ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE

FOR

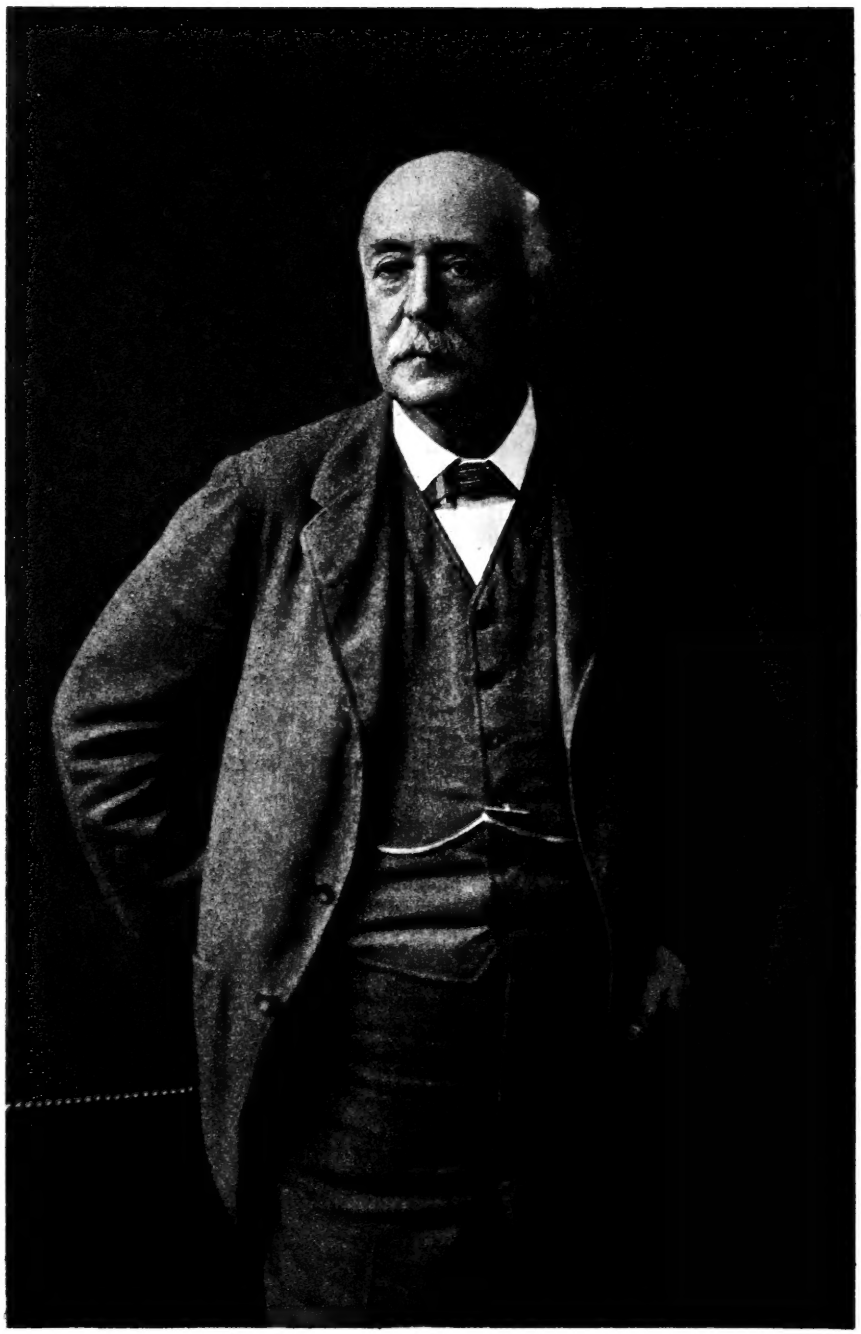
1909-1910.

CAMBRIDGE, U. S. A.:
PRINTED FOR THE MUSEUM.
1910.

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, PUBLISHED OR IN PREPARATION: —

A. AGASSIZ. V.[5] General Report on the Expedition.
A. AGASSIZ. I.[1] Three Letters to Geo. M. Bowers, U. S. Fish Com.
A. AGASSIZ and H. L. CLARK. The Echini.
H. B. BIGELOW. XVI.[16] The Medusae.
H. B. BIGELOW. The Siphonophores.
R. P. BIGELOW. The Stomatopods.
O. CARLGREN. The Actinaria.
S. F. CLARKE. VIII.[8] The Hydroids.
W. R. COE. The Nemerteans.
L. J. COLE. XIX.[19] The Pycnogonida.
W. H. DALL. XIV.[14] The Mollusks.
C. R. EASTMAN. VII.[7] The Sharks' Teeth.
W. G. FARLOW. The Algae.
S. GARMAN. XII.[12] The Reptiles.
H. J. HANSEN. The Cirripeds.
H. J. HANSEN. The Schizopods.
S. HENSHAW. The Insects.
W. E. HOYLE. The Cephalopods.
W. C. KENDALL and L. RADCLIFFE. The Fishes.
C. A. KOFOID. III.[3] IX.[9] XX.[20] The Protozoa.
P. KRUMBACH. The Sagittae.
R. VON LENDENFELD. XXI.[21] The Siliceous Sponges.
H. LUDWIG. The Holothurians.
H. LUDWIG. The Starfishes.
H. LUDWIG. The Ophiurans.
G. W. MÜLLER. The Ostracods.
JOHN MURRAY and G. V. LEE. XVII.[17] The Bottom Specimens.
MARY J. RATHBUN. X.[10] The Crustacea Decapoda.
HARRIET RICHARDSON. II.[2] The Isopods.
W. E. RITTER. IV.[4] The Tunicates.
ALICE ROBERTSON. The Bryozoa.
B. L. ROBINSON. The Plants.
G. O. SARS. The Copepods.
F. E. SCHULZE. XI.[11] The Xenophyophoras.
H. R. SIMROTH. The Pteropods and Heteropods.
E. C. STARKS. XIII.[13] Atelaxia.
TH. STUDER. The Alcyonaria.
JH. THIELE. XV.[15] Bathysciadium.
T. W. VAUGHAN. VI.[6] The Corals.
R. WOLTERECK. XVIII.[18] The Amphipods.
W. McM. WOODWORTH. The Annelids.

[1] Bull. M. C. Z., Vol. XLVI., No. 4, April, 1905, 22 pp.
[2] Bull. M. C. Z., Vol. XLVI., No. 6, July, 1905, 4 pp., 1 pl.
[3] Bull. M. C. Z., Vol. XLVI., No. 9, September, 1905, 5 pp., 1 pl.
[4] Bull. M. C. Z., Vol. XLVI., No. 13, January, 1906, 22 pp., 3 pls.
[5] Mem. M. C. Z., Vol. XXXIII., January, 1906, 90 pp., 96 pls.
[6] Bull. M. C. Z., Vol. L., No. 3, August, 1906, 14 pp., 10 pls.
[7] Bull. M. C. Z., Vol. L., No. 4, November, 1906, 26 pp., 4 pls.
[8] Mem. M. C. Z., Vol. XXXV., No. 1, February, 1907, 20 pp., 15 pls.
[9] Bull. M. C. Z., Vol. L., No. 6, February, 1907, 48 pp., 18 pls.
[10] Mem. M. C. Z., Vol. XXXV., No. 2, August, 1907, 56 pp., 9 pls.
[11] Bull. M. C. Z., Vol. LI., No. 6, November, 1907, 22 pp., 1 pl.
[12] Bull. M. C. Z., Vol. LII., No. 1, June, 1908, 14 pp., 1 pl.
[13] Bull. M. C. Z., Vol. LII., No. 2, July, 1908, 8 pp., 5 pls.
[14] Bull. M. C. Z., Vol. XLIII., No. 6, October, 1908, 285 pp., 22 pls.
[15] Bull. M. C. Z., Vol. LII., No. 5, October, 1908, 11 pp., 2 pls.
[16] Mem. M. C. Z., Vol. XXXVII., February, 1909, 243 pp., 48 pls.
[17] Mem. M. C. Z., Vol. XXXVIII., No. 1, June, 1909, 172 pp., 5 pls., 3 maps.
[18] Bull. M. C. Z., Vol. LII., No. 9, June, 1909, 26 pp., 8 pls.
[19] Bull. M. C. Z., Vol. LII., No. 11, August, 1909, 10 pp., 3 pls.
[20] Bull. M. C. Z., Vol. LII., No. 13, September, 1909, 48 pp., 4 pls.
[21] Mem. M. C. Z., Vol. XLI., August, September, 1910, 323 pp., 56 pls.



A. Agassiz

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MUSEUM OF COMPARATIVE ZOÖLOGY.

Faculty.

ABBOTT LAWRENCE LOWELL, *President.*

HENRY P. WALCOTT. GEORGE L. GOODALE.

SAMUEL HENSHAW, *Curator.* ———————, *Secretary.*

Committee on the Museum.

HENRY P. WALCOTT. GEORGE L. GOODALE.

Officers.

SAMUEL HENSHAW . . .	*Curator.*
WALTER FAXON	*Assistant in Charge of Crustacea and Mollusca.*
SAMUEL GARMAN	*Assistant in Herpetology and Ichthyology*
WILLIAM BREWSTER . . .	*Assistant in Charge of Birds.*
W. McM. WOODWORTH . .	*Assistant in Charge of Worms.*
CHARLES R. EASTMAN . .	*Assistant in Vertebrate Palaeontology.*
OUTRAM BANGS	*Assistant in Charge of Mammals.*
HUBERT L. CLARK . . .	*Assistant in Invertebrate Zoölogy.*
HENRY B. BIGELOW . . .	*Assistant in Invertebrate Zoölogy.*
ROBERT W. SAYLES . . .	*Assistant in Charge of the Geological (Exhibition) Collections.*
FRANCES M. SLACK . . .	*Librarian Emerita.*
MAGNUS WESTERGREN .	*Artist.*
GEORGE NELSON	*Preparator.*
WALTER R. ZAPPEY . . .	*Preparator.*

WILLIAM M. DAVIS . . .	*Sturgis Hooper Professor of Geology.*
EDWARD L. MARK	*Hersey Professor of Anatomy.*
GEORGE H. PARKER . . .	*Professor of Zoölogy.*
WILLIAM E. CASTLE . . .	*Professor of Zoölogy.*
WILLIAM M. WHEELER . .	*Professor of Economic Entomology.*
ROBERT DEC. WARD . . .	*Professor of Climatology.*
HERBERT W. RAND . . .	*Assistant Professor of Zoölogy.*
JAY B. WOODWORTH . . .	*Assistant Professor of Geology.*
DOUGLAS W. JOHNSON . .	*Assistant Professor of Physiography.*

Instructors and Assistants in the Laboratories of Zoölogy and Geology.

C. T. BRUES	*Instructor in Economic Entomology.*
F. H. LAHEE	*Instructor in Geology.*
JOHN DETLEFSEN	*Austin Teaching Fellow in Zoölogy.*
E. C. DAY	*Austin Teaching Fellow in Zoölogy.*
S. I. KORNHAUSER	*Austin Teaching Fellow in Zoölogy.*
E. A. BOYDEN	*Assistant in Zoölogy.*
HENRY LAURENS	*Assistant in Zoölogy.*
SEDGWICK SMITH	*Assistant in Geology.*
SAMUEL C. LAWRENCE . .	*Assistant in Geology.*
EDWARD WIGGLESWORTH	*Assistant in Geology.*
W. G. REED, JR.	*Assistant in Physiography and Meteorology.*

REPORT.

To the President and Fellows of Harvard College:—

During the Academic year 1909–1910 seventeen courses were given by Professors Mark, Parker, Wheeler, Castle, Rand, East, and Mr. Brues to two hundred and ninety-seven students in Harvard University.

The Assistants in these courses were Messrs. E. A. Boyden, J. W. Chapman, E. C. Day, John Detlefsen, A. O. Gross, Henry Laurens, E. C. MacDowell, J. W. Mavor, Sergius Morgulis, and W. R. B. Robertson.

The Virginia Barret Gibbs Scholarship was held by Mr. R. A. Spaeth. The income of the Humboldt Fund aided four students, three at the Bermuda Station for Research, and one at Bermuda and at the Museum in Cambridge.

The instruction in Radcliffe College was given by Professors Mark and Rand assisted by Mr. Sergius Morgulis, and by Mr. D. W. Davis. Four courses were given to twenty-four students.

The number of courses and of students in 1908–1909 was: — *Harvard,* seventeen courses, two hundred and thirty-seven students; *Radcliffe,* five courses, eighteen students.

The instruction in the Department of Geology and Geography was given by Professors Davis, Wolff, Ward, Palache, Johnson, and Mr. Lahee assisted by Messrs. J. W. Eggleston, W. P. Haynes, W. G. Reed, Jr., Sedgwick Smith, and B. M. Varney.

Eighteen courses were taken by two hundred and fifty-five students in Harvard University and four courses were taken by twenty-one students of Radcliffe College.

In 1908–1909 the number of courses and of students was:— *Harvard,* nineteen courses, three hundred and nine students; *Radcliffe,* two courses, twelve students.

The income of the Josiah Dwight Whitney Scholarship Fund was used to aid students in the Rocky Mountain summer course.

A bronze tablet with the following inscription:—

Museum
and
Laboratories
of
Geology and Geography
erected
By the Children of Louis Agassiz
1901

has been set in the wall of the entrance hall of the southwestern corner of the University Museum.

The life size portrait of Louis Agassiz painted in 1842 by Fritz Zuberbühler (1822–1896) has been hung on the east wall of the northwestern section of the Museum where it is visible alike to students and to visitors. It comes to the Museum as a gift of the children of Alexander Agassiz.

Mrs. Henry L. Higginson has given a flag inscribed on one side

Hotel des Neuchâtelois

and on the other

Kein Felsen Widersteht
So fest der Mancht der Zeit,
Als festen Willens
Bestaendigkeit

words well known to all familiar with the work of Louis Agassiz among the glaciers of the Alps. The flag has been placed in the Geological Museum.

For additions to its year's income the thanks of the Museum are due Messrs. Gorham Brooks, Louis Cabot, Theodore Lyman, and John C. Phillips.

In May, 1907, the Museum installed as a gift of Mr. Agassiz a model of the coral island Bora Bora, and shortly afterwards Mr. Agassiz arranged with Mr. George C. Curtis, whose Bora Bora was so satisfactory a piece of workmanship, for a model of the classic atoll, Funafuti.

One of the Ellice Islands, situated in the Middle Pacific, Funafuti was selected as an atoll showing an extremely narrow land

rim with a large lagoon. It had, moreover, the advantage of having been personally examined by Mr. Agassiz, whose notes, together with the Report of the Coral Reef Committee of the Royal Society, furnished Mr. Curtis with the data for his work.

Though Funafuti lacks the scenic beauty of Bora Bora, Mr. Curtis by his skillful use of color, shows most effectively the depth of the ocean and the shallowness of the lagoon. The former is represented by dark blue and the lagoon in varying tints of blue and green. The atoll rises gently from a depth of 2000 fathoms while the lagoon ranges from four feet to twenty fathoms in depth.

For the case in which Funafuti is shown the Museum is indebted to Miss E. H. Clark.

From Mr. John E. Thayer's wise generosity the whole Museum benefits. Owing to his chief personal interest the greater number of the additions received from him are birds, but Mr. Thayer's liberality and broadmindedness are such that the expeditions he fosters in unexplored regions yield material for the research collections in all departments.

For the exhibition collections Mr. Thayer has given a magnificent specimen of the California Vulture mounted with the wings showing a spread of nearly nine feet. Two other notable additions to the exhibition collections received from Mr. Thayer are: — a superb male Reeve's Pheasant, *Syrmaticus reevesii*, measuring six feet, nine and three-fourths inches in length, with the tail more than five feet six inches long; and a fine Tibetan Takin, *Budorcas tibetanus*, a mammal rare in collections and obtained by Mr. W. R. Zappey in the mountains at Liang How Kow, western Szechnan. The Pheasant and Takin (Plate 2) were mounted by the Museum Preparator, Mr. George Nelson.

Drs. William Lord Smith, Glover M. Allen, and Mr. Gorham Brooks spent about three months, July–September, 1909, in British East Africa collecting in the interests of the Museum. As the result of their energetic industry and skill the Museum collections have been enriched with series of small mammals, bird skins, reptiles, amphibians, fishes, and of insects and other invertebrates, together with about fifty specimens, skins with complete skeletons, of large game mammals. The generous assistance of Messrs. Shepherd Brooks and John E. Thayer made possible this African expedition.

Additional specimens from British East Africa have been received from Mr. Childs Frick. Mr. Frick, accompanied by Mr. W. R. Zappey as his Assistant, hunted in British East Africa from December, 1909, until March, 1910, and has been so good as to give the Museum some acceptable invertebrates as well as the collections of birds and small mammals that he secured. Mr. Frick's series is a most useful supplement to the Smith-Allen-Brooks collection, as it was obtained at a different time of the year.

To Dr. John C. Phillips the Museum owes thanks for an important collection of skins of Mexican birds. The Museum's series of birds from Middle America is an especially large and valuable one and Dr. Phillips's gift of over 2,000 skins obtained principally in Tamaulipas, Mexico, by Mr. George B. Armstrong fills one of the gaps from which, geographically, material was most needed.

The Museum is indebted to Miss Elizabeth B. Bryant for many additions to its series of New England spiders; she has also worked over portions of the collection of spiders and has given considerable time to the study and preservation of the same.

Mr. Thomas Barbour has, as in previous years, enhanced the value of the research collections of reptiles and amphibians by his gifts of very many rare and valuable species and also by his voluntary work of identification, together with much of the attendant museum drudgery. A noteworthy addition received from him is an excellent specimen of the rare Chinese Alligator, *Alligator sinensis* (*cf.* Proc. Acad. nat. sci. Phila., 1910, p. 464). Mr. Barbour's gifts are not confined, however, to the groups in which he is especially interested; among much desirable material he has given a Japanese Serow, *Nemorrhaedus crispus,* and a living example of the Bahama Parrot, *Amazona bahamensis,* a species whose extinction is probably a matter of a few years only; important additions to the collections of mammals and birds, of insects, shells and other invertebrates are included in Mr. Barbour's various donations.

For a specimen of the rare West African Forest Pig, *Hylochoerus rimator,* the Museum has to thank Mr. William Barbour, and for a number of small Irish mammals mounted for the exhibition collection similar thanks are due Mr. J. R. T. Mulholland.

The Museum of Zoölogy of the University of Cambridge (Eng-

land), through Dr. Hans Gadow, has been kind enough to send in exchange an important series of Hawaiian Honey Creepers, a series which contains several species hitherto unrepresented in the collection of the Museum, and also an especially valuable lot of bones of the extinct Solitaire, *Pezophaps solitarius*, collected in Rodriguez by Jenner in 1871. The skeleton as mounted for exhibition by Mr. Nelson is shown on Plate 3.

For a mounted specimen of the Almique, *Solenodon cubanus*, the Museum is indebted to the Havana Institute of Secondary Education. Especial interest is attached to this specimen as the label is in the hand of the distinguished Cuban zoölogist, Dr. Juan Gundlach.

The Carnegie Museum, Pittsburgh, through its Director, Dr. W. J. Holland, has presented a plaster restoration of *Dinohyus hollandi*, a remarkable giant pig from the Miocene of western Nebraska. This model is shown in full relief and is the work of Mr. Theodore A. Mills. Dr. Holland has also kindly sent in exchange a fine series of fishes, one of the results of explorations in British Guiana carried on by the Carnegie Museum under the direction of Prof. C. H. Eigenmann.

The Museum has received another valuable collection of fishes from the U. S. Bureau of Fisheries. These specimens are in an excellent state of preservation and were captured in the Pacific when Mr. Agassiz was in charge of the U. S. F. C. Steamer "Albatross" during the cruise in the Tropical Pacific in 1899–1900 and again in 1904–1905, Expedition to the Eastern Tropical Pacific.

The New York Zoölogical Society has continued its policy of sending to the Museum specimens of reptiles, many of which, after Mr. Nelson's skillful taxidermy, supply for exhibition purposes most desirable dry mounts. Its donations this year, for which the thanks of the Museum are tendered, include among several others a striking example of the Green Boa, *Corallus caninus*, from Surinam, and one of the Bushmaster, *Lacheis mutus*, a most venomous snake from Trinidad. The skeleton of the Bushmaster, prepared by Mr. Nelson, is shown with the mounted skin.

While engaged in anthropological work for the Peabody Museum in South and Central America, Prof. W. C. Farabee and Dr. A. M. Tozzer kindly procured for this Museum some zoölogical

specimens of value. Dr. Tozzer's collection included both vertebrates and invertebrates, while the specimens received from Professor Farabee were mostly insects.

Interesting specimens have also been received from Mrs. Henry Bryant, from Drs. H. B. Bigelow, C. B. Davenport, Walter Faxon, E. W. Gudger, R. T. Jackson, Theodore Lyman, A. G. Mayer, H. K. Oliver, and H. W. Smith, and from Messrs. William Brewster, Edwin Farrar, E. N. Fischer, C. A. Frost, R. H. Howe, Jr., R. O. Morris, A. P. Morse, and R. A. Spaeth.

The W. G. Dietz collection of Coleoptera, a valuable accession, was acquired by purchase. This collection is especially rich in Rhynchophora, Snout-beetles, from all parts of the world, and contains more than one hundred specimens which are the types of species described by Dr. Dietz and others.

It should be mentioned that the Dietz series of Rhynchophora makes a notable supplement to the Deyrolle collection which was given to the Museum in 1870 by Mrs. Augustus Hemenway.

Some Green River fossils collected by the late Prof. Leslie A. Lee of Bowdoin College were bought of Mrs. Lee; among this collection there are the types of a number of fossil insects described by S. H. Scudder and two important specimens of fossil fishes described by E. D. Cope.

Twelve mounted specimens of several forms of the Land tortoises of the Galapagos have been purchased of Miss E. E. Hull and the F. B. Webster Company.

During his studies of fossil Echini, Dr. R. T. Jackson got together a number of valuable specimens. As the Museum has an important series in this group, it was glad of the opportunity of purchasing the Jackson set which contains a number of figured specimens, casts of types, and types.

Considerable series of bird skins from India, Australia, New Guinea, New Zealand and from other parts of the world have been purchased of Messrs. Angell and Cash, W. F. H. Rosenberg, and S. F. Denton. From Mr. Denton the Museum has also acquired mounted fishes for its Systematic, European, and North American collections. Specially prepared specimens of Medusae have been bought of the Naples and Woods Hole Laboratories and of Prof. A. E. Verrill, and additional installments of slides of Rotatoria have been received from Mr. C. F. Rousselet.

In 1906 the Museum was enabled through the generosity of Mr. Agassiz to undertake the renovation of all its entrance and exhibition halls. Since that date a number of the work rooms in the Museum have, from the Museum's own resources, undergone a similar renovation, and during these changes additional safeguards against fire, such as resistant doors and windows, have been introduced. Danger from fire is lessened also by the withdrawal of alcoholic specimens on exhibition and by the subsitution of carbon tetrachloride for carbon bisulphide as a preventive against insect pests. The number of mounted reptiles and fishes introduced in place of alcoholic specimens of the same has been very great during recent years. Carbon tetrachloride is less volatile and less disagreeable to work with than carbon bisulphide; to be equally effective, however, it must be used in larger quantities than is necessary with carbon bisulphide, but it is not inflammable and notwithstanding its greater cost has proved a most desirable substitute for carbon bisulphide.

New cases have been built in the exhibition rooms devoted to the Systematic collections of mammals and of coelenterates, and in the North American room the three floor cases have been replaced by one large case, which encloses also the central space of the gallery of the fourth floor. Additional space for the display of mammals and birds is afforded by this change. A new wall case in the North American gallery has also been built.

Mr. Bangs is making good progress in overhauling the study collection of bird skins, merging the E. A. and O. Bangs series and the very many skins received in recent years from Mr. John E. Thayer with the Museum collection, and arranging the entire series according to the British Museum Hand List. With additional equipment in the way of cases, this important department will be in the course of a few years in most satisfactory condition.

In addition to his collecting in British East Africa, Dr. G. M. Allen has been employed for three days in each week throughout the year. The condition of the study series of mammals shows constant improvement as the result of his work, which includes the identification or reidentification and rearrangement of the entire series of skins and skulls, together with the labeling and cataloguing where such work is necessary. Following Trouessart's Catalogue the collection is in order as far as the Muridae.

A part of Dr. Allen's time is devoted to research, one of the results of which has been published as Memoirs M. C. Z., vol. 40, no. 1, *Solenodon paradoxus*, 54 pages, 9 plates.

To the preparation of specimens for exhibition Mr. Nelson gives a large part of his time. In addition to those already mentioned he has prepared a number of North American snakes and turtles, among the latter a giant Snapping turtle, *Chelydra serpentina*, a specimen remarkable not only for its weight, fifty-four pounds, but for the absolute perfection of its exoskeletal parts; also a series of West Indian Crows and Troupials. The collection of North American mammals, the systematic collection of birds, and the special collections of domesticated animals, of nests and eggs of birds, and of heads and horns of mammals all show additions, the result of Mr. Nelson's work.

Mr. Nathan Banks was employed for two weeks, during which time he identified and labeled a large part of the collection of scorpions, and Mr. E. C. Day was engaged for several weeks in labeling some of the Bryant birds and the Selah Merrill birds and mammals.

Details of the work accomplished during the year and of additions to the several departments of the Museum will be found in the Reports of the Assistants.

To Messrs. Faxon, Brewster, Woodworth, Bangs, Bigelow, and Sayles the Museum is indebted for the interest they have taken in the collections under their charge.

The Library contains 46,924 volumes, and 43,367 pamphlets; 1,269 volumes, and 1,559 pamphlets have been added during the year. For many of the accessions this year the Museum is indebted to Mr. Outram Bangs, Mr. Henry L. Higginson, Profs. W. M. Davis, G. L. Goodale and to Dr. W. McM. Woodworth.

The publications for the year include eight numbers of the Bulletin, three numbers of the Memoirs, and the Annual Report, a total of 609 (222 quarto and 387 octavo) pages, with 77 (48 quarto and 29 octavo) plates. Two numbers of the Bulletin and two of the Memoirs contain reports on the scientific results of expeditions maintained by Mr. Agassiz. Two numbers of the Bulletin contain Contributions from the Zoölogical Laboratory and the other publications, four numbers of the Bulletin and one number of the Memoirs, are based upon Museum collections and explorations. A list of these publications is given on pages 46–47.

The grant of $350.— made by the Corporation to aid in the publication of Contributions from the Zoölogical and Geological Laboratories has been used for numbers of the Bulletin which have appeared in volume 53 and for plates to illustrate Professor Woodworth's report on his expedition to South America.

After the death in 1896 of Prof. J. D. Whitney, Sturgis Hooper Professor of Geology from 1865–1896, his sister, Miss Maria Whitney, took a keen and generous interest in the Museum and its work.

Her death on the 19th of January, 1910, is recorded with regret.

The death of Mr. Agassiz on the 27th of March, 1910, takes from the Museum one whose devoted service of more than fifty years will never be equalled.

In the first Report of the Director of the Msueum for the year 1859, acknowledgment is made of the receipt of a great number of specimens from the Pacific Coast of Mexico, the gift of Mr. Agassiz, at that time an Aid of the U. S. Coast Survey. For the five years following, Mr. Agassiz's activities included the care of the collections of several departments of the Museum, and in those early days care comprised not only labeling and cataloguing, but the assortment, distribution and arrangement of large masses of material; during one or more of these years Mr. Agassiz also attended to the general superintendence of the Museum's business and gave courses of instruction which were open both to College students and to others. For the years 1865–1866, (7th and 8th Reports), Mr. Agassiz was Assistant in charge, reporting as such and also on the work done in special departments. From the date of his return from the Thayer-Brazilian Expedition in 1866 until his death in December, 1873, Professor Agassiz in all Museum affairs relied upon the scientific judgment and business capacity of his son. As the Executive head of the Museum Committee, Mr. Agassiz made the Reports for the years 1873 and 1874. He was appointed Curator in 1875 and Director in 1892 and held these offices until his resignation in September, 1898. Since that date until his death, he gave ready and hearty support to his successors.

Such in brief are Mr. Agassiz's official connections with the Museum of Comparative Zoölogy, a Museum built, in every sense of the word, by him; for although the general plan was in the mind of its founder and in part worked out by him, the initial

difficulties, due to the lack of rooms and of means, together with the accumulation of the immense collections which in 1873 overflowed the building from roof to basement, prevented Professor Agassiz from a full realization of his plans.

How well these plans have been carried out by Mr. Agassiz and with what tenacity of purpose he adhered to them often at a sacrifice of personal interest, the Museum is the best witness.

The full extent of Mr. Agassiz's work for the Museum and of his great gifts to its collections will be clearly shown in a historical sketch of the Museum now in course of preparation.

Mr. Agassiz advocated at an early date a distinct field for the work of a University Museum; he claimed that its province should in no way compete with that of national, state, or municipal establishments, but that the maintenance of large collections by such a Museum, supplemented first by a Zoölogical Station controlled by the Museum, and secondly by explorations conducted under the direction of the Museum, was vital for the scientific progress and usefulness of the Museum.

Throughout his life Mr. Agassiz promoted these aims. In some of its departments the Museum of Comparative Zoölogy offers unsurpassed facilities for research; the resources of his Newport laboratory, together with opportunities for work at other laboratories, he rendered available for many years, while his furtherance of exploration and the publication of the scientific results have brought to the Museum and to the University their greatest distinction.

Equally pronounced was the policy adopted by Mr. Agassiz in regard to the display of specimens exhibited to the public. By the practice in vogue in most museums in 1875, large numbers of specimens, many of them merely duplicates, were arranged in single crowded series. Mr. Agassiz limited his general collection to selected typical forms and followed his father's plan of showing fossils, recent forms, and skeletons together.

In his Report for 1875 Mr. Agassiz wrote:— "The great defect of museums in general is the immense number of articles exhibited, compared with the small space taken to explain what is shown.* * * The need of general labels, and a small number of specimens properly selected to illustrate the labels, would go far towards making a museum intelligible," and he thus maintained an im-

portant principle in museum organization which has been supported by Goode and Flower and is to-day quite generally adopted.

In 1883, or ten years after Mr. Agassiz assumed the care of the Museum, he was able to report that the building had been doubled in size and that the invested funds for the maintenance of the Museum had been increased over three fold. Both results were largely due to him. The uses of the several rooms noted by Mr. Agassiz at that time were not essentially different from those that prevail to-day.

Along with the systematic exhibit, Mr. Agassiz built up the geographic one, and increased the facilities for research by the acquisition of extensive collections, which were conveniently stored and made accessible to all able to make proper use of them.

The difficulties of a geographic exhibit are well recognized; none of the great museums of the world, those of London, Paris, or Berlin, have attempted such an exhibit, and there are but two in Europe that have done so, both of which, one in Dublin and the other in Dresden, are on a comparatively small scale. And yet so successfully and with so true a sense of proportion did Mr. Agassiz develop the whole Museum that the distinguished English naturalist Wallace stated in 1887 that as an educational institution for the public, for students, and for the special investigator the Museum of Comparative Zoölogy was superior to the British Museum and "probably equally in advance of every European Museum."

Mr. Agassiz's eminence as a Museum Director is secure and his standards of work will always be an incentive to those who follow him.

SAMUEL HENSHAW.

REPORT ON THE ZOÖLOGICAL LABORATORY.

By E. L. Mark.

Instruction in Zoölogy has suffered by the temporary discontinuance of the courses in Palaeontology. Professor Jackson's enthusiastic presentation of his subject will not readily be forgotten by those who had the privilege of his instruction. The only other change in the staff is the appointment of Mr. C. T. Brues, who took the place of Mr. Paul Hayhurst as Instructor in Economic Entomology.

The accompanying tables show the number of students in each of several classes who attended each of the courses in Zoölogy. The first table relates to courses in Harvard University, the second to those in Radcliffe College.

TABLE I.

Courses 1909-10	Graduate		Sen.	Jun.	Soph.	Fresh.	Spec.	Uncl.	Total
	A. & S.	Ap. Sci.							
Zoölogy 1	6		7	20	31	67	10	8	149
" 2	2			7	13	4	2	5	33
" 3	8		3	6	1	1			19
" 4	6		2		1				9
" 5*b*	8	1	1		1				11
" 7*a*	2	4		2			1		9
" 7*b*	2						2		4
" 7*c*		1							1
" 11	8	4		1	1			1	15
" 12	2	1							3
" 14*a*	11	1	2	1					15
" 17	8		1						9
" 20*a*	9								9
" 20*c*	4								4
" 20*d*		2	1						3
" 20*e*	2								2
" 20*f*		2							2
Sums	78	16	17	37	48	72	15	14	297

TABLE II.

Courses 1909–10	Gr.	Sen.	Jun.	Soph.	Fresh.	Sp.	Uncl.	Total
Zoölogy 1		4	2	1	5	3	2	17
" 2		1	1			1		3
" 5*b*		2						2
" 20*a*	2							2
Sums	2	7	3	1	5	4	2	24

The only courses in which there were changes were 4, 11, and 12. Professor Rand took entire charge of Course 4, and Professor Mark gave a new half-course — "Zoölogy 12, Cytology, with special reference to Heredity." The half-course on "Variation, Heredity, and the Principles of Animal Breeding" announced as Zoölogy 11 by Professor Castle was altered so as to cover Plant Breeding, and was given jointly by Professor Castle and Assistant Professor East of the Department of Botany.

Zoölogy 1 was given as usual by Professor Parker, whose chief assistant was Mr. E. C. Day, Austin Teaching Fellow. The sub-assistants were Messrs. J. W. Chapman, A. O. Gross, H. Laurens, J. W. Mavor, and W. R. B. Robertson.

In Zoölogy 2, given by Professor Castle, the chief assistant was Mr. J. Detlefsen, Austin Teaching Fellow. The sub-assistant was Mr. E. C. MacDowell.

Assistant Professor Rand gave Zoölogy 3 substantially as in previous years. The assistants were Messrs. E. A. Boyden and J. W. Mavor. Three graduates not enrolled in the course attended the lectures.

Zoölogy 4 was given by Assistant Professor Rand, who had as assistant Mr. S. Morgulis, Austin Teaching Fellow. The lectures covered the same topics as in previous years when given by Professor Mark, and the laboratory work was also substantially the same as previously.

Zoölogy 5*b* (formerly 6) was conducted in the main as in 1907–1908, most attention being given to the development of the central nervous system. Mr. S. Morgulis was assistant in this course also.

The lectures in Zoölogy 7*a*, 7*b*, 7*c*, and 11 were given at the Museum of Comparative Zoölogy, the laboratory and field work in these courses at the Bussey Institution. Courses 7*a* and 7*b* were given by Professor Wheeler with the assistance of Mr. C. T. Brues; 7*c* by Mr. Brues.

The laboratory work in Zoölogy 11 was based partly on zoölogical, partly on botanical material. The course was conducted jointly by Professor Castle and Assistant Professor East.

In Zoölogy 14*a*, conducted by Professor Parker, students were, as usual, assigned topics for research or thesis work. Five wrote theses. Two students not enrolled attended the lectures.

The lectures in Zoölogy 17, by Assistant Professor Rand, followed the same plan as the year before, but their content was considerably changed, more time being given to experimental embryology and less to regeneration. The results of work on some of the laboratory problems will be presented for publication later.

For the first time since instruction in Zoölogy was offered to students in Radcliffe College, the elementary courses have been put in charge of a person not an instructor in Harvard. The department was fortunate in securing Mr. D. W. Davis to take charge of Zoölogy 1 and 2. Since his graduation from Harvard College in 1905 Mr. Davis has been engaged in teaching, and his management of these two courses has been very satisfactory.

Professor Mark gave the lectures in Zoölogy 5*b* (Radcliffe), the laboratory work being under the general supervision of Assistant Professor Rand, who had as assistant Mr. S. Morgulis.

Twenty-one graduate students and one undergraduate were engaged in researches, eleven under the direction of Professor Mark, four under Professor Parker, two under Professor Wheeler at the Bussey Institution, three under Professor Castle extending through the whole year, at the Bussey Institution, and two under Assistant Professor Rand. Of these twenty-two persons, two were graduate students of Radcliffe College. Three presented theses for the doctor's degree, and received the degree of Ph.D. The thesis of Edith N. Buckingham was on "*The division of labor among ants*," that of Sergius Morgulis was entitled "*Studies of inanition in its bearing on the problem of growth*," and that of William A. Willard "*The cranial nerves of Anolis carolinensis*."

Four students received aid from the income of the Humboldt Fund to the amount of $238.60 while working at the Bermuda Station.

Professor W. M. Chester of Colgate University, student in the Graduate School of Arts and Sciences, was appointed Assistant Director of the Bermuda Biological Station for Research for the summer session of 1910. The Station was opened June 17, and closed August 2. Seven persons were enrolled, all except one connected with Harvard University. Professor Mark was obliged to leave the Station the middle of July, after which the management was in the hands of the Assistant Director.

The 8th International Zoölogical Congress, held in Graz, Austria, was attended by Professor Mark, who presented a joint paper with Dr. J. A. Long, and announced two demonstrations, the result of joint work with two graduate students, S. S. Berry and R. A. Spaeth. Of the 139 papers and demonstrations announced on the programme of the Congress twenty-nine were by Americans, and of these, ten were by persons now or formerly connected with the Zoölogical Department.

