
PART I.

REPORT

UPON THE

CONDITION AND PROGRESS OF THE U. S. NATIONAL MUSEUM
FOR THE FISCAL YEAR ENDING JUNE 30, 1886.

BY

G. BROWN GOODE.

ASSISTANT SECRETARY OF THE SMITHSONIAN INSTITUTION, IN CHARGE OF THE
NATIONAL MUSEUM.

REPORT UPON THE CONDITION AND PROGRESS OF THE UNITED STATES
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In the report now presented, which relates to the year ending with June 30, 1886, it was my intention to have presented a general review of the history of the Museum, and of its several departments. The publication of this historical sketch will, however, be reserved for presentation at some future time.

LIST OF ERRATA.

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which is being to the United States, which may be in the city of Washington," should be delivered to the Regents of the Smithsonian Institution, and, together with the new specimens obtained by exchange, donation, or otherwise, should be so arranged and classified as best to facilitate their examination and study.*

It was not until 1858 that the actual custody of the "National Cabinet" was assumed by the Regents, and appropriations were made by Congress for its maintenance. During the twenty-three years which followed, the collections were greatly increased and were made the subjects of numerous important memoirs upon the natural history and ethnology of America. The public halls, with their arrangements for the exhibition of a portion of the collections, also received a due share of attention, and a reasonable amount of instruction and pleasure was afforded to visitors. The appropriations however were small, the space limited, and the staff so inadequate, that little could be done except to keep the collections in a good state of preservation.

* An act to establish the Smithsonian Institution "for the increase and diffusion of knowledge among men." (Approved August 10, 1846; Revised Statutes, Title LXIII, sections 5579-5594.) See also Revised Statutes, section 5586, and Statutes Forty-fifth Congress, third session, chap. 182, p. 894.

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The name NATIONAL MUSEUM was used in the Smithsonian Reports as early as 1868, though it was not until after the erection of the new building had been determined upon that this designation seems to have been actually adopted by Congress. It was without doubt the purpose of Congress, as early as 1846, that a national museum should be established in Washington, and that it should be placed under the administrative direction of the Smithsonian Institution, then just organized. Such was manifestly the intention of the act of incorporation passed in that year, by which it was provided that "all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging or hereafter to belong to the United States, which may be in the city of Washington," should be delivered to the Regents of the Smithsonian Institution, and, together with the new specimens obtained by exchange, donation, or otherwise, should be so arranged and classified as best to facilitate their examination and study.*

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The Exhibition of 1876 in Philadelphia was an event of great educational importance to the people of the United States; and not the least of its benefits were the lessons it taught as to the possibilities for good in public museums. The objects which were given to the United States for its National Museum, at the close of the Centennial, were of much intrinsic value, but were still more important, in that they led to the erection of a large building for the expansion of the museum itself.

From 1876 to 1881 was a period of incubation. The museum embryo was developing, but it was within a shell of store-houses. From 1881 to 1886, another period of five years, its growth has been rapid, though the organism is still in its infancy. These five years have been years of experiment, but it is hoped that it is now evident to the people and to Congress that the young museum is now ready to begin a promising progress toward maturity.

Among the most important features of the work, up to the present time, certain definite stages of progress have been attained, among the most important of which may be mentioned:

(1) An organization of the Museum staff has been effected—efficient for present purposes and capable of expansion and extension as occasion may require.

(2) Through the agency of this staff, the materials in the Museum, the accumulations of nearly half a century, have been examined, classified, and brought under control.

(3) The collections have been more than doubled in extent.

(4) A beginning has been made toward the development of a thoroughly labelled exhibition series, available for the instruction of the public.

(5) A thorough study of the organizations and systems of classification in other museums throughout the world has been made, the results of which are beginning to appear in the work of the Museum staff. A report upon the great museums of the world is in preparation and will soon be published.

(6) Many new methods of installation have been developed by experiments in the Museum, and in the expositions in which the Museum has participated. These are finding favor, and are being adopted in many similar establishments at home and abroad, and will certainly add to the economy and success of our own administration.

(7) Science has been forwarded by the publication of many hundreds of papers describing the materials in the Museum, while the work of specialists in the production of these papers has greatly improved the significance and value of the collections.

It is, I think, possible to show that Washington may readily be made the seat of one of the greatest museums in the world. It will perhaps be neither practicable nor desirable to gather together in Washington collections of ancient and mediæval art, such as those which adorn the capitals of Europe; but a representative series of such objects will un-

doubtedly grow up, which shall tend to educate the public taste, and to promote, so far as possible, the study of the elements of art and the history of civilization, as well as to forward the growth of the arts of design. This having been accomplished, the attention of the Museum should be directed mainly toward the exhibition of the geology and natural history of America, and its natural resources, to the preservation of memorials of its aboriginal inhabitants, and to the exposition of the arts and industries of America.

In referring to the industries of America it is not intended to recommend that anything similar to what is generally understood as an "industrial exhibition" should be attempted. The element of competitive display should not be admitted, and no two objects of precisely similar import should ever be placed side by side.

