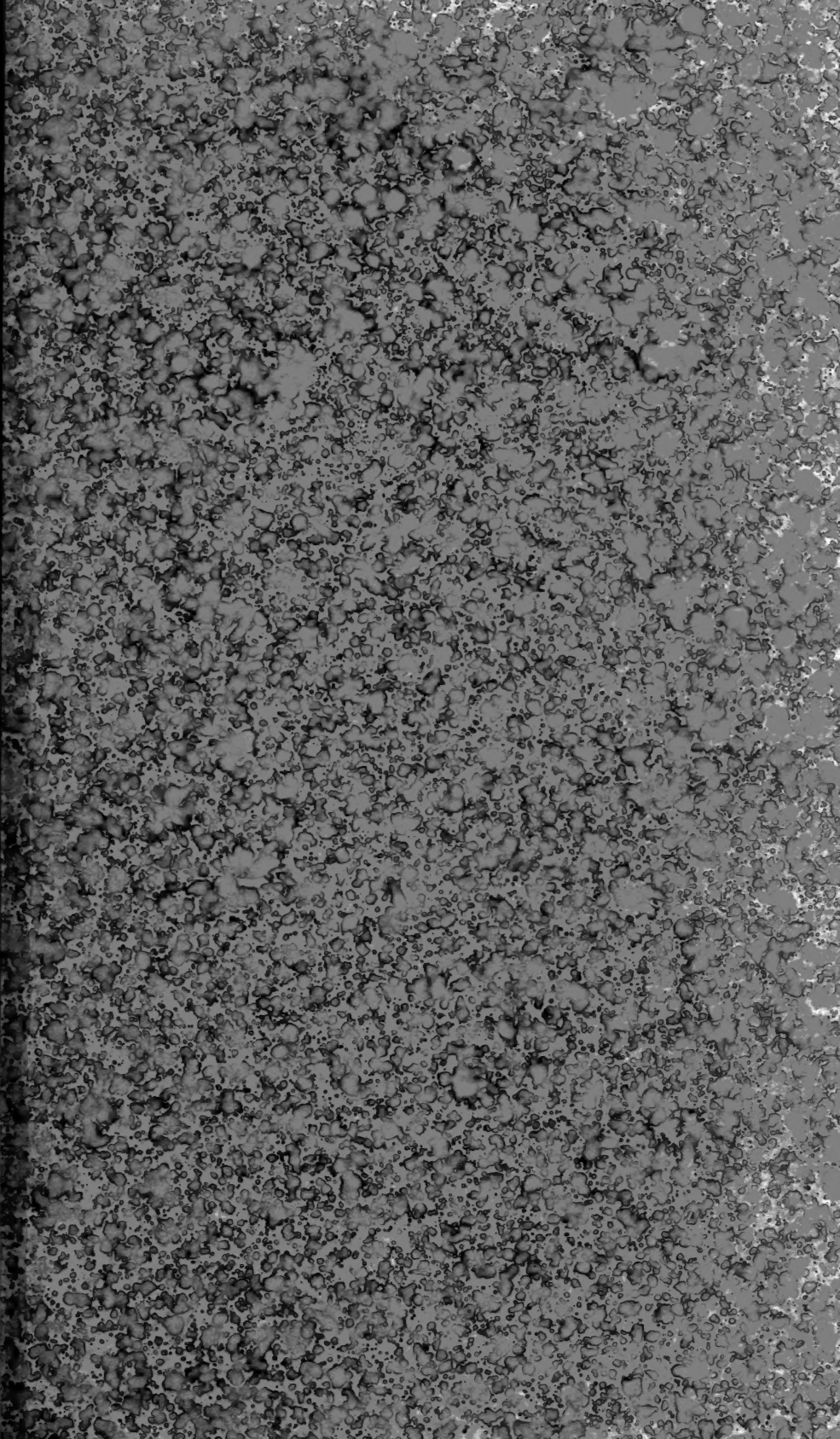


Halter - Faxon.



ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY

AT HARVARD COLLEGE,

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

FOR

1880-81.

CAMBRIDGE:

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1881.

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J. W. FEWKES,	<i>In charge of Radiates.</i>
PAULUS ROETTER,	<i>Artist.</i>
MISS F. M. SLACK,	<i>Librarian.</i>

REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE:—

DURING the past year the exterior of the northwestern corner-piece of the Museum building has been finished, and fair progress made towards the completion of the interior. Four of the rooms are now ready for use, and the greater part of the rest of the building will be finished during the coming year.

The usual instruction has been given at the Museum by Professors Whitney, Shaler, Hagen, James, Farlow, and Faxon, and by Messrs. Mark, Davis, and Wadsworth. For the details of these courses, I would refer to the special reports of the Professors and Assistants.

An arrangement has been made with Professor S. F. Baird, United States Fish Commissioner, by which the Museum will have the right to send annually one student to Wood's Holl to avail himself of the facilities for the prosecution of zoölogical research afforded by the new zoölogical station to be established by the Commissioner.

As in former years, two of the assistants of the Museum and two special students spent the greater part of the summer at my Newport Laboratory. The former devoted their time principally to embryological studies of Crustacea and Acalephs. A part of the collection of Crustacea dredged by the "Blake" has been returned by Professor Alphonse Milne-Edwards. Professor Oscar Schmidt has also returned the whole of the collection of "Blake" Sponges. Professor Carus has returned the Cephalopods.

Collections have been sent for study to Professor Verrill, to Dr. Meinert, to Mr. Simon, to Mr. Eaton, and to Count Keyserling.

The publications of the Museum during the past year are shown

in detail in Appendix A. to this Report. They consist of Bulletins by Messrs. Agassiz, Lyman, Verrill, Fewkes, Faxon, Wadsworth, Hamlin, Garman, Allen, and Hagen.

The preliminary Reports of the "Blake" collections have made excellent progress during the past year. Part I. of the Crustacea by Professor Alphonse Milne-Edwards has been published; also the preliminary Reports of the Starfishes by Professor Perrier, and of the Mollusca by Mr. Dall. The Reports on the Cephalopods by Professor Verrill, and by Mr. Wilson, E. B., on the Pycnogonidæ, have been issued in the Museum Bulletins. No. 2, Vol. VII. of the Memoirs containing the "Climatic Changes" by Professor J. D. Whitney has been issued, in connection with Professor Whitney; and the Second Part of the Immature State of the Odonata, the *Æschnina*, has been published by Mr. Louis Cabot.

The additions to the Library have not been quite so large as usual, as no extensive purchases were made this year.

Among the publications of the Assistants of the Museum not issued in the Museum publications, may be mentioned a monograph by Mr. J. A. Allen on the Seals, founded in part on Museum material, and published in the United States Geol. Survey Report.

Professor Shaler and Mr. Davis have published the first of a series of Memoirs intended to illustrate the principal features of the structure of the crust of the earth.

Mr. Lyman has published a paper on some remarkable deep-sea Ophiurans, in the Memoirs of the Boston Society of Natural History, and has also completed his final Report on the Ophiurans of the "Challenger."

I have myself seen through the press the final report on the Echini of the "Challenger" Expedition to be issued as Vol. III. of the Zoölogy of that expedition; it forms 321 pages and 65 plates.