During November and December Professor Parker delivered a course of eight lectures at the Lowell Institute in Boston, on "The human sense organs."

Much of Professor Wheeler's time and that of his assistant, Mr. W. Reiff, has been devoted to a field study of the wilt disease of the Gypsy Moth.

In July Professor Castle delivered a course of lectures on heredity and animal breeding at the Graduate School of Agriculture, which held its fourth biennial session at Ames, Iowa, under the auspices of the Association of Agricultural Colleges and Experiment Stations. He has had the assistance of Research Fellow Dr. J. C. Phillips in research work.

The Zoölogical Club held twenty-three meetings, at which there were presented twenty original papers and twelve reviews. The average attendance was between fourteen and fifteen.

PUBLICATIONS. AUGUST 1, 1909–July 31, 1910.

Contributions from the Zoölogical Laboratory.

200. RAND, H. W.— Wound reparation and polarity in tentacles of actinians. *Journ. exp. zoöl.*, September, 1909, vol. 7, p. 189–238, 2 pls.
201. PARKER, G. H.— The integumentary nerves of fishes as photoreceptors and their significance for the origin of the vertebrate eyes. *Amer. journ. physiol.*, October, 1909, vol. 25, p. 77–80.
202. HARGITT, G. T.— Maturation, fertilization, and segmentation of Pennaria tiarella (Ayres) and of Tubularia crocea (Ag.). *Bull. M. C. Z.*, October, 1909, vol. 53, p. 159–212, 9 pls.
203. MULLENIX, R. C.— The peripheral terminations of the eighth cranial nerve in vertebrates, especially in fishes. *Bull. M. C. Z.*, November, 1909, vol. 53, p. 213–250, 6 pls.
204. PARKER, G. H.— The reactions of sponges, with a consideration of the origin of the nervous system. *Journ. exp. zoöl.*, January [March], 1910, vol. 8, p. 1–41.
205. HAHN, C. W.— The stages of Haemogregarina stepanovi Danilewsky found in the blood of turtles, with special reference to changes in the nucleus. *Arch. f. protistenk.*, December, 1909, bd. 17, p. 307–376, pl. 16–18.
206. PEARSE, A. S.— The reactions of amphibians to light. *Proc. Amer. acad. arts and sci.*, January, 1910, vol. 45, p. 159–208.
207. BANTA, A. M.— A comparison of the reactions of a species of surface isopod with those of a subterranean species.— Part I. Experiments with light. *Journ. exp. zoöl.*, July, 1910, vol. 8, p. 243–310.
208. MAC CURDY, H.— Degeneration in the ganglion cells of the crayfish Cambarus bartonii Gir. *Journ. comp. neurol. and psychol.*, June [July], 1910, vol. 20, p. 195–210, 1 pl.

Contributions from the Bermuda Biological Station for Research.

16. RAND, H. W.— Wound reparation and polarity in tentacles of actinians. *Journ. exp. zoöl.*, September, 1909, vol. 7, p. 189–238, 2 pls.
17. MARK, E. L.— The new Bermuda biological station for research. *Separate*, November, 1909, 6 pp., from *Proc. seventh internat. zoöl. Congress*, Boston meeting.

18. SMALLWOOD, W. M.— Notes on the hydroids and nudibranchs of Bermuda. *Proc. zool. soc. London,* June, 1910, p. 137–145.
19. SMALLWOOD, W. M., AND ROGERS, C. G.— Studies on nerve cells. III. Some metabolic bodies in the cytoplasm of nerve cells of gasteropods, a cephalopod, and an annelid. *Anat. anzeiger,* April, 1910, bd. 36, p. 226–232.

Contributions from the Entomological Laboratory of the Bussey Institution.

Professor Wheeler reports that seventeen articles and a book were published by the entomological staff during the year.

Other Publications.

CASTLE, W. E.— Heredity. *Pop. sci. mo.,* May, 1910, vol. 76, p. 417–428.

The effect of selection upon Mendelian characters manifested in one sex only. *Journ. exp. zoöl.,* 1910, vol. 8, p. 185–192.

PARKER, G. H.— The origin of the nervous system and its appropriation of effectors. Parts II–IV. *Pop. sci. mo.,* August–October, 1909, vol. 75, p. 139–146, 253–263, 338–345.

The phylogenetic origin of the nervous system. *Anat. record,* February, 1910, vol. 4, p. 51–58.

Structure and functions of the ear of the squeteague. *Bull. bureau fisheries,* April, 1910, vol. 28, p. 1211–1224, pl. 122.

REPORT OF THE STURGIS HOOPER PROFESSOR OF GEOLOGY.

By W. M. Davis.

During the past academic year, my teaching included a half course on the Physiography of Europe, for undergraduates and graduates, in the second half year, and an advanced course of research in Physiography, primarily for graduates, running through the year. Both courses were attended by a disappointingly small number of students.

My personal work was directed almost wholly to the revision of the lectures on the Explanatory description of land forms, given in the University of Berlin in the winter of 1908–1909, and in the preparation of a large number of drawings for their illustration, with the intention of publishing them in Germany. This work was undertaken with the idea of extending in time and place whatever impression of American geographical methods the lectures themselves may have produced. An interruption was caused by the preparation and delivery of a course of lectures in the Lowell Institute, Boston, in January, on the "Greater lessons of geology."

An intercollegiate geological and geographical excursion was organized under my direction for the April recess to Catskill, N. Y., a ground familiar from many earlier spring and summer excursions some years ago. It was attended by some thirty persons, including teachers and students from the Institute of Technology, Yale, Columbia, St. Lawrence, and Rutgers, as well as Harvard. During July I conducted a small party in a summer course of physiographic field work in the Rocky mountains of Colorado, where we found many features of interest, a report on which is in preparation. A series of "Notes on the description of land forms" has been begun for publication in the Bulletin of the American Geographical Society, with a view of calling attention particularly to the methods employed in such descriptions, as well as to the facts described.

PUBLICATIONS. AUGUST 1, 1909–JULY 31, 1910.

Glacial erosion in north Wales. *Quart. journ. geol. soc. London*, August, 1909, vol. 65, p. 281–350, pl. 14.

The systematic description of land forms. *Geogr. journ.*, September, 1909, vol. 34, p. 300–318, 324–326.

The Alps in the glacial period. [Review of Penck and Brückner: Die Alpen im Eiszeitalter]. *Geogr. journ.*, December, 1909, vol. 34, p. 650–659.

Der grosse Cañon des Colorado. *Himmel und erde*, 1909, vol. 22, p. 22–41.

Geographical essays. Edited by D. W. Johnson. Boston [1910].

Experiments in geographical description. *Bull. Amer. geogr. soc.*, June, 1910, vol. 42, p. 401–435; *Science*, 17 June, 1910, new ser., vol. 31, p. 921–946. *Scott. geogr. mag.*, November, 1910, vol. 26, p. 561–586.

Deutsche und romanische Flussterminologie. *Geogr. anzeiger*, June, 1910, p. 121–123.

REPORT OF THE DEPARTMENT OF GEOLOGY AND GEOGRAPHY.

By Robert DeC. Ward.

The Department has had a successful year in its teaching, its general activities, and in the gifts which have been received. The omission of the courses in Palaeontology is, however, a serious handicap to the work of the Department. Messrs. J. W. Eggleston, W. P. Haynes, F. H. Lahee, W. G. Reed, Jr., S. Smith, and B. M. Varney were assistants during the year.

Mention was made in last year's Report of the welcome anonymous gift of $5,000. towards the maintenance of a summer field course in geology in the western mountain region of North America. This gift has been increased to $10,000., the donor being Mr. Robert Wilcox Sayles, of the Class of 1901. The income of the fund puts the western summer course upon a permanent basis and releases the funds which of late years have been devoted to this course. The gift is one of the most useful which this Department has ever received. Mr. Sayles further gave the sum of $350., for current expenses of this course in 1910. Another welcome gift, of $300., was received from Mrs. W. S. Fitz, Mrs. H. S. Grew, and Mrs. Edward Wigglesworth, for a wall case, which has been installed in the Geological Museum, and is used for the permanent exhibition of photographs from the Gardner Collection. It has hitherto been impossible to make adequate public exhibition of the valuable materials belonging to this Collection. Mr. Edward Wigglesworth was appointed Curator of the Gardner Collection at the beginning of the year, and has given a great deal of time, with the assistance of Mr. G. M. Flint, to cataloguing, systematizing, and extending the Collection, which can now be much more effectively used than ever before. The activity and the support of the new Curator of this Collection have been of great help to the Department.

The state of the Gardner Collection on July 1, 1910, is shown in the subjoined table: —

State of Collection, July 1.	Photographs.	Slides.	Negatives.
Accessions since last report	338	743	0
Unidentified views	150	0	155
Duplicates	116	0	0
Broken	0	0	0
Condemned	29	6	0
Last accession number	6322	6223	0
Number now in collection	6211	6311[1]	836[2]
Card catalogued	0	6311	0

The principal additions were as follows: — 89 slides of the Italian Riviera made from negatives of Prof. W. M. Davis; 48 slides of fossils and restorations, secured through Prof. W. M. Davis; 33 slides of the Canadian Rockies, the gift of Mr. R. W. Sayles; 70 Japanese slides, the gift of Mr. E. G. Stillman through Mr. Sayles; 110 Asiatic slides from negatives of Dr. E. Huntington, and 22 unmounted photographs of volcanoes and South American views, purchased and presented to the collection by Mr. E. Wigglesworth. Ten large photographs were framed and put on exhibition.

During the afternoons of two weeks in January, 1910, the Harvard Seismographic Station and the Students' Meteorological Observatory were opened to officers and students of the University. The working of the instruments was explained by members of the Department to a considerable number of visitors. At the same time there was a public exhibition of the new model of the temperatures of Boston, the construction of which was mentioned in last year's Report, and also of a selected series of photographs of New Zealand scenery from the Gardner Collection.

The sub-committee on the Josiah Dwight Whitney Scholarship reports that $100. was awarded to Donald C. Barton, and $100. to Joseph Murdoch, both members of the Junior Class and students in the Rocky Mountain summer course, and that the balance of the income was placed at the disposal of Professor Davis to

[1] Includes 88 meteorological slides numbered in advance.

[2] Decrease since last Report due to removal of sets belonging to Geological Laboratory and to a general working over of the collection.

assist students working under his direction in the Rocky Mountains.

No student took the research course in Meteorology, 20*f*, with Professor Rotch, and his time was occupied in directing the work of the Blue Hill Observatory.

In addition to his regular courses (Geology B, 1, 2, 19, 20*e*), Professor Ward gave three lectures on the geography of South America in the course, "Business 14." Under the general direction of Professor Ward, Mr. William G. Reed, Jr., Assistant in Meteorology, spent much time in the equipment of the Students' Meteorological Observatory, in regulating the instruments, and in taking regular observations. The Station is now well equipped with most of the ordinary instruments, and gives opportunity for effective work on the part of students. Several investigations carried on by members of the course in Advanced Climatology have been published, as follows: "The study of phenomenal climatology" and "South American rainfall types," by W. G. Reed, Jr. (*Quart. journ. Roy. met. soc.*, January, 1910, vol. 36, No. 153, p. 39–47; 49–59); "Model of the chrono-isotherms of Boston, Mass., U. S. A." (*Ibid.*, April, 1910, p. 181–184) and "The temperature conditions of Boston, Mass." (*Monthly weath. rev.*, June, 1910, vol. 38, No. 6, p. 973–976), by Andrew H. Palmer. Professor Ward spent part of the summer in Brazil, making a study of the economic climatology of the São Paulo coffee district.

With the assistance of Professors Davis and Wolff, Professor Woodworth gave the lectures in Geology 4, and also conducted courses 8, 16 and 20*c*. Two half-courses in elementary geology were given, in the Museum, to students in Radcliffe College. Professor Woodworth, with the assistance of Mr. J. W. Eggleston, gave the summer course in field geology in Montana, which was completed by 17 students. Mr. G. M. Flint accompanied the party as collector. Professor Woodworth has devoted considerable time to the completion of reports on field work, and to the management of the Seismographic Station. A small collection of Middle Cambrian trilobites was purchased.

Professor Johnson gave courses A, 9, 10, and, in coöperation with Professor Davis, 20*a*. In the summer he supervised the field work of Mr. N. J. Bond, who made a five-weeks' study of shoreline changes in the Quincy-Hingham area. Under the

auspices of the Teachers' School of Science a course of fifteen lectures and laboratory exercises on the Geography of the United States was given to a class of over one hundred teachers. During the Spring recess Professor Johnson conducted a party of seventeen students and teachers, representing eight New England and New York educational institutions, on an excursion in the Catskill Mountains. A two-days' excursion to Cape Cod was participated in by seven students.

During the first half-year the work in Geology 12, conducted by Mr. F. H. Lahee, consisted of the mapping and study of the geology of an area, and, in the second half-year, of special field problems. Mining 28, a half course in field geology and geological surveying given to students in the Division of Mining and Metallurgy, was completed by ten students. In the April Recess a small party of graduates and undergraduates, under the direction of Mr. Lahee, studied the structure and stratigraphy of selected localities in the vicinity of Catskill, N. Y. Mr. Lahee devoted most of the summer to the investigation of the petrology of the Narragansett Basin.

Publications. August 1, 1909–July 31, 1910.

Johnson, D. W.

Hanging valleys. *Bull. Amer. geogr. soc.*, November, 1909, vol. 41, p. 665–683.

Geographical lantern slides, with descriptive catalogue. Boston, 1909.

Geographical essays. By W. M. Davis. Edited by D. W. Johnson. Boston [1910].

Map drawing in the schools. *Popular educator*, January–February, 1910, p. 230–233, 284–287; *Journ. geogr.*, 1910, vol. 8, p. 152–158, 169–178.

The southernmost glaciation in the United States. *Science*, 11 February, 1910, new ser., vol. 31, p. 218–220.

The geology and scenery of the Grampians and the valley of Strathmore. By Peter Macnair. [Review.] *Bull. Amer. geogr. soc.*, February, 1910, vol. 42, p. 137–139.

The form of Nantasket Beach [with W. G. Reed, Jr.]. *Journ. geol.*, February–March, 1910, vol. 18, p. 162–189.

Traité de géographie physique. By Emmanuel de Martonne. [Review.] *Bull. Amer. geogr. soc.*, July, 1910, vol. 42, p. 533–535.

The origin of the Yosemite Valley. *Appalachia*, July, 1910, vol. 12, p. 138–146, pl. 24.

The college student's knowledge of geography. *Popular educator*, 1910, vol. 27, p. 505–508.

The development of Nantasket Beach. *Rept. Brit. assoc. adv. sci.*, 1909, 1910, p. 535.

Reviews in *Bull. Amer. geogr. soc.*

LAHEE, F. H.

Theory and hypothesis in geology. *Science*, 22 October, 1909, new ser., vol. 30, p. 562–563.

Dodecahedral jointing due to strain of cooling. *Amer. journ. sci.*, February, 1910, ser. 4, vol. 29, p. 169–170.

ROTCH, A. L.

The aerological congress at Monaco. *Science*, 13 August, 1909, new ser., vol. 30, p. 193–199.

The highest balloon ascension in America. *Science*, 3 September, 1909, new. ser., vol. 30, p. 302–303.

Die obere inversion im osten der Vereinigten Staaten. *Meteor. zeitschr.*, December, 1909, vol. 26, p. 554–555.

Étude de l'atmosphère marine par sondages aeriens, Atlantique moyen et region intertropicale. *Ann. Bur. central météor. France.* I. Mémoires. Année 1905. Paris, 1909. Also *Trav. scient. observ. météor. dyn. de Trappes*, 1909, 243 pp., 17 plates.

The highest meteorological observations in America. *Rept. Brit. assoc. adv. sci.*, 1909, 1910, p. 415.

The coldest region of the atmosphere. *Sci. Amer.*, 2 July, 1910, vol. 103, p. 9.

The relation of wind to aerial navigation. *Aeron. annual*, 1910, vol. 4, p. 150–155.

WARD, R. DEC.

Bosquejo da climatologia economica do Brasil. *Jorn. commercio*, Rio de Janeiro, 25 December, 1909.

Climate in some of its relations to man. *Pop. sci. mo.*, March, 1910, vol. 76, p. 246–268.

National eugenics in relation to immigration. *N. Amer. review*, July, 1910, vol. 192, p. 56–67.

Notes on climatology and reviews. *Bull. Amer. geogr. soc.*, throughout the year.

Appendix.

SECOND ANNUAL REPORT ON THE HARVARD SEISMOGRAPHIC STATION.

By J. B. Woodworth.

The accompanying tabulated list of earthquakes and seismic disturbances (pages 28–33) recorded at this Station continues the list printed in the Report for the year 1908–09 (pages 30–31).

In the record of August 13, 1908, 7 P. M. and 8 P. M. should be substituted for the hours 8 and 9 respectively, according to the Albany records. (Rept. 1908–1909, p. 30.)

Altitude of Station: The elevation of the Station was provisionally determined in 1908 as 7 meters. In December, 1909, Mr. C. H. Paige of the Department of Engineering accurately determined the altitude of the center of the steady masses by reference to the local bench marks as 5.367 meters or 17.61 feet above mean half-tide. The middle of a black line painted on the south wall of the instrument room has this elevation.

Instrumental constants: The period of complete oscillation of the pendulums as set up is frequently tested with the needles tracing in the smoked paper. At the last determination the pendulum 59A had a mean period of 25. secs; 59B 27.5 secs. With these periods using the formula

$$T = 2\pi\sqrt{\frac{I}{Mgli}} \quad \text{which gives}$$

$$i = \frac{4\pi}{T^2}\,\frac{l^2+\frac{r^2}{2}}{gl}$$

(i) the angle of stability for the horizontal pendulum 59A was determined to be 5′28″ of arc; 59B, 9′ 59.57″ of arc.

Mr. Stephen Royce in November, 1909, made the following measurements of the Bosch-Omori tromometer No. 59 A. & B., to which other data are appended:—

	Comp. 59A.	Comp. 59B.
Distance between upper and lower supports of horizontal pendulum	105.0 cm.	105.0 cm.
Length of horizontal pendulum from lower point of support to center of steady-mass	23.54 "	23.64 "
Radius of weight (steady-mass) (r)	11.93 "	11.83 "
Total length of boom (l^1)	106.37 "	107.04 "
Length: short arm of indicator as adjusted (l^2)	1.6 "	1.6 "
Length: long arm of indicator to needle point (l^3)	24.5 "	24.5 "
Weight of steady-masses as given by maker	100 Kg.	100 Kg.
Multiplication ratio of indicator	15.3	15.3
Multiplication of pendulum and boom	3.51	3.10
Magnification of record, as thus adjusted	53.7	47.4

Records of the Station

75th Meridian Date		Beginning of V_1	Beginning of V_2	Beginning of W_1	Maximum Motion	End of Vibrations	Duration of Motion
1909		h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
Sept. 8 a.m.	N	11 59 47	12 08 13	12 22 27	12 23 34	1 22 27	60 ca.
	E						
" 19 p.m.	N	(3 43 14)	3 46 14	3 49 54	3 50 42	3 57 42	14 16
	E						
" 22 a.m.	N	9 48 29	9 53 47	9 58 37	9 59 48	10 20 01	31 42
	E	9 48 26	9 53 40	9 58 32		10 28 45	40 19
Oct. 3 p.m.	N	4 04 34		4 05 17	4 05 38	4 07 38	3 04
	E	3 57 46		4 05 42	4 08 08	4 14 33	16 47
" 6 p.m.	E			9 55			
" 19 a.m.	N			3 44 27		4 — —	
	E			3 44 22		4 — —	
" 20 p.m.	N	7 05 56	7 17 05	7 31 10	7 35 56	8 29 38	1 13 42
	E						
" 21 p.m.	N			1 41 00		1 41 50	50
	E			1 40 56		1 41 34	38
" 29 a.m.	N		?2 07 20			2 14 20	7 00
	E						
" 31 a.m.	N	5 29 24	5 35 07	5 44 10	5 44 30	6 50	1 20 00
	E						
Nov. 10 a.m.	N	1 31 33	1 46 13	1 57 46		2 45	1 13 27
	E						
" 12 p.m.	N			6 45		6 45 50	50
	E						
" 21 a.m.	N			3 36 55		3 58 00	22 00
	E			3 36 55	3 47 00	3 51	14 00
Dec. 9 a.m.	N						
	E		11 40 24	11 46 07	11 47 59	12 42 00	1 7 00
" 9 p.m.	N						
	E	7 04 08	7 16 08	7 27 28		7 56 00	48 00
1910							
Jan. 1 a.m.	N	6 07 49	6 12 40	6 16 20	6 17 08	8 40	2 32 00
	E	6 07 45	6 12 27	6 16 08	6 18 08	8 05	2 — —
" 22 a.m.	N	3 55 47	4 01 43	4 06 55			
	E	3 55 35	4 01 40	4 07 19	4 09 20	6 27 00	2 31 00
" 23 p.m.	N	1 56 06	2 01 26	2 05 21	2 05 21	2 25	41 48
	E		2 01 26	2 03 22	2 03 55	2 37 54	41 48
" 28 p.m.	N						
	E	11 46 20	11 51 26	11 55 10		12 20 00	33 40
Feb. 4 a.m.	N			8 32			
	E						

There are 352 milled divisions on edges of head-stocks for adjusting period of pendulums; and the crossbar carrying same has two threads to 1 mm. The horizontal displacement of the upper point of support for each turn of one division of milled edge of head-stock thus equals 0.00284 cm.

The geographical position of the Station as determined by Professor Willson is L. 42° 22′ 36″ N., Long. 71° 6′ 59″ W. from Greenwich.

The orientation of the two components as determined from the meridian carried into the instrument room by Mr. Burke is as

from Sept. 8, 1909, to July 29, 1910.

TION OF		DISTANCE		Range	REMARKS
lst Preliminaries	All Preliminaries	$1+\Delta=V_2-V_1$	$3=\Delta W_1-V_1$		
h. m. s.	m. s.	Miles	Miles	mm.	
8 26	24 40	4300		8	Began Washington 11: 59: 52.
8 25	22 45	4300		9	
					Shocks reported in Amazon Valley.
					Illegible.
5 18	10 08	2300	2100	7	No press reports.
5 14	10 06	2200	2100	2	
				3	No press reports.
	7 56		1642	1	
					Waves in short group. Shocks reported in Idaho.
				3	Time uncertain.
				1	"
11 09	25 15	6700	5225	5	Readings doubtful.
				4	Undecipherable.
					A group of 3 waves; 16.6s period.
					" 12.6s "
					Shocks on Pacific Coast at 1:45 a. m.
					Illegible.
				18	5: 29: 24 possibly $=V_2$.
					E. W. component locked by damper.
14 40				1.5	Quake reported in Bungo Channel, Japan,
				3.0	about this time.
					4 waves of ca. 15 secs. period.
					E. W. record erased.
				0.4	Doubtful readings. Reported earlier at Ann
				0.5	Arbor, Mich., Japan?
				0.4	
				0.5	Not reported. $2\Delta-1=W_1-V_2=2050$ mi.
					Earthquake at Guam Id.
12 00	23 20			3	
4 55	8 57	2050	1800	61	Shock reported at Vicio Chico, Quintana
4 42	8 23	2000	2750	111	Roo, Mexico (Yucatan) and Swan Id.
5 56	11 08	2700	2500	150+	Needle fell out near Max. Quake reported
6 05	11 44	2750	2800	150+	at Seydisfiord, Iceland, 3:45 a. m.
5 20	9 15	2300	1914	4	Quake reported at St. Vincent, W. I. I., at
				14.7	2.50 p. m. 60° time.
				.2	
				.75	Distant 1750 mi.?
					Group of 2nd P. T. s with W_1 at 8:32 a. m. and
					again at 4 p. m.

Records of the Station

75th Meridian Date		Beginning of V_1	Beginning of V_2	Beginning of W_1	Maximum Motion	End of Vibrations	Duration of Motion
1910		h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
Feb. 28 p.m.	N	4 16 43		4 29 49			5 16
	E	4 16 31		4 29 46			
Mar. 11 a.m.	N			2 13 38	2 14 15		
	E						
" 18 p.m.	N		7 31 22		7 32 33	7 40 58	9 36
	E		7 30 33		7 35 05	7 56 45	26 02
" 25 a.m.	N	10 35 04	10 44 08	10 59 20	11 03 59		
	E				11 03 45		
" 30 p.m.	N		12 34 21	1 00 11	1 03 25	2 25	1 50
	E		12 34 17	12 58 10	1 03 45		
" 31 p.m.	N		2 13 44	2 16 34	2 17 09		
	E		2 05 01	2 16 29	2 17 33		
Apr. 3 p.m.	N		2 28 18	2 39 35	2 43 31	2 54 06	25 48
	E			2 37 08		2 44 20	7 12
" 11 p.m.	N	7 40 29	7 46 57	7 52 29			
	E	7 41 21	7 48 37	7 52 29			
" 13 a.m.	N						
	E		1 57 34	2 01 07	2 04 17	2 10 25	12 48
" 16 p.m.	N			8 43		8 51 08	
	E	8 36 02	8 39 32	8 42 22			(25 06)
" 18 p.m.	N			11 45 39		11 47 29	1 50
	E			11 44 39		11 46 01	1 22
May 1 p.m.	N		2 19 52	2 34 34	2 38 34	3 55 30	35 38
	E						
" 4 p.m.	N	7 35 13		7 46 27	7 48 46	8 07 26	32 13
	E	7 39 44		7 44 26	7 45 26	8 15 00	35 34
" 10 p.m.	N			1 45 27		1 58	12 +
	E			1 46 03			
" 11 a.m.	N	2 31 16		2 38 52		2 51	19 46
	E	2 35 43		2 39 30		2 50	14 47
" 12 a.m	N		4 19 29	4 41 09		4 47 06	27 37
	E		4 19 03	4 39 56		4 40 58	21 55
" 13 a.m.	N	3 08 05	3 15 33	3 31 56	3 34 33	5 30	2 22 —
	E	3 05 29	3 15 29	3 31 24	3 34 45	6 26	3 10 —
" 14 p.m.	N			6 39 53	6 42 16	6 43	
	E			6 35 05	6 41 21	7	
" 15 a.m.	N						
	E			10 22 22			
" 17 p.m.	N						
	E	3 31 16		3 56 05	4 01 39	4 20	
" 20 a.m.	N	7 12 24	7 16 52	7 23 52	7 24 36	8 16 32	1 04 08
	E	7 11 36	7 16 44	7 24 30	7 24 32	8 10	58 24
" 22 a.m.	N	1 36 42	1 47 18	2 06 56	2 11 27	2 37 25	1 00 43
	E	1 36 55	1 47 14	2 07 10	2 12 02	3 12 54	1 35 57
" 31 a.m.	N	12 03 20	12 09 04	12 18 42	12 21 50	1 05 38	1 02 18
	E	12 03 28	12 09 14	12 17 55	12 18 08	1 31 34	1 28 06
June 1 a.m.	N	1 16 13		2 01			
	E	1 16 21		1 57 36	2 04 26	3 36 16	2 19 55
" 14 p.m.	N	2 45 51	2 51 18			3 44	
	E	2 45 45	2 50 13	2 56 13		3 48	1 03 15
" 16 a.m.	N	1 49 29	2 00 27	2 08 17	2 09 33	4 20	
	E		1 51 19	2 01 05	2 05 10	4 50	
" 17 p.m.	N						
	E			12 22 15	12 27 15	1 15 05	52 50
" 25 p.m.	N	2 17 27	2 36 56	2 57 39		4 10	
	E	2 20 55	2 36 35	3 00 40	3 06 08	4	

from Sept. 8, 1909, to July 29, 1910 (*Continued*).

TION OF		DISTANCE		Range	REMARKS
1st Preliminaries	All Preliminaries	$1+\Delta=V_2-V_1$	$3\Delta=W_1-V_1$		
h. m. s.	m. s.	Miles	Miles	mm.	
1 00	13 06			13	
	13 13		2750	12	
				1.5	Quake reported in California at 10:55 p. m. March 10.
					Origin west of 90th Meridian.
				3.75	
			5000	0.675	
1 50 39					
			*3850		*$2\Delta-1=W_1-V_2$
			3500		Doubtful beginnings.
6 28	12 00	3050	2484	1.2	8: 13: 35 reflected L.?
7 16				3.0	8: 14: 15 " "
					Chronograph stopt. N–S.
				1.0	O. in Costa Rica.
				0.2	Beginning uncertain.
				0.8	"
				0.8	Quake felt at Helena, Montana, at 11:30
				1.0	p. m.
			*4675	1.0	*$2\Delta-1=W_1-V_2$.
					E. W. held by damper.
	11 14		2350	1.0	Cartago, Costa Rica, destroyed by Q
				3.0	
					Quavers from ca. 9 a. m. until 5 p. m.
	7 39		1580		San Domingo Q.
			6480	0.2—	V_1 at Ottawa 4: 11: 03.
			6790	0.2+	Distance $=2\Delta-1=W_1-V_2$.
6 18	16 23			13.6	Shocks in Costa Rica this a. m.
9 41	25 26			20.0	
				0.6	
				1.0	
					Quakes reported at Los Angeles from 6: 50 to 7: 53 a. m.
					No distinct record N–S. [parallax.
	14 49		3300	1.0	Hour may be 2 or 4 with corrections for
4 28				4.0	
4 08				9.25	
10 36	30 14	5975	6250	2.0	
10 19	30 15			2.0	
5 44	15 22	2400	3200	6.25	Time uncertain, as given, slow: Q at
5 46	14 45	2450	3000	9.9	Guerrero, Mex.
				1.0	
				4.2	
5 27		2760			Record not clear.
4 28	10 15	1850	2150		
10 58				5.0	2nd W_1 2–22–56; M at 2–27–43.
				92.7	2nd W_1 2–27–47; M at 2–30–33.
					No record N–S.
				1.0	Periods of 15.4 secs.
				1.0	N–S. readings doubtful.
15 45	39 45		8250	1.6	" "

Records of the Station

75th Meridian Date		Beginning of V_1	Beginning of V_2	Beginning of W_1	Maximum Motion	End of Vibration	Duration of Motion
1910							
		h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
June 27 a.m.	N	1 03 01				1 13 09	10 —
	E	1 03 34					
" 29 a.m.	N					4 37	
	E		3 45 14	3 48 49		4 30	
" 29 a.m.	N	6 13		6 44	6 46	8 20	
	E	6 14		6 45	6 48	8 22	
" 29 a.m.	N						
	E			10 20 27		11 02 45	
July 3 a.m.	N		4 28 48			4 47 46	
	E		4 29 18			6	
" 6 p.m.	N	11 47 59		12 00 28	12 01 40	12 50	1 02 —
	E						
" 7 a.m.	N	?3 36 23	3 38 41	3 57 20			
	E						
" 17 a.m.	N						
	E		3 13 58			3 19 32	5 34
" 17 a.m.	N	5 07 41	5 13 17	5 21 31			
	E						
" 19 p.m.	N						
	E	10 46 58	i10 55 12	11 01 53	11 03 04	11 26	39
" 24 a.m.	N			11 25 08	11 30 59	11 50	24
	E			11 19 50	11 26 05	11 36	16
" 29 a.m.	N	5 48 26		6 34 28	6 38	8	2 11
	E			6 36	6 38 37	7 57	1 21

N. B. These records are from undamped pendulums and the times of maximum motion and range of the pendulums cannot be taken as the basis for the calculation of the motion of an earth particle.

follows: Pendulum 59B pointing northward, N. 3° 38′ 24″ E. Pendulum 59A pointing eastward, N. 93° 38′ 24″ E.

Since the last Report a helpful exchange of data including the times of principal phases of seismic motion for recorded quakes has been established with the stations at Albany, N. Y., Ottawa, Canada, Cleveland, O., and Seattle, Wash.

The time at the Station has throughout the year been obtained by telephonic comparison with Harvard Observatory. Mr. George M. Flint has performed the ordinary routine work of the instrument room except on Sundays and holidays when I have set up the recording drums. During the summer vacation Mr. Holmes, the janitor, maintained a satisfactory service.

Seismographic station chart: The accompanying chart, Plate 4, designed to facilitate the work of ascertaining the epicenter of distant quakes, is based upon the determination of the distance

from Sept. 8, 1909, to July 29, 1910 (*Concluded*).

TION OF		DISTANCE		Range	REMARKS
1st Preliminaries	All Preliminaries	$1+\Delta=V_2-V_1$	$3\Delta=W_1-V_1$		
h. m. s.	m. s.	Miles	Miles	mm.	
					Periods of 6 sec.
				2.0	
				23.0	
				1.5	
				0.7	
				0.5	
	12 29		2600		
				9.0	E. W. ticker out of order.
					Not reported from other Stations N. & W.
					Began 3–14 at Ottawa.
5 36	13 50	2500	2860		
				0.50	
	14 58		3100	0.2	
					Shocks reported at Rock Springs, Wyo.,
				1.0	last night and this a. m.
	49 34		10250		Indistinct records.

by Laska's rules I and II. By Rule I, the distance in megameters is equal to the difference in minutes between the times of arrival of the 1st and 2nd preliminaries, minus 1; by Rule II, the difference between the times of arrival of the 1st preliminary and the main or long waves in minutes is three times the distance in megameters. For ascertaining the distance by the chart, where the 1st and 2nd preliminaries are known, find their difference in minutes and parts of a minute (seconds or tenths); enter the table at the bottom on the line of minutes, and above in the line of megometers or miles as desired will be found the distance by Laska's Rule I. If the distance in degrees of arc is desired, follow the vertical line up to the line of Degrees of arc. To obtain the distance according to Laska's Rule I with Benndorf's Corrections, enter the table as before, and follow the oblique lines which will give the best reading. To obtain the distance by Rule II, enter the table above at the line marked Laska's Rule II; follow down to the lines of miles or kilometers as before.

To obtain the time of the earthquake at the epicenter, find the distance by the rules as given, and follow up to the top lines where the nearest figure will give the amount in minutes and hundredths to be subtracted from the time of arrival of the 1st or 2nd preliminary as may be required. In the blank space the names of countries, seismic areas, or cities may be entered at their appropriate distances from the Station at which the chart is used.

REPORT ON THE MAMMALS.

By Outram Bangs.

Acceptable additions to the Department of Mammals have been received from Messrs. G. M. Allen, Thomas Barbour, William Barbour, Henry B. Bigelow, Theodore Lyman, George Nelson, W. L. Smith, A. H. Thayer, J. E. Thayer, and J. A. Wollfsolin. Exchanges have been effected with the British Museum and with the Muséum d'Histoire Naturelle, Paris.

Publications. August 1, 1909–July 31, 1910.

List of the mammals of Labrador. Grenfell's Labrador, New York, 1909, p. 458–468.

A new race of the Pileated Woodpecker. *Proc. N. E. zoöl. club*, 2 April, 1910, vol. 4, p. 79–80.

A new Gallinule from the Lesser Antilles. *Proc. N. E. zoöl. club*, 2 April, 1910, vol. 4, p. 81–82.

Unrecorded specimens of two rare Hawaiian birds. *Proc. Biol. soc. Washington*, 4 May, 1910, vol. 23, p. 67–70.

New or rare birds from western Colombia. *Proc. Biol. soc. Washington*, 4 May, 1910, vol. 23, p. 71–76.

A new humming-bird from the Sierra Nevada De Santa Marta, Colombia. *Proc. Biol. soc. Washington*, 24 June, 1910, vol. 23, p. 105–106.

A new Tinamou from Lake Titicaca. *Proc. Biol. soc. Washington*, 24 June, 1910, vol. 23, p. 107–108.

REPORT ON THE BIRDS.

By William Brewster.

The most important collection of birds received is that which Dr. John C. Phillips has given to the Museum. It contains upwards of two thousand skins. Most of these were obtained in eastern Mexico by the well-known professional collector F. B. Armstrong who traversed Tamaulipas from the Texas border almost to Vera Cruz. To Mr. John E. Thayer we are indebted for some six or seven hundred birds from various localities, including certain of the islands off the coast of California. Other acceptable gifts have been received from Messrs. G. M. Allen, Thomas Barbour, Gorham Brooks, Childs Frick, R. H. Howe, Jr., F. W. Putnam, H. H. Smith, and W. L. Smith. A few specimens have been sent in exchange to the National Museum and a considerable number have been loaned for study.

Publications. August 1, 1909–July 31, 1910.

In Memoriam: James Cushing Merrill. *Auk*, April, 1910, vol. 27, p. 113–119.

Resurrection of the Red-legged Black Duck. *Auk*, July, 1910, vol. 27, p. 323–333.

REPORT ON THE REPTILES, BATRACHIANS, AND FISHES.

By Samuel Garman.

Two large additions to the collections of fishes have been received, one from the U. S. Bureau of Fisheries, consisting of a series of pelagic and shore fishes, not including any of those commonly described as deep sea fishes, secured during Mr. Agassiz's researches in the Pacific Ocean; the other from the Carnegie Museum, Pittsburgh, contains a set collected in British Guiana by Professor Eigenmann and his aids. Other contributions were received from Messrs. Thomas Barbour, William Brewster, S. M. Johnson and A. P. Morse. Purchases of mounted specimens have made large additions to the material in the exhibition rooms. Central American specimens were purchased of Mr. Wm. B. Richardson. A number of large serpents, some tortoises, and a caiman were presented by the New York Zoological Society. The tortoises loaned to Mr. Walter Rothschild for study have been returned and the purchase of a series of mounted specimens, some of them among the largest yet known, has greatly increased the Museum's representation of the Testudinata of the Galapagos Islands. By means of exchanges with the Museum Senckenbergianum important series of reptiles and batrachians from Africa, Madagascar, and parts of Asia were obtained. Mr. John E. Thayer's collections in central China furnished a large number of valuable specimens, especially of fishes. With few exceptions the new material was received in excellent condition; the greater portion of it is already classified and named.

REPORT ON THE ENTOMOLOGICAL DEPARTMENT.

The collections of the Entomological Department have received acceptable additions through the kindness of Miss Elizabeth B. Bryant, Messrs. G. M. Allen, Thomas Barbour, W. C. Farabee, W. G. Farlow, D. B. Fay, E. N. Fischer, C. A. Frost, J. G. Jack, A. P. Morse, F. W. Putnam, Roland Thaxter, and A. M. Tozzer.

The W. G. Dietz collection of Coleoptera was acquired by purchase. Some fossil insects from Green River, Wyoming, collected by the late Prof. Leslie A. Lee and described by Mr. S. H. Scudder were purchased of Mrs. Lee.

Some work of rearrangement of parts of the Hemiptera Heteroptera has been carried out and portions of the Hayward and Dietz collections have been incorporated with the general collection.

REPORT ON THE CRUSTACEA AND MOLLUSCA.

By Walter Faxon.

Very valuable contributions to the Museum's collection of Mollusca have been received during the past year from the Rev. R. K. Smith and Mr. W. F. Clapp. These gifts include a lot of marine shells from Buzzard's Bay and another from Cape Cod Bay, together with an assemblage of the land and fresh-water Mollusca of the basin of Lake Champlain. Mr. Clapp has also presented a collection of shells secured by him on the west coast of Florida, with fossil shells from the Caloosahatchie River, Fla.

Mr. Clapp has contrived by ingenious devices, known only to the skillful collector, to secure many species in considerable numbers that have heretofore been deemed excessively rare by collectors, and he has also by persistent labor increased the knowledge of the geographical distribution of many of our native species of Mollusca.

Other donors whose favors should be acknowledged are Messrs. Thomas Barbour, S. S. Berry, Hiram Bingham, R. T. Jackson, and S. B. Warner.

REPORTS ON THE LOWER INVERTEBRATES.

ECHINODERMS.

By Hubert Lyman Clark.

The work on the card catalogues of ophiurans, Echini, and holothurians has occupied most of the time during the past year. While only a small part of the holothurians has been catalogued, the work on the Echini has been carried nearly through the Regulares and the catalogue of the ophiurans has been completed. The collection of ophiurans includes some eighteen thousand specimens of more than seven hundred species. There are more than a hundred holotypes and nearly a hundred and fifty cotypes of ophiurans.

A report on the Echinoderms of Peru has been prepared for the Ministerio de Fomento of the Peruvian government. It is based upon a collection made in 1907–1908 by Dr. Robert E. Coker and presented to the Museum by the Peruvian government. There are 268 specimens of 21 species, and they form the chief addition of the year. There were no important additions from exchanges, but a very valuable series of flexible sea-urchins (Echinothuridae), 49 specimens of nine species, was received from the United States National Museum. Other donations have been received from Messrs. W. B. Benham, T. S. Hall, R. T. Jackon, and S. B. Warner. A fine series of echinoderms was sent to the Frankfort Museum in return for a desirable lot of reptiles.

Publications. August 1, 1909–July 31, 1910.

Alexander Agassiz and Hubert Lyman Clark.

Hawaiian and other Pacific Echini. The Echinothuridae. *Mem. M. C. Z.*, November, 1909, vol. 34, p. 135–206, 30 pls.

Hubert Lyman Clark.

Scientific Results of the Trawling Expedition of H. M. C. S. "Thetis," off the coast of New South Wales, in February and March, 1898. Echinodermata. *Australian museum, Memoir IV*, part 11, 11 August, 1909, p. 517–564, 12 pls.

ACALEPHS.

By Henry B. Bigelgw.

During the past year an unusual number of accessions in this Department has been received. The most important is the duplicate set of siphonophores collected by H. M. S. "Research" in the Bay of Biscay in 1900. These specimens received through Mr. G. H. Fowler add many species, several represented by large series, to the Museum collection. Noteworthy also are two large and excellently preserved collections of Medusae, one from the Philippine Bureau of Science, the other from Puget Sound, from the University of Washington through Professor T. Kincaid. Specimens have also been given by Dr. A. G. Mayer, Mr. Thomas Barbour, and Mr. Howard J. Shannon. A small collection of Medusae has been received from the Berlin Museum in exchange. Purchases for the year are series of Medusae, hydroids, siphonophores and ctenophores from Naples and from Woods Hole, Mass., part of which have been placed on exhibition; also a specimen of *Rhopilema verrillii* Fewkes collected at Branford, Connecticut, by Professor A. E. Verrill. The "Albatross" collections of Hydromedusae made in the Philippines, and the Medusae, siphonophores and ctenophores collected in the Northwestern Pacific, have been received for study.

During the year I have been occupied with the reports on the siphonophores of the "Albatross" Eastern Pacific, and of the "Research" Biscayan Expeditions.

Publications. August 1, 1909–July 31, 1910.

Cruise of the U. S. Fisheries Schooner "Grampus" in the Gulf Stream during July, 1908, with description of a new Medusa (Bythotiaridae). *Bull. M. C. Z.*, August, 1909, vol. 52, pp. 193–210, 1 plate.

Coelenterates from Labrador and Newfoundland, collected by Mr. Owen Bryant from July to October, 1908. *Proc. U. S. nat. mus.*, 14 December, 1909, vol. 37, p. 301–320, pl. 30–32.

REPORT ON THE DEPARTMENT OF VERTEBRATE PALAEONTOLOGY.

By Charles R. Eastman.

Departmental work has been carried on during the past year along essentially the same lines as heretofore, fossil fishes having formed the chief subject of investigation.

An exchange with the Museum of Wesleyan University at Middletown has been arranged and a report prepared on the Triassic fishes of the Connecticut River Valley, which will be published by the Geological and Natural History Survey of Connecticut.

Through Prof. Charles Schuchert, of Yale University, we have received for study and exchange a quantity of Tertiary and other fish remains from the western United States, including some from the supposed Oligocene of Florissant, Colorado. These last are interesting, especially in view of fresh discoveries of Tertiary fishes from Nevada, and quite recently from Washington, the actual specimens having become the property of the Museum.

Additions.

A miscellaneous assortment of fossil vertebrate remains from the English Crag and Cretaceous, transferred from the Department of Invertebrate Palaeontology.

A fine specimen showing the well-preserved head and anterior portion of the trunk of a species of Hypsocormus, from the Lithographic Stone, Upper Jura, of Solenhofen, Bavaria. Presented by Mr. Samuel Henshaw.

A nearly complete skeleton of *Diplomystus dentatus*, from the Green River Eocene of Uinta County, Wyoming. (L. A. Lee Collection.) Purchased.

Holotype of *Xiphotrygon acutidens* Cope, from the Green River Eocene of Twin Creek, Wyoming. (L. A. Lee Collection.) Purchased.

Publications. August 1, 1909–July 31, 1910.

A new species of Helodus. *Annals Carnegie museum*, June [August], 1909, vol. 5, p. 488–489.

Recent literature on ancient animal names and effigies. *Amer. journ. philology*, [October], 1909, vol. 30, p. 322–331.

Mylostomid palatal dental plates. *Bull. M. C. Z.*, December, 1909, vol. 52, p. 259–270.

Scoville family brochure. June, 1910.

REPORT ON THE GEOLOGICAL COLLECTION.

By Robert W. Sayles.

During the year, 225 specimens have been added to the collections. Most of these are fossils purchased for the historical collection, which up to the present time has been very inadequately represented.

Dr. Laurence La Forge and the Assistant have made a collection of rock specimens to illustrate the stratigraphical and petrographical geology of the Boston region. This collection is now on exhibition.

Three new wall cases are partially filled with specimens.

Publication. August 1, 1909–July 31, 1910.

Glacial clays of the Maine coast. *Science*, 31 December, 1909, new ser., vol. 30, p. 968.

REPORT ON THE LIBRARY.

During the year from August 1, 1909, to July 31, 1910, inclusive, 1,269 volumes, 1,898 parts of volumes, and 1,559 pamphlets have been added to the Library.

The total number of volumes in the Library is 46,924, the total number of pamphlets is 43,367.

Five hundred and seventy-one volumes have been bound.

[A]

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

FOR THE YEAR 1909–1910.

BULLETIN: —

Vol. LII.

No. 11. 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, Lieut. Commander L. M. Garrett, U. S. N., Commanding. XIX. Pycnogonida. By Leon J. Cole. pp. 10. 3 Plates. August, 1909.

No. 12. Cruise of the U. S. Fisheries Schooner "Grampus" in the Gulf Stream during July, 1908, with description of a new Medusa (Bythotiaridae). By Henry B. Bigelow. pp. 18. 1 Plate. August, 1909.

No. 13. 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, Lieut. Commander L. M. Garrett, U. S. N., Commanding. XX. Mutations in Ceratium. By Charles Atwood Kofoid. pp. 48. 4 Plates. September, 1909.

No. 14. Mylostomid palatal dental plates. By C. R. Eastman. pp. 12. December, 1909.

No. 15. Notes on the herpetology of Jamaica. By Thomas Barbour. pp. 32. 2 plates. May, 1910.

Vol. LIII.

No. 3. Maturation, fertilization, and segmentation of Pennaria tiarella (Ayres) and of Tubularia crocea (Ag.). By George T. Hargitt. pp. 54. 9 Plates. October, 1909.

No. 4. The peripheral terminations of the eighth cranial nerve in vertebrates, especially in fishes. By R. C. Mullenix. pp. 38. 6 Plates. November, 1909.

Vol. LIV.

No. 1. The parasitic Hymenoptera of the Tertiary of Florissant, Colorado. By Charles T. Brues. pp. 126. 1 Plate. January, 1910.

MEMOIRS: —

Vol. 27.

No. 3. 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. XLIV. Les pénéides et sténopides. Par Alphonse Milne Edwards et E. L. Bouvier. pp. 98. 9 Plates. August, 1909.

Vol. XXXIV.

No. 3. Hawaiian and other Pacific Echini. The Echinothuridae. By Alexander Agassiz and Hubert Lyman Clark. pp. 70. 30 Plates. November, 1909.

Vol. XL.

No. 1. Solenodon paradoxus. By Glover M. Allen. pp. 54. 9 Plates. June, 1910.

REPORT: —

1908–1909. pp. 49. 3 Plates. December, 1909.

[B]

INVESTED FUNDS OF THE MUSEUM.

In the Hands of the Treasurer of Harvard College.

Sturgis Hooper Fund	$108,511.23
Gray Fund	50,000.00
Agassiz Memorial Fund	297,933.10
Teachers and Pupils Fund	7,594.01
Permanent Fund	117,469.34
Humboldt Fund	7,740.66
Virginia Barret Gibbs Fund	5,908.60
Willard Peele Hunnewell Memorial Fund	5,000.00
Maria Whitney Fund	5,526.10
	$605,683.04

The payments on account of the Museum are made by the Bursar of Harvard College, on vouchers approved by the Curator. The accounts are annually examined by a committee of the Overseers. The only funds the income of which is restricted, the Gray, the Humboldt, and the Maria Whitney Funds, are annually charged in an analysis of the accounts, with vouchers to the payment of which the income is 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 $300.) 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 Maria Whitney Fund can be applied for the care (binding) and increase of the Whitney Library.

The income of the Virginia Barret Gibbs Scholarship Fund, of the value of $250., 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.

PLATE 1.

ALEXANDER AGASSIZ, 1904.

PLATE 2.