As early as 1851, the scope of the Museum was considered to be a question of great importance; but even now it is perhaps too early to speak definitely in regard to the nature of its future development. The first Secretary of the Institution, Professor Henry, was opposed to the accumulation of extensive collections at the expense of the Smithsonian fund. He did not underrate the importance of great collections, but, on the contrary, deemed it the duty of the Institution to point out the means by which they might be made, and to aid in this work by utilizing all opportunities for procuring specimens for distribution, by facilitating exchanges, and by assisting explorations. He considered the formation of a general collection, although beyond the means of the Institution at that time, an object which ought to engage the attention of Congress, and was firmly convinced that in accepting donations of specimens, preference should be given to those of importance for use in scientific research, the study of which was likely to produce new and interesting results. Professor Baird, taking up the same administrative problem at a later period, and finding the conditions greatly changed, has forwarded enthusiastically the progress of the National Museum, supported as it now is by direct grants of money from the general Government. With the experience of these years it has become evident that the National Museum of the United States will of necessity have features peculiar to itself, developed in response to the peculiar needs of the people of this continent. It should be remembered that the national collections of every principal European nation are divided into several groups, each under separate administration, though often within the general control of some central authority. In France, for instance, most of the museums are under the Ministry of Public Instruction, and in England, to a less extent, under the Department of Science and Art.

In London, in Paris, in Berlin, and in Vienna the public collections are scattered through various parts of the city, in museums with distinctive names, and independent in their organizations. Much of the work which should properly be done by such museums is omitted, because no one of them has seen fit to undertake it; while, on the other

hand, much labor is duplicated, which is perhaps equally unfortunate, collections of similar scope and purpose being maintained in different parts of the same city. One of the chief objections to such division of effort is, that much of the value of large collections in any department is lost by failure to concentrate them where they may be studied and compared side by side. In Washington the national collections are all, without exception, concentrated in one group of buildings. The Army Medical Museum will soon occupy a building side by side with those under the control of the Smithsonian Institution, and this proximity, in connection with the long-established policy of co-operation between the two organizations, will cause them to be, for all practical purposes, united in interest.

It is possible that, in the future, museums of specialties, occupying buildings of their own, may grow up under the control of other Executive Departments of the Government, but it is to be hoped that they will not be very remote from the chain of museum buildings already in process of formation, and that a harmonious system of co-operation will always be found to be practicable.

The National Museum is now approaching an important crisis in its history. Its future will depend upon the action of Congress in granting it an additional building, for without more room its growth can not but be in large degree arrested. From this time forward it will be impossible to develop the collections satisfactorily without additional space. The laboratories and workshops are already entirely inadequate for the storage of the unexhibited collections and the accommodation of the preparators and mechanics, and the exhibition halls do not afford suitable opportunity for the display of the materials already in order for public examination. Each collection, and above all each department, should have a hall of its own, more or less completely isolated from those which adjoin it. It is evident that when several collections are placed side by side in the same department, much is lost in respect to effect and convenience of study, not to mention the still greater disadvantage of overcrowded space.

A.—THE MUSEUM STAFF.

Several changes have been made in the arrangement of the scientific staff during the year. The collection of Cenozoic Fossils is now in the custody of the Curator of Mollusks, the Department of Invertebrate Palæontology having been divided into three groups, corresponding to the three principal periods of geologic time, Paleozoic, Mesozoic, and Cenozoic. Mr. John B. Smith was appointed Assistant Curator of the Department of Insects on August 1, 1885. Mr. Romyn Hitchcock, Curator in the Department of Arts and Industries, was granted leave of absence for two years to visit Japan for scientific exploration, and, having received from the Japanese Government an appointment as

Professor in the University of Osaka, departed on his mission in July, 1886.

Mr. W. V. Cox was designated Chief Clerk in December, 1885. Mr. R. I. Geare has been placed in charge of Correspondence and Reports; and Mr. A. Howard Clark is Assistant in charge of Publications, Stationery, and Labels. Mr. S. C. Brown, as Registrar, has charge of Transportation, Registry, and Storage. Mr. John Murdoch has been designated Assistant Librarian.

By the death, March 19, 1886, of Mr. James Templeman Brown, the Museum suffered the loss of an enthusiastic worker, who had rendered efficient service in the development of the Museum. Mr. Brown had made an exhaustive study of the whale fisheries of the world, and the collection formed by him to illustrate the history of the New England whale fishery, will always be a prominent feature in the fisheries court.

The Museum staff, as now organized, consists of two classes—the scientific officers or curators, and the administrative officers.

There are at present 28 curatorships, some of which are divided, so that the number of heads of departments or sub-departments is 26, and the total number of men in the scientific staff 30, of whom 13 are in the pay of the Museum, and the others are honorary (or unpaid), some being detailed for this duty by the Director of the Geological Survey, by the Director of the Bureau of Ethnology, others by the Commissioner of Fish and Fisheries, and by the Secretary of the Navy, while two are volunteers. These details are in every instance made in the interests of co-operation by those Bureaus of the Government engaged in work closely connected with that of the Museum. The paleontologists of the Geological Survey have found it to be so much to their advantage to have access to the paleontological collections of the Museum and the use of the laboratories, storage cases, and general administrative appliances of the Museum, that they are permitted by the Director to assume the responsibilities of curatorships and perform a general work of supervision. It is intended, however, that the Museum shall provide paid assistants, to relieve the honorary curators of most of the routine work of their departments.

B.—THE CONDITION OF THE COLLECTIONS.

The reports of the curators indicate that the collections under their charge are in an excellent state of preservation.

The perishable objects, such as skins of birds and mammals, the insects, certain ethnological materials, and the objects preserved in spirits, have in most cases been provided with improved case accommodations, and a decided advance has been made in the methods of preventing insect ravages.

During the year the collection of aboriginal American pottery in the northwest court has been opened to the public, and a series of casts of

reptiles has been placed on exhibition in the west range of the Smithsonian building. