To Dr. W. B. Long for a core of laminated Capitan limestone.

Additions for which separate mention should be made include: — a collection of skins and skulls of mammals from San Luis Potosi, Mexico (purchase); skeleton of *Stenodelphis blainvillii* Gervais (exchange); Arachnida, Myriopoda, and Isopoda (purchase); Tertiary fossils from California (purchase).

Dr. T. Wayland Vaughan has returned a portion of the Gabb collection of corals from the Dominican Republic, which he has had for many years; the remaining specimens are held pending the publication of his report. He also writes that he has been unable to work up the corals from the elevated reefs of the Fijis, sent to him by Mr. Agassiz, and that the collection is retained, for the present, as Dr. J. Edward Hoffmeister expects to take up his unfinished work upon corals.

The collection of alcyonarian corals collected by the BLAKE during the cruises of 1877, 1878, 1879, and 1880 has been returned by Professor Verrill; his report, the final BLAKE report, a voluminous manuscript of more than 900 pages, involves much editorial revision.

The Library contains 62,044 volumes, and 68,759 pamphlets; 984 volumes and 1,794 pamphlets have been received during the year.

The publications for the year include five numbers of the Bulletin, one number of the Memoirs, and the Annual Report, a total of 526 (116 quarto and 410 octavo) pages, illustrated by 38 (12 quarto and 26 octavo) plates.

Though not the place for even a brief valuation of Dr. John C. Phillips's Monograph of the Ducks, the issuance of the second volume in November, 1923, justifies a record of satisfaction that so admirable a contribution to science may be considered, in some measure, a Museum credit.

The William and Adelaide Barbour Fund has been increased to \$15,000. — a gift of \$5,000. having been received from Dr. Thomas Barbour.

SAMUEL HENSHAW,
Director.

REPORT ON THE MAMMALS.

BY OUTRAM BANGS.

During the past year 649 specimens have been added, divided as follows:—skins or skeletal parts 267, alcoholics 138, fossils 244.

The largest single accession is a series of 126 fossils from South Carolina presented by the Misses and the Rev. F. Le J. Frost and Dr. Thomas Barbour. Dr. Barbour likewise presented some fossils from Porto Rico and small lots of skins with skulls from Panama and Scotland, also two Bottlenose Whales.

From the American Museum of Natural History were received 96 specimens of fossil horses belonging to several genera and a series of bats from China, 38 alcoholics and 42 skins.

By purchase, (William and Adelaide Barbour Fund), a series of 76 skins with skulls from San Luis Potosi, (W. W. Brown collector), was received.

Single specimens or small series have been received from Messrs. B. H. Cornell, C. P. Curtis, Jr., R. T. Fisher, H. Friedmann, A. B. Howell, C. W. Johnson, J. R. Johnson, A. V. Kidder, F. C. Kirkwood, Arthur Loveridge, S. J. Mixter, George Nelson, T. E. Penard, J. L. Peters, George Schwab, the Peabody Museum of American Archaeology and Ethnology, and the U. S. Biological Survey.

REPORT ON THE BIRDS.

BY OUTRAM BANGS.

During the year 3,533 specimens were received.

Through the generosity of Dr. Thomas Barbour, who has taken much interest in the Department, the larger part of the accessions has been acquired. Besides many small lots and single skins, he has presented a fine Great Auk, the Swann collection of Accipitres, 471 skins, 10 types; 684 skins (Rosenberg), species and subspecies new to the collection; 336 Humming birds; 73 Sunbirds; 92 skins, Chinese collection (H. Weigold); 360 skins, East Africa (Arthur Loveridge); 288 skins, Argentina (H. Friedmann); and several small series of skins from Chile, Cuba, and the Canary Islands.

Dr. W. C. Van Heurn most generously presented a series of about 300 skins which he had collected in Holland.

Col. John E. Thayer has presented 43 skins, including a fine series of *Anas novimexicana*.

By purchase, (William and Adelaide Barbour Fund), 131 skins were obtained; 60 other specimens have also been purchased.

Single specimens or small lots have been presented by Messrs. A. M. Bailey, H. B. Bigelow, H. S. Blair, R. T. Fisher, Conover Fitch, E. H. Forbush, A. O. Gross, F. H. Kennard, George Nelson, J. L. Peters, J. C. Phillips, H. C. Robinson, W. Rowan, E. H. Thompson, C. W. Townsend, W. E. Wall, Josselyn Van Tyne, the Field Museum of Natural History, and the Philippine Bureau of Science.