During the past year the lower floor of the Systematic Collections of Mollusks and the South American Faunal room have been opened to the public, although the collections they contain are not yet properly labelled. Good progress has also been made in the arrangement of the Australian room, and the materials for the African and Indian Faunal Collections are coming in at a satisfactory rate. The completion of the exhibition rooms of the wing will now enable us to make the final arrangement of the Systematic Collection of Fishes and of Birds, as all the material foreign

to these collections has been removed to the proper storage rooms.

The Annelids have, as usual, been under the care of Dr. Mark. There is nothing special to report on this collection; the bulk of it is still in Europe in the hands of Professor Ehlers.

The Corals and Sponges have during the past year been in charge of Mr. Fewkes, who has selected sets of duplicates of the "Blake" Sponges for distribution, and commenced the arrangement of the Halcyonoids for the Systematic Collection.

A complete series of Blatschka glass models of Radiates has been added to the Systematic room of that group. Two important collections of Invertebrate palæozoic fossils have been purchased during the year, one the collection of Professor G. Washington Taylor, principally rich in fossil Cephalopods, from the New York Silurian. Also the collection of the Rev. F. H. Day, brought together during a series of twenty years, mainly from the Niagara limestone of Wisconsin, near Milwaukee.

During the past season Mr. Garman has been engaged in collecting fossil Vertebrates in the Bad-lands, supplementing the collection made by him from these localities during the previous year. Mr. Charles H. Sternberg has also been engaged in collecting for the Museum, and has brought together an admirable collection of Cretaceous Plants of Kansas. His collections, as well as a collection of Duplicates of Western Tertiary and Cretaceous Plants presented to the Museum by the Smithsonian, have been identified by Mr. Lesquereux, who has also examined a small collection made for the Museum by the Rev. A. Lakes, and a collection of Carboniferous Plants from Cannelton.

Mr. Sternberg, after making the collections of the Dakota group, moved further West, and has explored some of the well known Vertebrate fossil localities of Western Kansas. The collections of these explorations have arrived at the Museum; a more detailed report of their contents cannot be given at present, until they have been more carefully examined.

I may also mention among the valuable additions to the collections the invoices of Captain Cole of the West Indian Telegraph Company. Besides a couple of species of Rhizocrinus and some interesting Comatulæ and Corals, he has sent us a couple of good specimens of Umbellularia from the comparatively shallow depth of 160 fathoms, off the south coast of Porto Rico.

During the months of March and April I explored the Tortugas under the auspices of the United States Coast Survey. The late Superintendent, the Hon. Carlile P. Patterson, placed at my disposal a small steam launch, and I hoped to be able to explore the surface fauna of the Gulf Stream, and ascertain the part taken by the innumerable surface organisms in building up the base (plateau) upon which the coral reefs of Florida have been raised. Unfortunately the weather was not favorable for surface and pelagic work, and little could be accomplished in that direction. I have given an account of the work done by myself and my assistant, Mr. Fewkes, in Letter No. 5, addressed to Mr. Patterson and published in the Museum Bulletin. To Lieutenant-Commander Winn and Lieutenant-Commander Wright I am greatly indebted for the facilities they placed at my command. Captain Scammon, of the Revenue Cutter "Dix," was also authorized by the Treasury Department to assist us as far as practicable. On my way across from Jacksonville to Cedar Keys I had the opportunity cursorily to examine a section of the peninsula. Dr. Smith has described the limestones of the central and western part as belonging probably to the Vicksburg age, flanked only on the very shore by the newer postpleiocene limestones. From the rapid examination I was able to make, I am more inclined to consider that some of the younger limestones have been deposited further inland along the sides of the backbone described by Dr. Smith, and forming there elevated coral reefs similar to those now found in the Everglades. But a very careful survey of the Peninsula of Florida is needed to ascertain how far it extended south during the Vicksburg period, and what portion of it consists of the later limestones and is formed by ancient coral reefs.

ALEXANDER AGASSIZ,

Curator.

CAMBRIDGE, Oct. 1, 1881.

REPORT ON THE GEOLOGICAL DEPARTMENT.

BY J. D. WHITNEY, *Sturgis-Hooper Professor.*

AT the close of the preceding year the Sturgis-Hooper Professor was engaged in passing through the press Part I. of No. 2 of Vol. VII. of the Memoirs of the Museum, the same being the introduction to a general discussion of the climatic changes of later geological times, and containing that portion of the work which especially relates to the glacial and surface geology of the Cordilleras of North America. The remainder of this contribution to geological science is now in press, and will be issued without further delay. This will complete Vol. VII. of the Memoirs.

The following papers have been published during the past year, giving the results of work done in the Lithological department.

BY DR. WADSWORTH, ASSISTANT IN LITHOLOGY.

1. On the Origin of the Iron Ores of the Marquette District, Lake Superior. Proc. Bost. Soc. Nat. Hist., 1880, XX. 470-479; Eng. and Min. Jour., 1881, XXXII. 286.

2. On the Age of the Copper-bearing Rocks of Lake Superior. Proc. Am. Assoc. Adv. Sci., 1880, XXIX. 429-430; Eng. and Min. Jour., 1881, XXXII. 270.

3. The Volcanic Dust from Dominica. Nature, 1880, XX. 266, 267.

4. A Microscopical Examination of some Tufas from Florissant, Colorado. Bull. U. S. Geol. Survey, VI. 1881, pp. 286, 287.

5. On an Occurrence of Gold in Maine. Bull. Mus. Comp. Zoöl., 1881, Geol. Ser. I. 183.

6. A Microscopical Study of the Iron Ore or Peridotite of Iron Mine Hill, Cumberland, R. I. Ibid., pp. 183-187; Proc. Bost. Soc. Nat. Hist., XXI. 1881.

7. A Microscopical Examination of the Mt. Ktaadn Granites. Bull. Mus. Comp. Zoöl. 1881, Geol. Ser. I. 209, 210.

8. On Amygdaloidal Structure and Vein Formation, with special Reference to the Copper-bearing Rocks of Keweenaw Point, Lake Superior: being a Reply to Professor James D. Dana. *Proc. Bost. Soc. Nat. Hist.*, 1880, XXI. 91-103.

9. The Appropriation of the Name Laurentian by the Canadian Geologists. *Ibid.*, 1881, pp. 121, 122.

BY EDWARD R. BENTON, Ph. D.

10. The Amygdaloidal Melaphyr of Brighton, Mass. *Proc. Bost. Soc. Nat. Hist.*, 1880, XX. 416-426, with plate.

BY J. S. DILLER, Candidate for the degree of Sc.D.

11. The Felsites and their Associated Rocks north of Boston. *Bull. Mus. Comp. Zoöl.*, 1881, *Geol. Ser. I.* 165-180.

The chief portion of the material prepared for publication during the past year by Dr. Wadsworth remains in manuscript, awaiting revision and completion.

The work of arranging and describing the lithological collection has been continued from time to time, as other duties permitted. The collection has been increased by additions from various sources. Among these additions may be mentioned a suite of specimens from Salvador, received from Mr. W. A. Good-year, the head of the Geological Survey of that State. Of these slides have been prepared, and a preliminary catalogue made of the specimens, 146 in number. From Europe 101 hand specimens have been obtained by purchase, and 122 slides. These were especially selected for purposes of comparison and study. Specimens illustrating the local lithology have been added from time to time, and some have been collected by Dr. Wadsworth in New Brunswick. Some interesting things were obtained by the Sturgis-Hooper Professor in Europe, and especially two masses of basalt containing native iron, from Ovikak, in Greenland. These were presented by Professor Johnstrup of Copenhagen. Mr. J. H. Huntington has also presented some valuable specimens collected by himself in Arizona and Mexico. He has from time to time continued the work of preparing thin sections for the microscopic examination of the collection. The slides now on hand amount to 1839 in number.

The Sturgis-Hooper Professor lectured from the beginning of the college year until the middle of May, giving two distinct

courses,—one on Economical Geology, which was attended by students in the fourth year of the Engineering Course of the Lawrence Scientific School and by special students; the other on Dynamical Geology, attended chiefly by teachers of Harvard University and of the schools in Cambridge and the adjacent towns. In the course of Economical Geology, Dr. Wadsworth gave the lectures on Building Materials.

During the summer one professor from a Western college pursued a course of Micro-lithology under Dr. Wadsworth's direction.

The Sturgis-Hooper Professor spent the summer months, from June 1 to September 15, in examining various museums and scientific collections in Italian, German, Danish, Belgian, French, and English cities. He also made certain geological examinations, with reference to problems coming up for discussion in the Second Part of the "Climatic Changes." The localities visited were at the base of the Italian Alps, and along the northern edge of the glaciated region of the northern slope of that chain, in Bavaria and Austria.

Large additions have been made to the geological library during the past year, and it is expected that we shall soon be in possession, either by exchange or purchase, of all the publications of the great geological surveys now going on in Europe.

REPORT OF N. S. SHALER, ON THE INSTRUCTION IN
GEOLOGY AND PALÆONTOLOGY.

THE instruction given in my department has been as follows:—

NATURAL HISTORY 1. By William M. Davis, instructor in Geology. Lectures three times a week.

NATURAL HISTORY 4. *Elementary Geology*. Three times a week. By N. S. Shaler and W. M. Davis. Lectures three a week, and excursions, to one hundred and sixty students.

NATURAL HISTORY 8. *Advanced Geology*. By N. S. Shaler and W. M. Davis. Lectures three times a week. Laboratory and field work to twenty-two students.

GRADUATE COURSE No. j. *Field Geology*. Field and office work and the preparation of reports. By N. S. Shaler and W. M. Davis. Six students.

GRADUATE COURSE No. h. *Palæontology*. Twice a week. Lectures and laboratory work. By N. S. Shaler. Six students.

GRADUATE COURSE No. i. *Historical Geology*. Lectures twice a week. Laboratory work. By N. S. Shaler. Six students.

During the vacation period of this year the advanced students who desired such assistance were guided in their studies in the field. Some assistance was rendered to some of these gentlemen from the funds placed in the hands of the Professor for the inquiries into the statistics of mines in New England, which was carried on by the United States census. In this work, and in several special surveys, it has been found possible to give remunerative employment to a number of special students in Geology.

The collection for the use of students in Palæontology has received considerable accessions during the past year, and is now in fair shape for use. A large amount of material for a teaching collection in Physical Geology has been gathered together, but the want of space makes it impossible to use it in teaching. The elementary classes are now far too large to be accommodated

in the rooms open to them. A part of the teaching has, most inconveniently, been given in another University building.

In the last Annual Report an account of the courses of studies given in Zoölogy was prepared by Professor Faxon. The following list describes the courses in Geology and Palæontology : —

NATURAL HISTORY 1. Mr. Davis.

Physical Geography. Two hours a week.

The size, shape, and density of the earth. The ocean : distribution of water-surface, area, depth, composition, character of sea-bottom, temperature, currents, tides. — The land : continental form, mountains, plains, lakes, rivers, coasts, islands.

Meteorology. One hour a week.

Physics of the atmosphere : temperature, pressure, moisture. — Phenomena of the atmosphere : winds, rains, storms. — Storm-warnings and weather-maps.

This course may be taken as a two or three hour elective. The instruction is given by lectures and collateral reading. For Physical Geography no text-book is used, but a good atlas should be constantly referred to. In Meteorology, Buchan's "Introductory Text-book" is recommended but not required.

NATURAL HISTORY 4. *Elementary Geology.* Mr. Davis. Two or three hours a week.

Dana's "Manual of Geology" (third edition, 1880) will be used as a *vade mecum* in this course. The teaching will be by lectures and study of reference-books ; the third hour of the week will be given to the illustration and extension of the two previous hours, as well as to certain additional topics. The course gives a general knowledge of the subject which may serve as a basis for further study, and includes the following topics : Origin and nature of the earth's crust ; structure and composition of rocks ; dynamics of the earth's crust ; continents, mountains, folds, dikes, veins, earthquakes, volcanoes ; dynamics of the earth's surface ; erosion by wind and water ; glaciers and glacial periods ; transportation of sediments by rivers and ocean currents ; deposition of sediments ; action of organic forces in erosion and deposition. — Outline of the physical and vital history of the several geological periods. — Relations of geological structure to human history ; form and nature of the earth's surface ; climate ; soil ; distribution of economic products of the earth.

Some opportunity will be given the class to become familiar with the geological phenomena of this vicinity, which is well adapted for the illustration of problems of Dynamic Geology, by excursions in charge of the

instructors of the department; attendance on these excursions will not be required.

NATURAL HISTORY 8. *Advanced Geology*. Mr. Davis. Three hours a week: lectures, collateral reading, field and laboratory work; open to those who have passed in N. H. 4; it is advisable to have taken N. H. 1 also in some previous year.

The aim will be to guide students in individual study in the library, laboratory, and field.

The lectures will follow Lyell's "Principles of Geology," and treat of the history of the science of Geology; evolutionary hypotheses popularly considered; problems encountered in geological surveying; climate; time ratios; marine action; uniformity of geological forces.

The third hour will include work to supplement these topics as far as possible, by reading and observation.

Special permission of the Faculty is necessary to open the following courses of the graduate department as regular electives to College undergraduates; this will ordinarily be given to those who have made good progress in the elementary electives. Courses h, i, and k will not be given in 1881-82.

[NATURAL HISTORY h. *Palæontology*. Professor Shaler: two lectures a week, with laboratory work and reading; open only to those who have passed in N. H. 2 or 5 and N. H. 4, and who can translate scientific French and German at sight; an acquaintance with N. H. 3 is also desirable.

This course is intended to give an acquaintance with the geological history of the various organic series, rather from the general point of view of the student of organic life than in the way required by the practical geologist. Although intended to be a complete course in itself, it is also meant as an introduction to Historical Geology (see below). Especial attention is given to the theories concerning the origin and development of animals as far as these questions are brought into view in the palæontological record. The course varies from year to year, but the following synopsis will give a view of the subjects generally treated: Conditions of organic life; heat, moisture, etc.; laws of the distribution of life on land and sea; conditions of fossilization; metamorphism and the preservation of the geological record; climatal and other evidence afforded by fossils. General history of the five great divisions of the animal kingdom; the development of the motor system in animals; development of the skeletal, nervous, visual, reproductive, and other systems of the five divisions; theories concerning the appearance and disappearance of animals as shown by fossils; palæontological history of man.]

[N. H. i. *Historical Geology*. Professor Shaler: two hours a week;

lectures, field, and laboratory work; open only to those who have taken Advanced Geology and Palæontology.

This course is designed particularly for those who intend making a specialty of Geology; its aim is to teach the use of fossils in identifying geological horizons. The lectures will be especially directed to the study of the North American series of rocks. Students who take this course will be required to spend some time in geological work in the eastern part of the United States.]

N. H. j. *Advanced Field-work.* Mr. Davis: two or three hours a week; field-work within thirty miles of Boston; N. H. 4 and 8 and Chem. 2, or their equivalents, are required as preparation. Some knowledge of topographical surveying and free-hand drawing is desirable.

This course aims to give special training in observation and description of geological phenomena.

[N. H. k. *History of Geological Opinions.* Professor Shaler: one lecture a week, with library work; open to those who have taken N. H. 4 and 8, and who can read French and German.

This course is intended to give, in successive years, a review of the literature of Geology, so far as it concerns the more important hypotheses of the science. During 1880-81 the subject proposed for the lectures was Experimental Geology, based upon Daubr e's " tudes synth tiques de G ologie exp rimentale," Paris, 1879. The course can advantageously be taken in two successive years.]

N. H. l. *Economical Geology.* Professor Whitney: about sixty lectures in the year, treating of the occurrence and distribution of useful minerals and rocks, in the following order:—

1. Water, mineral and thermal springs.
2. Salt, and saline earths.
3. Mineral medicines, pigments, dyes, and detergents.
4. Materials used for grinding, whetting, and polishing.
5. Coal, lignite, petroleum, and asphaltum.
6. Refractory or fire-resisting materials; fire-clay, silicious rocks, graphite, steatite, asbestos, etc.
7. Clays and sands used for pottery, porcelain, and glass.
8. Building stones.
9. Lime, cement, artificial stone.
10. Gems and decorative materials.
11. Mode of occurrence of metalliferous ores.
12. History and statistics of production of the metals.

N. H. m. *Lithology.* Professor Whitney: lectures once a week, with practical instruction in the laboratory. This course is for advanced students who intend to make a special study of Geology, and requires a good knowledge of Mineralogy.

REPORT ON INSTRUCTION IN ZOÖLOGY.

BY WALTER FAXON *Assistant Professor of Zoölogy.*

DURING the last academic year the instruction was carried on for the most part according to the plan given in detail in my report a year ago. Professor Farlow's absence during the first half of the year, however, caused a reversal of the regular sequence of the Botany and Zoölogy in the Biological course, which was taken by thirty-nine students, sixteen of whom were Seniors, eleven Juniors, and seven members of the Scientific School. Mr. C. H. Morss assisted in the supervision of the laboratory work.

In the course in Advanced Zoölogy the whole year was devoted to the morphology of the Vertebrata. This course was attended by eleven students, — seven Seniors, one Sophomore, one member of the Scientific School, one candidate for the degree of Doctor of Science, and one graduate.

REPORT ON THE MAMMALS AND BIRDS.

BY J. A. ALLEN.

MAMMALS. — The additions during the year include sixty-five mounted and thirty unmounted skins, twenty mounted skeletons and about the same number of skeletons unmounted. Among the stuffed specimens are a fine Indian elephant, a gaur ox, a Bactrian camel, a nilghau, a kob antelope, a brindled gnu, a pair of chimpanzees, a lion, an ibex, two species of porpoise, and a number of monkeys and antelopes. The mounted skeletons also include several large pieces.

BIRDS. — The number of skins added is seventeen hundred and forty-four, and includes about six hundred mounted specimens. Among them are various species of pheasants, birds of paradise, pittas, humming-birds, manucodias, etc., as well as many less showy species of considerable rarity. There have been added also twenty-five mounted skeletons, besides nearly as many unmounted, and fifty sets of eggs, representing as many species. These are especially noteworthy as being nearly all from the Argentine Republic, thoroughly identified and beautifully prepared. The principal additions are from the West Indies and South America, including three hundred skins from Santa Lucia, British West Indies, three hundred and seventy from Trinidad and the island of Grenada, and five hundred from the Argentine Republic. The latter were all collected near Concepcion del Uruguay, and represent over two hundred species, forming an excellent suite of the birds of that immediate vicinity.

In general, it may be stated that the increase of material for the Faunal rooms has progressed satisfactorily. The South American room, though still incomplete, has been opened to the public, and there is a large accumulation of material for the Indian and African rooms, which only awaits the completion of the cases, to be transferred to the exhibition rooms.

The preparation and identification of the fossil mammals

obtained last year by Mr. Garman, together with the care and identification of the additions, has interfered very materially with the preparation of the systematic catalogue of birds mentioned in the report for last year; several additional families, however, have been revised, the work being continued as opportunity favors.

The skins of the birds and mammals have been placed in the new workrooms in the attic, giving greatly increased facilities for work. The osteological material has been temporarily removed from the osteological rooms, and at present is not fully accessible, but, as soon as the new storage cases are put in place, will be returned in better order than before, and with suitable space for the expansion of this rapidly increasing collection.

The following papers, written by me, have been published during the past year:—

History of North American Pinnipeds: A Monograph of the Walruses, Sea-Lions, Sea-Bears, and Seals of North America. Washington: Government Printing Office, 1880. 8vo, pp. i-xvi, 1-785. ("Miscel. Publ. No. 16" of the U. S. Geol. and Geogr. Survey of the Territories, F. V. Hayden, Geologist-in-charge.)

List of Mammals collected by Dr. Edward Palmer in Northeastern Mexico. Bull. Mus. Comp. Zoöl., VIII. No. 9, pp. 183-189.

Insectivorous Birds in their Relation to Man. Bull. Nuttall Orn. Club, VI. pp. 22-28.

Supplementary List of the Birds of Santa Lucia, W. I. Bull. Nuttall Orn. Club, VI. p. 128.

On the Migration of Birds. Scribner's Monthly Mag., XXII. pp. 932-938.

REPORT ON REPTILES, BATRACHIANS, SELACHIANS,
AND FISHES.

BY SAMUEL GARMAN.

A GENERAL revision of these collections was commenced about eight months ago. Up to date only about one fifth of the material has been overhauled. This portion has received fresh alcohol, tin numbers, and new labels. A considerable number of specimens have been mounted on tablets or otherwise prepared for the exhibition rooms. Various changes for the better have been made in the previous exhibit.

The greater portion of the accessions in these departments are such as were desiderata. In most cases they have been choice specimens. With the stoppage of indiscriminate and miscellaneous collecting on the part of our correspondents there has been a decrease in bulk of receipts, and in the labor and expense required in their care, accompanied by a great increase in importance and value. What are asked for are such as supply deficiencies, replace inferior specimens, or are desirable as exchanges. The answers to such requests contain little that is undesirable or useless.

For donations we are indebted to Dr. C. C. Abbott, Professor Alexander Agassiz, J. H. Blake, Esq., Captain Edwin Cole, H. Garman, John F. Hooper, C. R. Hooper, R. M. Kemp, W. F. Littlefield, Colonel Theodore Lyman, Reuben Smith, and Mrs. C. N. Willard. The specimens sent by Professor Agassiz, Mr. Blake, Captain Cole, and Mrs. Willard were especially important on account of young stages of fishes somewhat rare. Dr. Abbott's contribution furnished specimens of a rare turtle, and Russell Hooper's a tolerably complete representation of New England reptiles and batrachians.

By exchange we have a series of the fishes of Illinois from the Illinois State Laboratory of Natural History, a continuation of the North American series from the Smithsonian, a collection made at

the Sandwich Islands from the Boston Society, and a collection of Algerian reptiles and mammals from Professor Fernand Lataste. Exchanges for reptiles and batrachians were also made with Dr. Manigault, Professor Jordan, and Mr. Cragin. Certain alcoholic specimens sent away for preparation have been returned as skeletons with great saving and gain to the Museum.

The purchases include Egyptian species from Ward, West Indian from Semper and Cazabon, and a large number of Mexican from Dr. Palmer.

In the collection made during a three months' expedition in the Territories there is a lot of fossil reptiles and fishes. On this work valuable duplicates of recent species were also obtained. Mr. Sternberg's collection from Western Kansas also contains an important series of fossils belonging to these classes.

The publications for the year include the following in the Bulletin: "New Species of Selachia in the Museum Collections," "New and little Known Reptiles and Fishes," and the "Report on the Selachians" of the "Blake" expedition. A synopsis of the "American Species of Rhinobatidæ" and another of "American Trygons" were published by the United States National Museum, and a revision of the genus *Rhinichthys* by the Science Observer.

REPORT ON INSECTS.

BY DR. H. A. HAGEN.

THE additions to the collection have been larger than usual. The most prominent are a very large lot of prepared caterpillars and Lepidoptera from Dr. O. Staudinger, Dresden, Saxony (bought); a splendid lot of United States Lepidoptera with its previous stages from Mr. H. Edwards, New York (presented); a large collection of insects of different orders from Japan, from the museum in Tokio, Japan (exchange); a collection from Himalaya by Dr. Williams, Jr., Boston (presented); and very large and valuable additions to the United States collections by Mr. H. G. Hubbard, Detroit, Mich., and Mr. Charles Dury, Cincinnati, O. (exchange).

The condition of the collection is very satisfactory, no pests having been observed. Special attention has been given to the advance of the United States collection. The Coleoptera have been revised kindly by Dr. George H. Horn; this collection contains now two thirds of the hitherto known United States species, represented by good specimens determined by prominent authorities. The same can be stated for the United States Lepidoptera, which has been enlarged by typical specimens presented by H. Edwards, R. Thaxter, E. L. Graefe.

The exceedingly rich additions to the Biological collection will require a rearrangement of a large part of the Lepidoptera, Neuroptera, and Pseudoneuroptera; but other parts also begin to be densely crowded. The Biological collection is finished and in exhibition, except for the Orthoptera and a part of the Hemiptera. A number of valuable additions have been received from Dr. J. L. Le Conte, Dr. George H. Horn, Mr. Th. Meehan, Philadelphia; Professor J. A. Cook, Lansing, Mich.; Mr. T. Henshaw, Boston; Mr. H. Edwards, New York; Miss Cora Clarke, Boston; Miss E. Smith, Peoria, Ill.; Mr. J. A. Lintner, Albany, N. Y.; Mr.

T. V. Chambers, Covington, Ky. ; Dr. E. Palmer, Boston. A detailed catalogue of this collection has been commenced.

The alcoholic collection has been carefully examined and studied through all orders except for Orthoptera and Hemiptera. The American Spiders are in the hands of Count von Keyserling, Glogau, Silesia ; the Scorpions have been sent to Mr. E. Simon, Paris, France, and all Myriapods to Dr. Fr. Meinert, Copenhagen, Denmark, for determination and scientific study. Therefore the whole alcoholic collection will be in a condition to be arranged after the return of those parts. The whole biological collection of the Ephemera and part of the systematical collection have been in the hands of Rev. E. A. Eaton, Croydon, England, to be used in his monograph of this family. The *Ægeridæ* have been in the hands of Mr. H. Edwards for his monograph.

Publications based entirely or partly upon material contained in the collection have been made as follows :—

By Mr. L. Cabot : The Immature Stages of the *Æschnina*, with five plates (Mem. of the Mass. Comp. Zoöl.).

By Count von Keyserling : New Spiders (Verhdl. Wien. Z. B. Gesell.) ; the rest to be published in his forthcoming monograph of American Spiders.

By Mr. R. McLachlan, London : The extremely Interesting Discovery of the Genus *Dilar* in the United States after an Unicum of the Collection (Entom. Monthly Magaz.).

By Rev. E. A. Eaton : Preliminary Reports about the Ephemera (Entom. Monthly Magaz.). Of his large monograph a number of plates have been communicated ; he has carefully returned all types for anatomical details figured in his monograph.

By Mr. E. Meade, Bradford, England : A Synopsis of the Anthomyidæ and Sarcophagidæ of the United States. Published with the additional remarks of the assistant concerning the specimens in the Loew's collection (Canad. Entomologist).

By the Assistant : A Synopsis of the Immature Stages of the Calopterygina and some new Species (Ann. Soc. Ent. Belge). The monograph with plates is ready for publication.

By the Assistant : On new Anatomical Facts concerning the Respiration of Insects (Carus, Anzeiger).

By the Assistant : A detailed Study on the so-called Devonian Insects (Bull. Mus. Comp. Zoöl.) ; a History of the Importation of the Hessian Fly, based upon a larger bibliographical material than used before, and proving that the importation by the Hessian troops was unfounded, even

impossible (Canad. Entom.) ; other papers, historical or biological, based upon material in the collection (in several scientific serials).

By the Assistant, after a new arrangement and study of the Psocina of the collection, a monograph of the United States species with anatomical details (Psyche). A monograph of the species contained in amber is ready for publication with plates.

The Library of the department has been considerably enlarged, chiefly by larger works. The part containing United States publications has received a number of papers of the late Th. W. Harris, never quoted before in the lists of this author's works, which are now nearly complete in the Library.

REPORT ON THE CRUSTACEA.

 BY WALTER FAXON.

SINCE the last report collections have been received from : —

1. Alexander Agassiz. Newport, R. I., and Tortugas Islands, Fla.
2. W. K. Brooks. *Lucifer*, from Beaufort, N. C.
3. S. F. Clarke. Two deformed claws of *Callinectes hastatus*, from Chesapeake Bay.
4. C. F. Gissler. *Eubbranchipus vernalis*, including one deformed and one hermaphrodite specimen, described in the American Naturalist, 1881.
5. A. R. McNair. *Eubbranchipus vernalis*, from Newton, Mass.
6. Edward Palmer. *Astacida*, *Palaemonetes*, and *Isopoda*, from Texas and New Mexico.

The first part of a preliminary Report on the Crustacea of the "Blake" Expedition, 1877-79, by M. Alphonse Milne-Edwards, has been published during the year in the Bulletin of the Museum (Vol. VIII. No. 1, 2 plates). The Report includes descriptions of twenty-eight new genera and one hundred and sixteen new species. The *Oxyryncha*, *Cancriada*, and *Portunida*, together with fifty-five other species, have been returned.

The Crustacea collected by the "Blake" in 1880, belonging to the more northern fauna investigated by the United States Fish Commission, have been assigned to Professor S. I. Smith of New Haven.

A part of the Cymothoids of the Museum, sent to Copenhagen in January, 1879, at the request of Drs. Schiøedte and Meinert, have also been returned. These were used in the preparation of a monograph of the Cymothoids, contributions to which have appeared in the Naturhistorisk Tidsskrift, Ser. III. Vol. XII., Copenhagen.

An account of the large collection of Crustacean deformities in the Museum has been published by the Museum (Bulletin, Vol. VIII. No. 13, 2 plates).

REPORT ON THE CONCHOLOGICAL AND PALÆONTOLOGICAL DEPARTMENTS.

BY CHARLES E. HAMLIN.

SINCE the last annual report two large additions have been made to the collections of Fossil Invertebrata. As these still remain undistributed, their amount can now be indicated only by a statement of the number of packages which contain them. There are:—

Sixty boxes and six barrels of specimens, chiefly from the Racine Beds of the Niagara Limestone of Wauwatosa and vicinity, in Southeastern Wisconsin, — being the entire collection of fossils gathered during the last twenty years by Dr. F. H. Day of Wauwatosa.

Twenty-four boxes of fossils from several groups of the New York Silurian System, comprising the whole collection made by Mr. G. W. Taylor of Cazenovia, Madison Co., N. Y.

Part of the month of November, 1880, was spent by me at Wauwatosa in assorting, labelling, and packing the Day collection; and in April last like work was done upon the Taylor collection, in part at Cazenovia, but chiefly at Pulaski, N. Y.

A large part of the year has been occupied in selecting and mounting Recent and Fossil Gasteropoda for exhibition. This work has been completed, and the specimens prepared have been arranged in the cases recently provided for them; much has also been done in selecting, determining, and mounting Lamelli-branchiata for exhibition.

Conchological exchanges have been continued only with the few correspondents from whom can be expected material adapted to supply deficiencies still remaining in the Systematic Collection of Recent Shells. Our consignments have been more in number than the receipts, several packages having been sent in return for shells received during the previous year.

The receipts of shells, in exchange, have been three packages, containing nine hundred and eighty (980) specimens of sixty-two (62) species. The consignments have been six packages, comprising eleven hundred and thirty-nine (1139) specimens of two hundred and forty-eight (248) species.

REPORT ON THE LIBRARY.

BY MISS F. M. SLACK.

DURING the year ending Sept. 1, 1881, the Library has been increased by 649 volumes, 999 parts, and 306 pamphlets.

	VOLUMES.	PARTS.	PAMPHLETS.
Gift	38	42	61
Exchange	104	333	56
Purchase	151	530	25
A. Agassiz	35	84	164
Museum Publications		10	
Binding parts and pamphlets	321		
	<u>649</u>	<u>999</u>	<u>306</u>

The whole number of volumes (exclusive of pamphlets) is 14,747.

[A.]

PUBLICATIONS
OF THE
MUSEUM OF COMPARATIVE ZOOLOGY.

ANNUAL REPORT of the Trustees, together with a Report of the Director for *1859, *1860, *1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877-78, 1878-79, 1879-80.

BULLETIN. The first volume contains the following papers:—

- No. 1. List of the FISHES sent by the Museum to different Institutions, in exchange for other Specimens, with Annotations. By F. W. PUTNAM. pp. 16. April, 1863. 15c.
- No. 2. List of the ECHINODERMS. By ALEXANDER AGASSIZ. pp. 12. August, 1863. 10c.
- No. 3. List of the POLYPS and CORALS. By A. E. VERRILL. pp. 32. January, 1864. 20c.
- No. 4. List of BRACHIOPODS from the Island of Anticosti. By N. S. SHALER. pp. 10. June, 1865. 10c.
- No. 5. The FOSSIL CEPHALOPODS of the Museum of Comparative Zoölogy. By ALPHEUS HYATT. pp. 32. December, 1867. 20c.
- No. 6. Contributions to the FAUNA of the Gulf Stream at Great Depths. By L. F. DE POURTALES. pp. 18. December, 1867. 10c.
- No. 7. Do. Second Series. pp. 22. December 10, 1868. 15c.
- No. 8. Catalogue of the MAMMALS of Massachusetts. By J. A. ALLEN. pp. 110. October, 1869. 75c.
- No. 9. Preliminary Report on the ECHINI and STARFISHES dredged in deep water between Cuba and the Florida Reef, by L. F. de Pourtales. Prepared by ALEXANDER AGASSIZ. pp. 56. October, 1869. 40c.
- No. 10. Preliminary Report on the OPHIURIDÆ and ASTROPHYTIDÆ dredged by L. F. de Pourtales. Prepared by THEODORE LYMAN. pp. 46. November, 1869. 35c.
- No. 11. List of the CRINOIDS obtained on the Coasts of Florida and Cuba, in 1867, 1868, 1869. By L. F. DE POURTALES. pp. 4. November, 1869. 5c.
- No. 12. List of HOLOTHURIDÆ dredged by L. F. DE POURTALES. pp. 3. November, 1869. 5c.
- No. 13. Report upon the DEEP-SEA DREDGINGS during the Third Cruise of the U. S. Coast Survey Steamer "Bibb." By LOUIS AGASSIZ. pp. 24. November 16, 1869. 15c.

The second volume contains:—

- * No. 1. On the EARED SEALS. By J. A. ALLEN. With an account of the HABITS of the NORTHERN FUR SEAL. By CHARLES BRYANT. pp. 108. 6 Woodcuts and 3 Plates. August, 1870. \$1.00. Plates destroyed by fire.
- * No. 2. Preliminary Report on the CRUSTACEA dredged by L. F. de Pourtales. Prepared by WILLIAM STIMPSON. Part I. pp. 52. December, 1870. 50c.
- * No. 3. On the MAMMALS and WINTER BIRDS of East Florida. By J. A. ALLEN. pp. 290. 5 Plates. April, 1871. \$3.25.
- No. 4. Directions for DREDGING. Drawn up by L. F. DE POURTALES. pp. 4. 5c.
- No. 5. Appendix to Preliminary Report on ECHINI. By ALEXANDER AGASSIZ. pp. 3. April, 1871. 5c.

* Out of print.