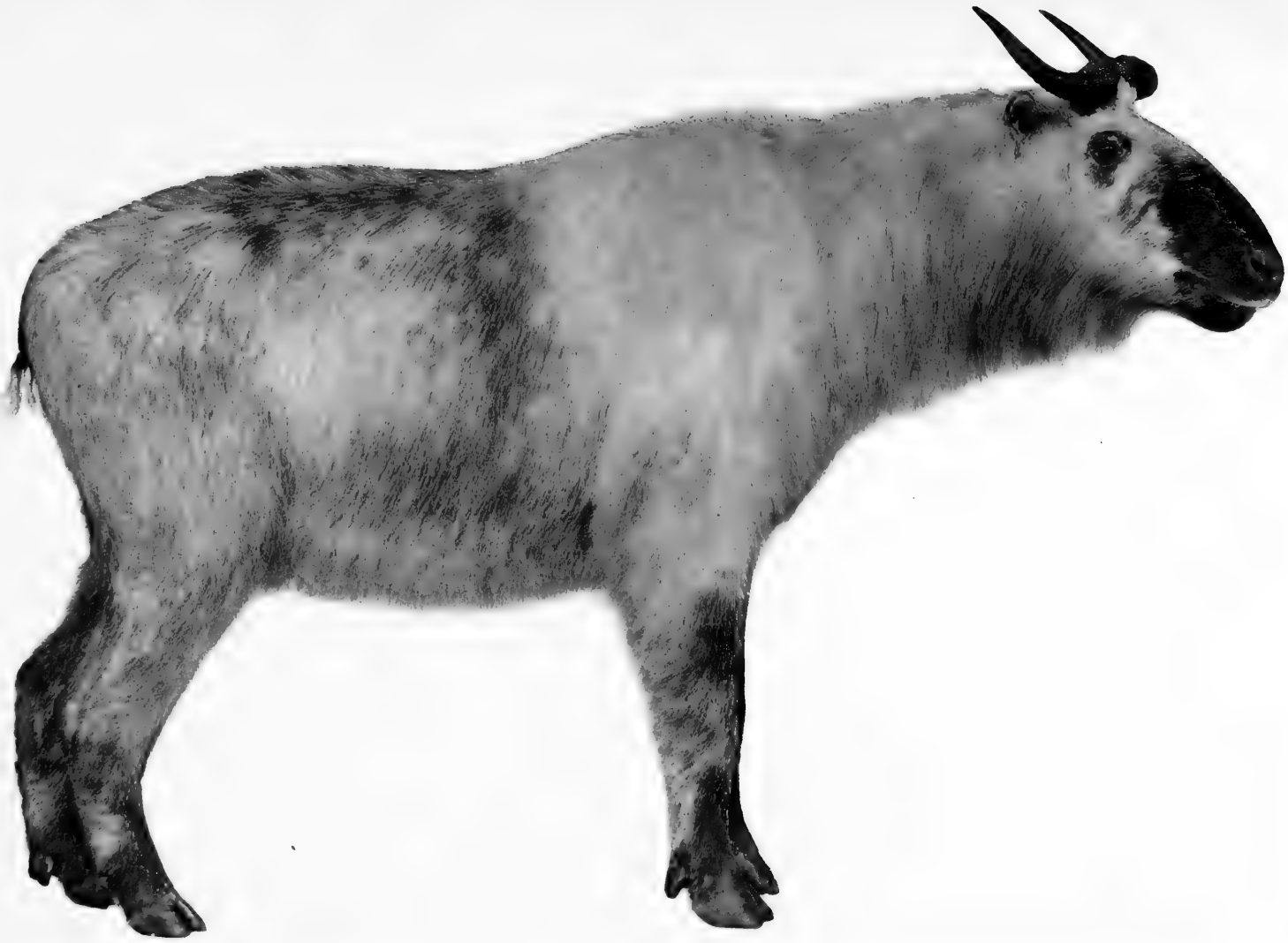
TIBETAN TAKIN.

PLATE 3.

SKELETON OF THE SOLITAIRE.

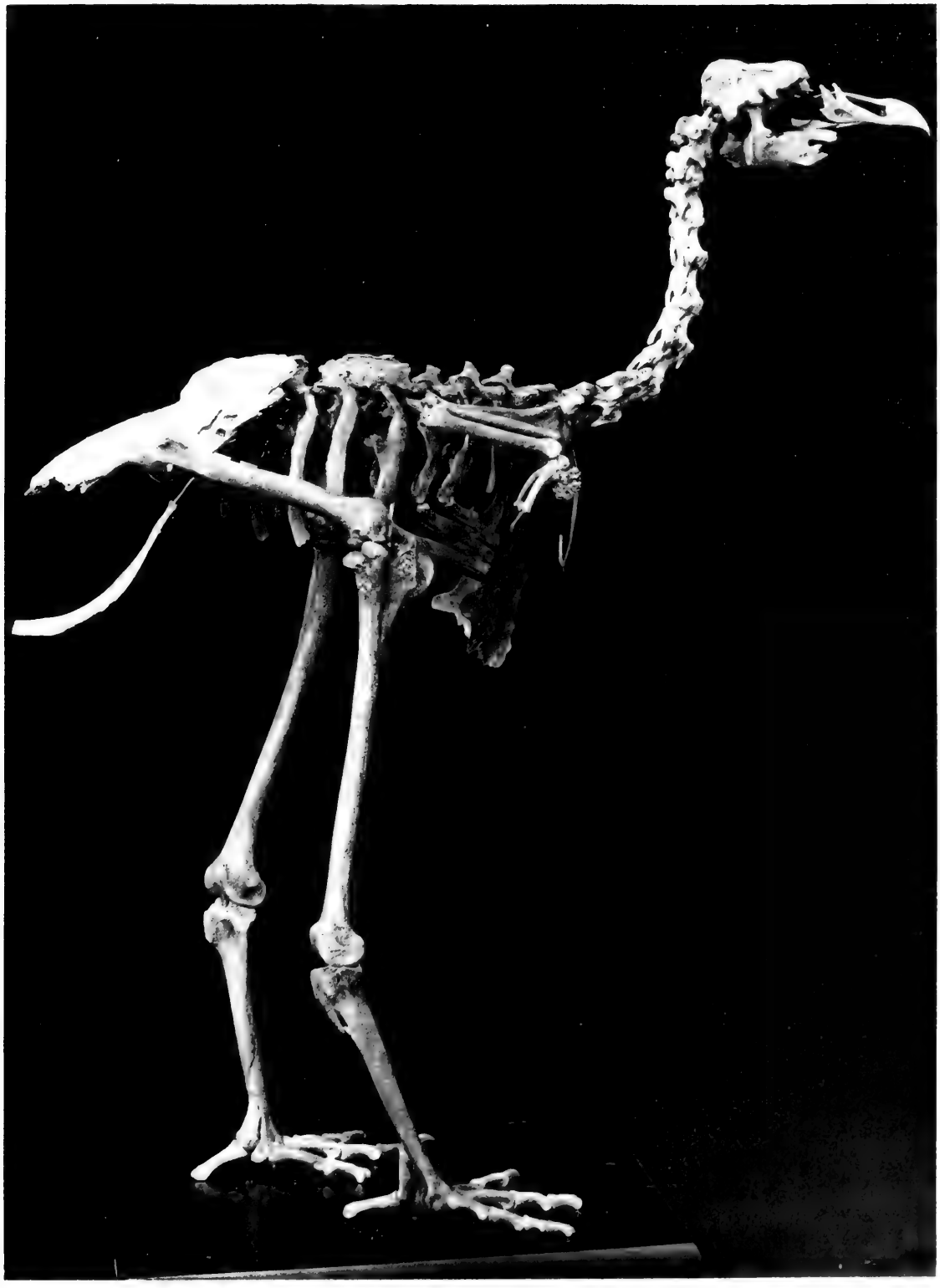
PLATE 4.

SEISMOGRAPHIC STATION CHART.

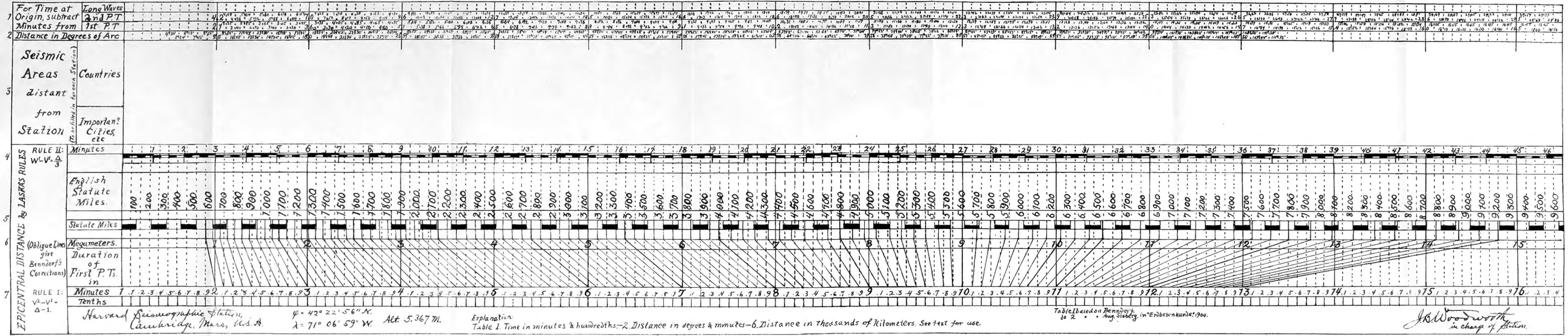


TIBETAN TAKIN

HELIOTYPE CO., BOSTON.



SOLITAIRE



Harvard Seismographic Station,
Cambridge, Mass., U.S.A.

φ = 42° 22′ 56″ N.
λ = 71° 06′ 59″ W.
Alt. 5.367 M.

Explanation.
Table I. Time in minutes & hundredths.—2. Distance in degrees & minutes—6. Distance in thousands of Kilometers. See text for use.

Table based on Benndorf's
do 2 " Aug. Sieberg, in "Erdbebenkunde" 1904.

J. B. Woodworth
in charge of Station.

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

LOUIS CABOT. Immature State of the Odonata, Part IV.
E. L. MARK. Studies on Lepidosteus, continued.
—— " On Arachnactis.
A. AGASSIZ and C. O. WHITMAN. Pelagic Fishes. Part II., with 14 Plates.
A. AGASSIZ and H. L. CLARK. The "Albatross" Hawaiian Echini.
S. GARMAN. The Plagiostomes.

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:—

C. HARTLAUB. The Comatulae of the "Blake," with 18 plates.
H. LUDWIG. The Genus Pentacrinus.
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: —

H. B. BIGELOW. The Siphonophores.
K. BRANDT. The Sagittae.
—— " The Thalassicolae.
O. CARLGREN. The Actinarians.
W. R. COE. The Nemerteans.
REINHARD DOHRN. The Eyes of Deep-Sea Crustacea.
H. J. HANSEN. The Cirripeds.
—— " The Schizopods.
HAROLD HEATH. Solenogaster.
W. A. HERDMAN. The Ascidians.
S. J. HICKSON. The Antipathids.
E. L. MARK. Branchiocerianthus.
JOHN MURRAY. The Bottom Specimens.
P. SCHIEMENZ. The Pteropods and Heteropods.
THEO. STUDER. The Alcyonarians.
—— The Salpidae and Doliolidae.
H. B. WARD. The Sipunculids.
W. McM. WOODWORTH. The Annelids.

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: —

A. AGASSIZ. The Echini.
H. L. CLARK. The Holothurians.
—— The Volcanic Rocks.
—— The Coralliferous Limestones.
J. M. FLINT. The Foraminifera and Radiolaria.
S. HENSHAW. The Insects.
W. C. KENDALL and E. L. GOLDSBOROUGH. The Fishes.
R. VON LENDENFELD. The Siliceous Sponges.
H. LUDWIG. The Starfishes and Ophiurans.
G. W. MÜLLER. The Ostracods.
MARY J. RATHBUN. The Crustacea Decapoda.
RICHARD RATHBUN. The Hydrocorallidae.
G. O. SARS. The Copepods.
L. STEJNEGER. The Reptiles.
C. H. TOWNSEND. The Mammals, Birds, and Fishes.
T. W. VAUGHAN. The Corals, Recent and Fossil.
W. McM. WOODWORTH. The Annelids.

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE.

There have been published of the BULLETIN Vols. I. to LII.; of the MEMOIRS, Vols. I. to XXIV., and also Vols. XXVIII., XXIX., XXXI. to XXXIII., XXXVII., and XLI.

Vols. LIII. to LV. of the BULLETIN, and Vols. XXV. to XXVII., XXX., XXXIV. to XXXVI., XXXVIII. to XL., XLII. to XLVII. of the MEMOIRS, are now in course of publication.

The BULLETIN and MEMOIRS are devoted to the publication of original work by the Professors and Assistants 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.

Contributions from the Zoölogical Laboratory, Professor E. L. Mark, Director.

Contributions from the Geological Laboratory.

These publications are issued in numbers at irregular intervals; one volume of the Bulletin (8vo) and half a volume of the Memoirs (4to) usually appear annually. 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 Curator of the Museum of Comparative Zoölogy, Cambridge, Mass.