Forty-three genera new to the collection have been added during the year and the Museum series now contains approximately one half of the known species and subspecies of the birds of the World.

As usual, many specimens have been lent and exchanges made with other Museums, ornithologists, and private collectors.

Mr. J. L. Peters, who is working on a card catalogue of the collection does much general work in the Department.

Dr. J. C. Phillips, Messrs. T. E. Penard, and F. H. Kennard continue their interest to the advantage of the Department.

REPORT ON THE REPTILES AND AMPHIBIANS.

BY THOMAS BARBOUR.

This year has been eventful in that during its course the Arthur Loveridge African collection was received, and Mr. Loveridge arrived to assist in a general overhauling of the study series. The Loveridge collection was divided with the University of Michigan Museum of Zoölogy. The census of species this year shows only a small gain over last year's. This, however, is due to the fact that many synonyms were recognized in the card index and most of these have now been eliminated. I was absent some months in Central America last winter, and while personally busied with the construction of the Research Laboratory on Barro Colorado Island in the Canal Zone, I had some time for collecting, whereas my companions, Mr. W. S. Brooks and Dr. Edward Wigglesworth, gathered extensive series of reptiles and amphibians. Mr. James Zetek and Mr. J. B. Shropshire, who reside at Ancon, greatly aided our work there. Our thanks are also due the officials of the United Fruit Company for many courtesies while in Jamaica, Costa Rica, and Honduras. Several weeks were spent at the Harvard Biological Institute, (Atkins Foundation), at Soledad, during the construction of the Laboratory building there, and Professor E. R. Dunn passed the summer at Soledad studying the local Amphibia, observing specially the breeding habits.

Specimens were received from the following sources:—

The Colorado Museum of Natural History, the New York Zoölogical Park, the United States National Museum, Dr. Afranio do Amaral, Mr. H. S. Blair, Prof. C. T. Brues, Dr. Herbert Clark, Mr. C. P. Curtis, Jr., Dr. H. Friedmann, Mrs. F. B. Manning, Dr. S. J. Mixter, Messrs. T. E. Penard, Oliver Ricketson, Drs. G. Stahel, Carlos de la Torre, Col. J. Wall, and Dr. James Zetek.

Material was purchased from:—

Messrs. C. S. Brimley, W. W. Brown, Rev. J. Graham, Brother

Niceforo Maria, Sr. Carlos A. Reed, Mr. W. F. H. Rosenberg, Dr. Malcolm Smith, Mr. Percy Viosca, and Dr. W. Wolterstorff.

Exchanges were received from the following institutions:

Academy of Natural Sciences, Philadelphia, British Museum (Natural History), Field Museum of Natural History, Instituto Butantan, São Paulo, Brazil, Museu Paulista, São Paulo, Brazil, Muséum d'Histoire Naturelle, Paris, North Carolina Division of Entomology, and University of Michigan Museum of Zoölogy.

Material to complete exchanges was sent to:

Academy of Natural Sciences, American Museum of Natural History, Field Museum of Natural History, Instituto Butantan, Mr. H. Munt, Museu Paulista, Muséum d'Histoire Naturelle, North Carolina Division of Entomology, Senckenbergische Naturforschende Gesellschaft, and University of Michigan Museum of Zoölogy.

A census of the collection is appended hereto:—

	Genera	Species	Gain Genera	Gain Species
Rhynchocephalia	1	1	0	0
Crocodylia	6	19	0	1
Chelonia	45	150	4	3
Lacertilia	234	1,346	8	29
Ophidia	158	1,045	9	25
Amphibia Apoda	11	23	1	4
“ Urodela	35	142	0	2
“ Salientia	126	788	11	57
	—	—	—	—
Totals	616	3,514	33	121

BUFO 96, HYLEA 117, RANA 142.

REPORT ON THE FISHES.

BY SAMUEL GARMAN.

In the years 1923-1924 the greater part of the work done on the Fishes has been for the general betterment of the collection. It included much replenishment of alcohol and a considerable reduction in bulk by destruction of useless or inferior duplicates. Researches among rare forms accumulated in past years accounts somewhat satisfactorily for a considerable work.

Donations were received from Dr. Thomas Barbour and from Messrs. L. C. Jones, Arthur Loveridge and J. B. Shropshire.

REPORT ON THE ENTOMOLOGICAL DEPARTMENT.

BY NATHAN BANKS.

Additions to the collection were received from Miss E. B. Bryant and Messrs. J. M. Aldrich, C. F. Baker, H. S. Barber, Thomas Barbour, F. C. Bowditch, L. D. Buchanan, F. H. Chittenden, T. D. A. Cockerell, J. W. Folsom, C. A. Frost, B. B. Fulton, C. B. Garrett, L. G. Gentner, O. A. Johannsen, C. W. Johnson, C. H. Kennedy, A. C. Kinsey, J. H. McDunnough, C. E. Mickel, A. P. Morse, C. H. Paige, L. W. Swett, T. E. Snyder, Roland Thaxter, and W. M. Wheeler.

The more noteworthy are the Cynipidae from Professor Kinsey, the Spanish insects from Dr. Barbour, and the beetles from Mr. Bowditch.

The Curator spent about two months in Panama and collected fully 8,000 specimens of insects and arachnids.

Eight boxes of Ichneumonidae loaned some years ago to Mr. Viereck were returned partly named; various smaller loans have also been returned. Some large Hydrophilidae were loaned to Mr. E. A. Richmond.

Besides the usual local visitors, ten other entomologists visited the collection.

Two inspections of the collection show that it is practically free from infestation.

Neuroptera were named for the Boston Society of Natural History, the Peabody Museum (Salem), the Nova Scotia Department of Agriculture; the Neuroptera and Arachnida of the Williams Galapagos Expedition were identified and described.

Collection labels were placed on many thousand of Morse Orthoptera, species labels on many Diptera and Hymenoptera, and about 200 types were verified and marked.

Part of the Hymenoptera were put into Schmitt boxes, and other

families worked over, preparatory to transfer. About half of the named material in the several collections of Chrysomelidae given by Mr. Bowditch have been united into one series. The valuable lot of Odonata received last year from Mr. Williamson has been mounted and distributed for the most part.

The visit of Mr. E. A. Schwarz, formerly an assistant with Dr. Hagen, furnished numerous clues to the sources of material, especially in the Le Conte collection.

An arrangement of the neuropteroid insects, (except Termites and Odonata), was completed. A census of this portion of the collection, (one of the smallest groups), follows:—

Embiidae	92 specimens,	17 species,	9 types
Psocidae	2,537	283	179
Perlidae	3,231	288	151
Ephemeridae	3,296	238	111
Mecoptera	1,186	97	28
Neuroptera	9,394	1,192	531
Trichoptera	14,193	1,188	688
Totals	33,929	3,303	1,697

There is also much alcoholic and biologic material not considered in the above census.

REPORT ON THE MYRIOPODS, ARACHNIDS, AND WORMS.

BY RALPH V. CHAMBERLIN.

As usual, many small collections of spiders and myriopods were received from various sources and were identified, such material becoming in whole or in part the property of the Museum. Much material was received in this way from the U. S. Horticultural Board, U. S. Department of Entomology, and the Bureau of Biological Survey. Mr. V. M. Tanner sent additional spiders from Utah, Mr. J. C. Chamberlin various arachnids from California, and Dr. T. E. Snyder several lots of arachnids and myriopods taken chiefly from termite nests in Panama. The myriopods taken by the Williams Galapagos Expedition, received through Director William Beebe, were identified and reported upon. Further material was received from the Alpine Laboratory of the Carnegie Institution in Colorado through Mr. G. W. Goldsmith.

Most of my working time has been given to study and preparation of a report upon the myriopods collected by the Belgian Congo Expedition of the American Museum of Natural History.

For several weeks in the spring, collecting was carried on in southwestern Utah, chiefly in Washington County; but owing to the accidental loss of outfit, most of the field-work planned for the year was abandoned. After returning to Cambridge, the concluding weeks of the year were occupied in cataloguing and interpolating recent additions to the myriopod collection.

Mr. A. S. Campbell presented to the Museum a collection of worms, arachnids, and myriopods, taken by him in the vicinity of Canton, China. The annelids of this collection have been identified. Material from China was also received from Mr. C. Ping. Mr. H. F. Loomis sent chilopods from Arizona, and larger collections of arachnids and myriopods, not as yet studied, were

received from the following sources:— Professor W. C. Allee, from Barro Colorado Island, Panama; the Field Columbian Museum, from Central America by Mr. W. Schmidt; Professor Dayton Stoner, from New Zealand; Illinois Natural History Survey, (through Mr. T. H. Frison), their entire collection of myriopods; Mr. E. Jacobson, myriopods from Sumatra; Raffles Museum, (through Mr. C. Boden Kloss), myriopods from Malay Peninsula; Tropical Station of New York Zoölogical Society, (through Mr. John Tee-Van), myriopods from British Guiana; U. S. Bureau of Biological Survey, a large collection of spiders from all parts of the United States.

REPORT ON THE ECHINODERMS.

BY HUBERT LYMAN CLARK.

The first two thirds of the year was devoted chiefly to the study of collections submitted for identification by the South African Fisheries Board; the Bishop Museum, Honolulu; the Naturhistoriska Riksmuseum, Stockholm; the Australian Museum, Sydney; and the South Australian Museum, Adelaide. Excepting only the last, reports on this material have been completed and submitted for publication, and series of specimens have been incorporated in the Museum collection.

The last third of the year was spent in London in studying the Recent Echini of the British Museum, and I wish to record my gratitude to the authorities of the British Museum for their cordial welcome and unfailing coöperation.

The accessions of the year were only 210 specimens, but they represent 87 species of which 11 were new to the collection; one of the new species belongs to a genus not hitherto represented. The most important lot was contributed by Dr. J. D. F. Gilchrist, for the South African Fisheries Board, and consisted of 39 sea-urchins, representing 20 species, of which 4 were new to the collection. The Bishop Museum, Honolulu, presented 44 specimens of 23 species, of which 2 were new. Other donors, to whom thanks are due, are the Australian Museum, the South African Museum, Drs. Thomas Barbour, and René Koehler, Professor C. H. O'Donoghue, Messrs. A. S. Campbell, R. M. May and George Nelson.

REPORT ON THE COELENTERATES.

BY HENRY B. BIGELOW.

The Museum is indebted to Mr. A. S. Campbell for an interesting collection of Chinese hydroids, actinians, and alcyonarians, from the vicinity of Amoy. The considerable series of BLAKE Alcyonaria, which has been in Professor A. E. Verrill's care for many years, has been returned.

As in past years, the Museum has coöperated with the U. S. Bureau of Fisheries in the investigation of biologic and oceanographic problems in the Gulf of Maine. The tagging of Cod and other fish, undertaken last year has been continued by the Fisheries Steamer HALCYON during the current season, under the direction of Mr. W. C. Schroeder, of the Bureau. Up to date nearly 15,000 fish have been tagged in New England waters. Approximately 3% of the fish tagged in 1923 have been recaptured and reported, throwing important light on the migrations of the Cod in the general region.

During August, 1923, the HALCYON released drift-bottles on three lines in the gulf of Maine, in continuance of the campaign inaugurated in 1922, and enough recoveries have been made to clarify the circulation of the Gulf. Bottles were also put out in Vineyard Sound during the early summer of 1924; and serial temperatures have been taken in different months at representative localities, to amplify the earlier cruises.

In connection with the International Ice Patrol of the Grand Banks, Lieut. Commander E. H. Smith, U. S. C. G., published as Bulletin 11, U. S. Coast Guard, the report on the oceanographic investigations carried out by the patrol during 1923. Mr. P. E. Pieris made a preliminary survey of the euphausiids and amphipods collected in the region of the Grand Banks, during 1921 and 1922.

During the spring Lieut. Commander Smith was successful in measuring the salinity of the seawater, on board the Patrol Cutter, by electric conductivity, using apparatus perfected by the U. S. Bureau of Standards.

Most of my time has been devoted to the general reports on the biology and oceanography of the Gulf of Maine (*cf. Report, M. C. Z.*, 1921-1922, p. 18). The report on the fishes is now in press; the report on the plankton has been handed in for publication; and that on the physical oceanography, completing the series, is well advanced.

REPORT ON INVERTEBRATE PALAEOLOGY.

BY P. E. RAYMOND.

The Curator, in company with Prof. Charles Schuchert, spent two weeks in August in northwestern Vermont, where numerous fossils were collected from Lower and Upper Cambrian and Lower Ordovician strata. Nearly all the specimens were obtained from localities recently discovered by Dr. Arthur Keith and Professor Schuchert, and were new to the collections. A day devoted to the Middle Ordovician conglomerates at Mystic, Quebec, yielded a large suite of very rare species, some of which proved to be undescribed.