The third volume contains:—

- * No. 1. BRACHIOPODS of the Straits of Florida. By W. H. DALL. pp. 45. 2 Plates. May, 1871. 85c.
- * No. 2. Application of PHOTOGRAPHY to Illustrations of Natural History. pp. 2. 2 Plates. November, 1871. 25c. Plates destroyed by fire.
- No. 3. A Letter concerning DEEP-SEA DREDGING addressed to Professor Peirce. By LOUIS AGASSIZ. pp. 5. December, 1871. 5c.
- * No. 4. Preliminary Notice of a few Species of ECHINI. By ALEXANDER AGASSIZ. pp. 4. January, 1872. 5c.
- * No. 5. FOSSIL CEPHALOPODS of the Museum. Embryology. By A. HYATT. pp. 53. 4 Plates. June, 1872. \$1.25.
- No. 6. ORNITHOLOGICAL RECONNAISSANCE of Kansas, Colorado, Wyoming, and Utah. By J. A. ALLEN. pp. 71. July, 1872. 50c.
- No. 7. Interim Report on the HYDROIDS collected by L. F. de Pourtalès. By GEORGE J. ALLMAN. pp. 2. January, 1873. 5c.
- No. 8. The ECHINI collected by the Hassler Expedition. By ALEXANDER AGASSIZ. pp. 4. January, 1873. 5c.
- No. 9. Catalogue of the TERRESTRIAL AIR-BREATHING MOLLUSKS of N. America. By W. G. BINNEY. pp. 30. 1 Plate. October, 1873. 50c.
- No. 10. OPHIURIDÆ and ASTROPHYTIDÆ, Old and New. By THEODORE LYMAN. pp. 51. 7 Plates. February, 1874. \$1.75.
- † No. 11. Exploration of LAKE TITICACA, by Alexander Agassiz and S. W. Garman. I. FISHES and REPTILES. By S. W. GARMAN. pp. 6. 1 Plate. November, 1875. 20c.
- † No. 12. Exploration of LAKE TITICACA. II. Notice of the PALÆOZOIC FOSSILS. By ORVILLE A. DERBY, M.S. With Notes by ALEXANDER AGASSIZ. pp. 8. March, 1876. 10c.
- † No. 13. Recent CORALS from Tilibiche, Peru. By ALEXANDER AGASSIZ and L. F. DE POURTALES. pp. 4. 1 Plate. March, 1876. 15c.
- † No. 14. The Development of SALPA. By Wm. K. BROOKS. pp. 53. 34 cuts. March, 1876. 75c.
- † No. 15. Exploration of LAKE TITICACA. III. List of MAMMALS and BIRDS. By J. A. ALLEN. With Field Notes by S. W. GARMAN. pp. 11. July, 1876. 10c.
- † No. 16. Exploration of LAKE TITICACA. IV. CRUSTACEA. By WALTER FAXON. With 37 cuts. pp. 15. July, 1876. 15c.

The fourth volume contains:—

- The TERRESTRIAL AIR-BREATHING MOLLUSCA of the United States and Adjacent Territories of North America. By W. G. BINNEY. Vol. V. pp. 449. 104 Plates, 312 Cuts. July, 1878. \$7.50.

The fifth volume contains:—

- No. 1. Letter No. 1 to C. P. Patterson, Supt. U. S. Coast Survey, on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." By A. AGASSIZ. pp. 9. April, 1878. 10c.
- * No. 2. On the Presence of DEMODEX FOLLICULORUM in the Skin of the Ox. By W. FAXON. pp. 7. 1 Plate. May, 1878. 15c.
- * No. 3. The RICHMOND BOULDER TRAINS. By E. R. BENTON. pp. 26. 2 Maps. May, 1878. 45c.
- * No. 4. Description of a New Species of CORBICULA, with Notes on other Species of the Corbiculadæ Family. By TEMPLE PRIME. pp. 4. 1 Plate. July, 1878. 12c.
- * No. 5. Notes on the Anatomy of CORBICULADÆ (Mollusca) and a Translation from the Danish of an Article on the Anatomy of Cyclas by Jacobsen. By TEMPLE PRIME. pp. 8. 1 Plate. July, 1878. 20c.
- * No. 6. Letter No. 2 to C. P. Patterson, Supt. U. S. Coast Survey, on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." By A. AGASSIZ. With Preliminary Report on the Mollusca of the Expedition. By W. H. DALL. pp. 10. 2 Plates. July, 1878. 20c.
- No. 7. OPHIURIDÆ and ASTROPHYTIDÆ of the "Challenger" Expedition. By T. LYMAN. Part I. pp. 104. 10 Plates. July, 1878. \$1.50.

* Out of print.

† Nos. 11-14, also 15-16, are not sold separately.

- No. 8. Reports on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." I. Description of SOUNDING MACHINE, Water-Bottle, and Detacher. By Lieut.-Commander C. D. SIGSBEE, U. S. N. pp. 11. 5 Plates. December, 1878. 60c.
- No. 9. Reports on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." II. ECHINI, by A. AGASSIZ. CORALS and CRINOIDS, by L. F. DE POURTALÈS. OPHIURANS, by T. LYMAN. pp. 58. 10 Plates. December, 1878. \$1.50.
- No. 10. Reports on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." III. Report on HYDROIDA. By S. F. CLARKE. pp. 14. 5 Plates. January, 1879. 65c.
- No. 11. On some Young Stages in the Development of HIPPA, PORCELLANA, and PINNIXA. By W. FAXON. pp. 16. 5 Plates. April, 1879. 66c.
- No. 12. Reports on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." IV. Preliminary Report on the WORMS. By Prof. ERNST EHLERS of Göttingen. pp. 6. June, 1879. 5c.
- * No. 13. On the Classification of ROCKS. By M. E. WADSWORTH. pp. 13. June, 1879. 15c.
- No. 14. Letter No. 3 to C. P. Patterson, Supt. U. S. Coast Survey, on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake." By A. AGASSIZ. pp. 14. 2 Maps. June, 1879. 35c.
- No. 15. On the Development of PALÆMONETES VULGARIS. By WALTER FAXON. pp. 28. 4 Plates. September, 1879. 68c.
- No. 16. On the Jaw and Lingual Dentition of certain TERRESTRIAL MOLLUSKS. By W. G. BINNEY. pp. 38. 2 Plates. December, 1879. 55c.

The sixth volume contains Part I. Nos. 1-11:—

- No. 1. List of the DREDGING STATIONS occupied by the U. S. C. S. Steamers "Corwin," "Bibb," "Hassler," and "Blake," from 1867-1879. By BENJAMIN PEIRCE and CARLILE P. PATTERSON, Superintendents of the U. S. Coast Survey. pp. 16. September, 1879. 15c.
- No. 2. OPHIURIDÆ and ASTROPHYTIDÆ of the "Challenger" Expedition. By THEODORE LYMAN. Part II. pp. 67. 9 Plates. December, 1879. \$1.50.
- No. 3. Reports on the Results of DREDGING under the Supervision of ALEXANDER AGASSIZ, in the GULF of MEXICO, 1877-78, by the U. S. C. S. Str. "Blake." Lieut.-Commander C. D. SIGSBEE, U. S. N., commanding. V. General Conclusions from a Preliminary Examination of the MOLLUSCA. By W. H. DALL. pp. 9. February, 1880. 10c.
- No. 4. Report on the Results of DREDGING, by the U. S. C. S. Str. "Blake." VI. Report on the CORALS and ANTIPATHARIA. By L. F. DE POURTALÈS. pp. 26. 3 Plates. February, 1880. 55c.
- No. 5. The Ethmoid Bone in the BATS. By HARRISON ALLEN, M.D. pp. 2. February, 1880. 5c.
- No. 6. On Certain Species of CHELONIOIDÆ. By S. W. GARMAN. pp. 4. March, 1880. 5c.
- No. 7. Contribution to a Knowledge of the Tubular JELLY FISHES. By J. WALTER FEWKES. pp. 20. 3 Plates. April, 1880. 50c.
- No. 8. Letter No. 4 to C. P. Patterson, Supt. U. S. Coast Survey, on the DREDGING OPERATIONS of the U. S. C. S. Str. "Blake," Commander Bartlett, U. S. N., during the summer of 1880. By A. AGASSIZ. pp. 8. September, 1880. 10c.
- No. 9. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." VII. Description of a GRAVITATING TRAP for obtaining Specimens of Animal Life from intermedial ocean Depths. By Lieut.-Commander C. D. SIGSBEE, U. S. N. pp. 4. 1 Plate. September, 1880. 15c.
- No. 10. On some Points in the Structure of the Embryonic ZOEÆ. By WALTER FAXON. pp. 8. 2 double Plates. October, 1880. 40c.
- No. 11. New Species of SELACHIANS in the Museum Collection. By S. GARMAN. pp. 6. October, 1880. 5c.

Part II.

- No. 12. Maturation, Fecundation, and Segmentation of LIMAX CAMPESTRIS. By E. L. MARE. 5 Plates. (*In press.*)

(No. 12 will end the volume.)

* Out of print.

The seventh volume contains Geological Series, Vol. I :—

- No. 1. Notes on the Geology of the IRON and COPPER Districts of LAKE SUPERIOR. By M. E. WADSWORTH. pp. 164. 6 Plates. July, 1880. \$2.25.
- No. 2. The FELSITES and their Associated Rocks NORTH of BOSTON. By J. S. DILLER. pp. 16. May, 1881. 15c.
- No. 3. On an Occurrence of GOLD in MAINE. By M. E. WADSWORTH. p. 1. May, 1881. 1c.
- No. 4. A Microscopical Study of the IRON ORE or PERIDOTITE of Iron Mine Hill, CUMBERLAND, RHODE ISLAND. By M. E. WADSWORTH. pp. 5. May, 1881. 5c.
- No. 5. Observations upon the Physical GEOGRAPHY and GEOLOGY of MOUNT KTAADN and the adjacent District. By C. E. HAMLIN. pp. 35. 2 Plates. June, 1881. 55c.

(Vol. VII. to be continued.)

The eighth volume contains :—

- No. 1. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." VIII. Études préliminaires sur les Crustacés. Par A. MILNE-EDWARDS. 1^e. Partie. pp. 68. 2 Plates. December, 1880. 90c.
- No. 2. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." IX. Preliminary Reports on the ECHIN. By A. AGASSIZ. pp. 7. December, 1880. 5c.
- No. 3. New and little-known REPTILES and FISHES in the Museum Collections. By S. GARMAN. pp. 11. February, 1881. 10c.
- No. 4. List of DREDGING STATIONS occupied during the year 1880 by the U. S. C. S. Str. "Blake." pp. 4. February, 1881. 5c.
- No. 5. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." X. Report on the CEPHALOPODS and on some additional Species dredged by the U. S. F. C. Str. "Fish-hawk," during the Season of 1880. By A. E. VERRILL. pp. 17. 8 Plates. March, 1881. \$1.00.
- No. 6. The Stomach and Genital Organs of ASTROPHYTIDÆ. By T. LYMAN. pp. 8. 2 Plates. February, 1881. 30c.
- No. 7. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." XI. Report on the ACALEPHÆ. By J. W. FEWKES. pp. 14. 4 Plates. March, 1881. 50c.
- No. 8. Studies of the JELLY-FISHES of NARRAGANSETT BAY. By J. W. FEWKES. pp. 42. 10 Plates. February, 1881. \$1.50.
- No. 9. List of MAMMALS collected by Dr. EDWARD PALMER in Northeastern MEXICO, with Field-Notes by the Collector. By J. A. ALLEN. pp. 7. 5c.
- No. 10. The TRILOBITE: New and Old Evidence relating to its Organization. By C. D. WALTER. pp. 41. 6 Plates. March, 1881. \$1.00.
- No. 11. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." XII. Report on the SELACHIANS. By S. GARMAN. pp. 8. March, 1881. 5c.
- No. 12. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." XIII. Report on the PYCNOGONIDA. By E. B. WILSON. pp. 18. 5 Plates. March, 1881. 65c.
- No. 13. On some CRUSTACEAN DEFORMITIES. By W. FAXON. pp. 18. 2 Plates. March, 1881. 40c.
- No. 14. The DEVONIAN INSECTS of NEW BRUNSWICK. By H. A. HAGEN. pp. 10. March, 1881. 10c.

The ninth volume contains:—

- No. 1. Reports on the Results of DREDGING, by the U. S. C. S. Str. "Blake." XIV. Description sommaire des Espèces nouvelles d'ASTÉRIES. Par E. PERRIER. pp. 31. June, 1881. 30c.
- No. 2. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." XV. Preliminary Report on the MOLLUSCS. By W. H. DALL. (*In press.*)
- No. 3. Letter No. 5 to C. P. Patterson, Supt. U. S. Coast Survey, on the EXPLORATIONS in the vicinity of the TORTUGAS, during March and April, 1881. By A. AGASSIZ. July, 1881. 5 pp. 5c.
- No. 4. Reports on the Results of DREDGING by the U. S. C. S. Str. "Blake." XVI. Preliminary Reports on the COMATULÆ. By P. H. CARPENTER. 1 Plate. (*In press.*)
- No. 5. Observations on the Species of the Genus PARTULA. By W. D. HARTMAN. 2 Plates. (*In press.*)

(Vol. IX. to be continued.)

The Quarto Publications will hereafter be issued as MEMOIRS. The Catalogues thus far published have been collected into Volumes I.-IV. of the MEMOIRS.

MEMOIRS.

Vol. I. contains Nos. 1, 2, Illustrated Catalogue.

- No. 1. OPHIURIDÆ and ASTROPHYTIDÆ. By THEODORE LYMAN. pp. 200. 13 Woodcuts and 2 Plates. October, 1864. \$3.50.
 No. 2. NORTH AMERICAN ACALEPHÆ. By ALEXANDER AGASSIZ. pp. 234. 360 Woodcuts. February, 1865. \$4.00.

Vol. II. contains Nos. 3, 4, 5, 6, Illustrated Catalogue, and No. 9 of Memoirs.

- No. 3. Monograph of the NORTH AMERICAN ASTACIDÆ. By DR. HERMANN A. HAGEN. pp. 111. 11 Plates. April, 1870. \$4.00.
 No. 4. Deep-Sea CORALS. By L. F. DE POURTALES. pp. 93. 8 Plates. 1871. \$3.00.
 No. 5. Immature State of the ODONATA. Part I. Sub-family Gomphina. By LOUIS CABOT. pp. 17. 3 Plates. July, 1871. \$1.00.
 No. 6. Supplement to the OPHIURIDÆ and ASTROPHYTIDÆ. By THEODORE LYMAN. pp. 17. 2 Plates. October, 1871. 75c.
 No. 9. On some INSECT DEFORMITIES. By DR. H. A. HAGEN. pp. 22. 1 Plate. May, 1876. 75c.

* Vol. III. contains No. 7 Illustrated Catalogue. 1 vol. Text; 1 vol. Plates. (*Plates partly destroyed by fire.*)

- No. 7. Revision of the ECHINI. By ALEXANDER AGASSIZ. pp. 796. 69 Woodcuts. 94 Plates. 1872-74. \$50.00.

Vol. IV. contains No. 8 Illustrated Catalogue and No. 10 of Memoirs.

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SEPTEMBER, 1881.

[B.]

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