In September, a visit of ten days' duration to central Maine, again with Professor Schuchert, was devoted to an effort to find fossils which would determine the age of some of the shales of that region. Collections were secured near Waterville and at Monson. Prof. E. H. Perkins of Colby College and the Curator were fortunate in discovering graptolites which show that the shales at and near Waterville are Middle Silurian in age.

In October, a short trip was made to Princeton, N. J., and Washington, D. C., for the purpose of studying certain collections from northwestern Vermont, and a day was spent in visiting the newly discovered locality for tracks of dinosaurs in the Triassic at Aldie, south of Leesburg, Va.

The identification, labeling, and description of the collections made during the summer occupied the greater part of the winter months. A paper on the new trilobites from Vermont was revised and completed, and has been published. Some time was also spent in the revision and completion of the report on the trilobites of the Middle Ordovician of the Appalachians.

Dr. T. H. Clark finished his studies of the faunas of the Cambrian and Ordovician formations at Lévis, Quebec. His work has

added to the collections the types of 9 genera and 51 species, distributed as follows:— Graptolites, 2 genera, 4 species; Cystoidea, 1 genus and species; Conodonts, 7 species; Worms, 1 species; Brachiopoda, 12 species; Gastropoda, 1 species; Cephalopoda, 1 species; Trilobita, 6 genera, 23 species; Cirripedia, 1 species.

Other accessions during the year were two lots of Pennsylvanian and Cretaceous fossils from Oklahoma, the gift of Mr. J. A. MacDonell, and Tertiary fossils from the Canal Zone, Panama, donated by Dr. Edward Wigglesworth.

REPORT ON THE GEOLOGICAL COLLECTIONS.

BY R. W. SAYLES.

The most important accessions of the year were obtained during a trip to Bermuda in January. Over fifty small boxes of fossils, mainly land forms, and over fifty bottles of soil samples were collected.

In addition to the land fossils there are numerous wind-blown Foraminifera and a few wind-blown marine Mollusca in the soils, and in one locality some pieces of carbonized wood.

Dr. T. H. Clark accompanied the Curator and aided in the study of the fossil soils. Three distinct soils were found:—at St. Georges, at Kyber Pass five miles southeast of Hamilton, and three at Hamilton the Curator believes. Two distinct soils were found at other places. These soils record interglacial episodes of the Pleistocene period in the opinion of the Curator.

Dr. Clark has identified the fossils and finds that although they are much the same in the middle and upper soils, the middle soil has several forms not found in the upper. The lowest soil has few fossils and in most cases none. He has proved that no rocks above sea level in Bermuda are older than the Pleistocene.

The Foraminifera have not been identified and Professor Jeffrey has not reported on the wood.

Miss Helen E. Vassar has analyzed six typical soil samples.

Another visit to Bermuda will be necessary to arrive at decisive conclusions concerning the interglacial nature of the soils.

Professor Charles Palache gave a glaciated slab of Rockport granite, and Dr. W. B. Lang a splendid core of laminated Capitan limestone, taken 1,200 feet below the surface at Culverston County, Texas. Layers are so even as to suggest seasonal origin.

A panoramic view, 19 feet long, of the Alps from the summit of Mount Blanc, made by Paul Helbronner from notes and photo-

graphs taken on July 26, 1891, August 15, 1893, August 18, 1893, and from a later survey with a theodolite, in various years between 1903 and 1919, has been installed in the room devoted to Geography.

In July, the Curator visited Cape Breton. At Ingonish, in rocks of Carboniferous age, some beds were found which strongly suggest a glacial origin.

There are two distinct Pleistocene tills at Ingonish: a lower dark boulder clay and an upper sandy till with numerous striated boulders.

At the Washington meeting of the Geological Society of America in December, the Curator gave a paper on the variations of the summer components of glacial varves, and one on the fossil soils of Bermuda. In April, a report on the progress of the studies of seasonal deposition in glacial sediments for 1923 was sent to the Committee on Sedimentation of the National Research Council.

REPORT ON THE LIBRARY.

During the Museum year from August 1, 1923, to July 31, 1924, inclusive, 984 volumes, 2,215 parts of volumes, and 1,794 pamphlets have been added to the Library.

The total number of volumes in the Library is 62,044 the total number of pamphlets is 68,759.

One hundred and thirty-six volumes have been bound; one thousand five hundred pamphlets have been separately bound.

From the Harvard College Library, the Museum has received 194 titles; other contributors are Nathan Banks (218 titles), Samuel Henshaw (205 titles), W. M. Davis (155 titles), W. M. Wheeler (147 titles), E. L. Mark (140 titles), Outram Bangs (77 titles), Thomas Barbour (54 titles), R. T. Jackson (32 titles), Peabody Museum of American Archaeology and Ethnology (21 titles).

PUBLICATIONS

FOR THE YEAR 1923-1924.

(1 AUGUST, 1923 — 31 JULY, 1924).

MUSEUM OF COMPARATIVE ZOOLOGY.

BULLETIN:—

Vol. LXV.

No. 11. Some Mollusca from the Solomon Islands. By William F. Clapp. 70 pp. 5 plates. November, 1923.

No. 12. Descriptions of new neuropteroid insects. By Nathan Banks. 38 pp. 4 plates. January, 1924.

No. 13. The holothurians of the Museum of Comparative Zoology. The Synaptinae. By Hubert Lyman Clark. 46 pp. 12 plates. June, 1924.

No. 14. East Indian Collembola. By Justus Watson Folsom. 15 pp. 5 plates. June, 1924.

Vol. LXVI.

Part 1. The birds of the Lake Umbagog region of Maine. By William Brewster. 210 pp. June, 1924.

MEMOIRS:—

Vol. XLVII.

No. 4. Reports on the results of dredging under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78), in the Caribbean Sea (1878-79), and along the Atlantic coast of the United States (1880), by the U. S. Coast Survey Steamer "Blake," Lieut. Com. C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. XLVII. Les Porcellanides et des Brachyures. Par Alphonse Milne-Edwards et E. L. Bouvier. 116 pp. 12 plates. November, 1923.

REPORT:—

1922-1923. 31 pp. December, 1923.

ALLEN, G. M.

New Chinese bats. *Amer. mus. novitates*, 28 August, 1923, no. 58, 8 pp.

Additional remains of the fossil dugong of Florida. *Journ. mammalogy*, November, 1923, 4, p. 231-239, pl. 26.

A new disc-winged bat from Panama. *Proc. N. E. zööl. club*, 10 December, 1923, **9**, p. 1-2.

New Chinese insectivores. *Amer. mus. novitates*, 28 December, 1923, no. 100, 11 pp.

[The Nuttall ornithological club. Fiftieth anniversary]. *Auk*, January, 1924, **41**, p. 203-204.

Mammals from the MacMillan expedition to Baffin Land. [With Manton Copeland]. *Journ. mammalogy*, February, 1924, **5**, p. 7-12.

The type-specimen of *Saurocetus gibbesii* Agassiz. *Journ. mammalogy*, May, 1924, **5**, p. 120-121, pl. 16.

BANGS, OUTRAM.

The identity of *Trochilus ruckeri* Bourcier. [With T. E. Penard]. *Occ. papers Boston soc. nat. hist.*, 7 April, 1924, **5**, p. 77-78.

A new form of *Melanochlora sultanea* from Fukien. *Proc. N. E. zööl. club*, 19 June, 1924, **9**, p. 23.

BANKS, NATHAN.

Arachnida of the Williams Galapagos expedition. *Zoologica*, 27 February, 1924, **5**, p. 93-99.

See also p. 27, *Bull.* **65**, no. 12.

BARBOUR, THOMAS.

Another new Bahaman Iguana. *Proc. N. E. zööl. club*, 30 November, 1923, **8**, p. 107-109, pl. 1, 2.

A new Pipa. *Proc. N. E. zööl. club*, 20 December, 1923, **9**, p. 3-5, pl. 1, 2.

The friends of medical progress. *Science*, 21 December, 1923, **58**, p. 507-509.

A check list of North American amphibians and reptiles. Ed. 2. [With Leonhard Stejneger]. Cambridge, etc., 1923, 10, 171 pp.

Two noteworthy new lizards from Panama. *Proc. N. E. zööl. club*, 4 January, 1924, **9**, p. 7-10.

An historic crocodile skull. *Copeia*, January, 1924, no. 126, p. 16.

CHAMBERLIN, R. V.

On four termitophilous millipeds from British Guiana. *Zoologica*, 1 October, 1923, **3**, p. 411-421, 3 pls.

An Algerian julid in America. *Proc. Biol. soc. Washington*, 19 December, 1923, **36**, p. 191-192.

The occurrence of diplopods in the human alimentary tract, with notes on two new cases. *Journ. parasitol.*, December, 1923, **10**, p. 95-98.

The northern range of the scorpion. *Science*, 18 January, 1924, **59**, p. 64.

A new freshwater nereid from China. *Proc. Biol. soc. Washington*, 21 February, 1924, **37**, p. 79-82.

Chilopods of the Williams Galapagos expedition. *Zoologica*, 27 February, 1924, **5**, p. 137-141, 1 pl.

The spider fauna of the shores and islands of the Gulf of California. *Proc. Cal. acad. sci.*, 14 April, 1924, ser. 4, **12**, p. 561-694.

A new milliped of the genus *Orthomorpha*, immigrant from the Philippine Islands. *Ent. news*, May, 1924, **35**, p. 173-174.

A new leptodesmoid milliped from Nicaragua. *Ent. news*, May, 1924, **35**, p. 174.

Descriptions of new American and Chinese spiders, with notes on other Chinese species. *Proc. U. S. nat. mus.*, 1924, **63**, art. 13, 38 pp., 7 pls.

CLARK, H. L.

Echinoderms from Lower California, with descriptions of new species: supplementary report. *Bull. Amer. mus. nat. hist.*, 5 October, 1923, **48**, p. 147-163.

Some holothurians from British Columbia. *Canad. field-nat.*, March, 1924, **38**, p. 54-57.

See also p. 27, *Bull.* **65**, no. 13.

PETERS, J. L.

A new race of *Spizitornis parulus*. [With Alexander Wetmore]. *Auk*, January, 1924, **41**, p. 144-146.

A second North American record for *Puffinus assimilis*. *Auk*, April, 1924, **41**, p. 337-338.

The type locality of *Alcedo cristata* Linné. *Auk*, April, 1924, **41**, p. 342-343.

[Charles Francis Jenney]. *Auk*, April, 1924, **41**, p. 386-387.

PHILLIPS, J. C.

A natural history of the ducks. Vol. 2. Boston, etc., 1923, 12, 409 pp., pl. 19-44, map 28-65.

RAYMOND, P. E.

New Upper Cambrian and Lower Ordovician trilobites from Vermont. *Proc. Boston soc. nat. hist.*, July, 1924, **37**, p. 389-466, pl. 12-14.

SAYLES, R. W.

Variability of summer deposition in glacial varves. (Abstract). *Bull. Geol. soc. Amer.*, March, 1924, **35**, p. 67-68.

Are some fossil soils in Bermuda recorders of interglacial episodes? (Abstract). *Bull. Geol. soc. Amer.*, March, 1924, **35**, p. 68-69.

Report on progress of studies on seasonal deposition in glacial sediments for 1923. *Rept. Comm. sedimentation, Nat. research council*. April, 1924, p. 33-39.

INVESTED FUNDS OF THE MUSEUM.

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE.

Gray Fund (1859)	\$50,000.00
Permanent Fund (1859)	117,469.34
Sturgis Hooper Fund (1865)	108,476.69
Humboldt Fund (1869)	9,605.28
Agassiz Memorial Fund (1875)	297,933.10
Teachers and Pupils Fund (1875)	7,594.01
Virginia Barret Gibbs Fund (1892)	8,531.88
Willard Peele Hunnewell Memorial Fund (1901)	5,635.84
Maria Whitney Fund (1907)	7,791.95
Alexander Agassiz Fund (1910)	99,500.00
Alexander Agassiz Expedition Fund (1910)	102,765.77
George Russell Agassiz Fund (1911)	50,000.00
George Russell Agassiz Fund. Special (1912)	50,000.00
Maria Whitney and James Lyman Whitney Fund (1912)	982.45
Louis Cabot Fund (1917)	6,272.87
Harvard Endowment Fund (1917)	1,000.00
William and Adelaide Barbour Fund (1923)	16,000.00
William Brewster Fund (1924)	60,115.86
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	\$999,675.04

The payments on account of the Museum are made by the Bursar of Harvard University, on vouchers approved by the Director. The accounts are annually examined by a committee of the Overseers. The income of funds which are restricted is annually charged in an analysis of the accounts, with vouchers, to the payment of which the incomes are applicable.

The income of the Gray Fund can be applied to the purchase and maintenance of collections, but not for salaries.

The income of the Humboldt Fund (about \$500.) can be applied for the benefit of one or more students of Natural History, either at the Museum, the United States Fish Commission Station at Woods Hole, the Stations at Bermuda, or the Tortugas.

The income of the Virginia Barret Gibbs Scholarship Fund, of the value of \$400., is assigned annually with the approval of the Faculty of the Museum, on the recommendation of the Professors of Zoölogy and of Comparative Anatomy in Harvard University, "in supporting or assisting to support one or more students who may have shown decided talents in Zoölogy, and preferably in the direction of Marine Zoölogy."

Applications for the tables reserved for advanced students at the Woods Hole Station should be made to the Faculty of the Museum before the 1st of May. Applicants should state their qualifications, and indicate the course of study they intend to pursue.

The income of the Whitney Funds can be applied for the care (binding) and increase of the Whitney Library.

The Alexander Agassiz Expedition Fund was bequeathed by Alexander Agassiz for the publication of reports on collections brought together by the expeditions with which he was connected.

The income of the Louis Cabot Fund can be applied to the purchase of books on travel, sport, and natural history.

The income of the William and Adelaide Barbour Fund is "expended wholly at the discretion of the Director of the Museum of Comparative Zoölogy* * * to increase the collections of the Museum either by exploration or the purchase of desirable material."

Three quarters of the income of the William Brewster Fund can be used for the salary of a competent ornithologist and one quarter "at the discretion of the Director of the Museum for the increase of the collection by purchase, or for the renewal or repair of the cases, or for the publication of matter contained in my manuscripts."

The following Publications of the Museum of Comparative Zoölogy are in preparation:—

Reports on the Results of Dredging Operations in 1877, 1878, 1879, and 1880, in charge of ALEXANDER AGASSIZ, by the U. S. Coast Survey Steamer "Blake," as follows:—

- A. MILNE EDWARDS and E. L. BOUVIER. The Crustacea of the "Blake."
A. E. VERRILL. The Alcyonaria of the "Blake."

Reports on the Results of the Expedition of 1891 of the U. S. Fish Commission Steamer "Albatross," Lieutenant Commander Z. L. TANNER, U. S. N., commanding, in charge of ALEXANDER AGASSIZ, as follows:—

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| K. BRANDT. The Sagittae. | H. J. HANSEN. The Schizopods. |
| K. BRANDT. The Thalassicolae. | — The Ascidians. |
| O. CARLGREN. The Actinarians. | S. J. HICKSON. The Antipathids. |
| W. R. COE. The Nemertean. | P. SCHIEMENZ. The Pteropods and Heteropods. |
| REINHARD DOHRN. The Eyes of Deep-Sea Crustacea. | H. B. WARD. The Sipunculids. |
| H. J. HANSEN. The Cirripeds. | |

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of ALEXANDER AGASSIZ on the U. S. Fish Commission Steamer, "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., commanding, as follows:—

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| G. W. MÜLLER. The Ostracods. | L. STEJNEGER. The Reptiles. |
| MARY J. RATHBUN. The Crustacea Decapoda. | T. W. VAUGHAN. The Corals, Recent and Fossil. |
| G. O. SARS. The Copepods. | |

PUBLICATIONS
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY
AT HARVARD COLLEGE.

There have been published of the BULLETIN Vols. I. to LIV., LVI., and LVIII. to LXV.; of the MEMOIRS, Vols. I. to XLII., and also XLIV. to XLVI., and XLVIII.

Vols. LV., LVII. and LXVI. of the BULLETIN, and Vols. XLIII., XLVII., XLIX., and L. of the MEMOIRS, are now in course of publication.

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 Explorations.

The following publications are in preparation:—

Reports on the Results of Dredging Operations from 1877 to 1880, in charge of Alexander Agassiz, by the U. S. Coast Survey Steamer "Blake," Lieut. Commander C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding.

Reports on the Results of the Expedition of 1891 of the U. S. Fish Commission Steamer "Albatross," Lieut. Commander Z. L. Tanner, U. S. N., commanding, in charge of Alexander Agassiz.

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of Alexander Agassiz, on the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., commanding.

Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific, in charge of Alexander Agassiz, on the U. S. Fish Commission Steamer "Albatross," from October, 1904, to April, 1905, Lieut. Commander L. M. Garrett, U. S. N., commanding.

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, Mass.





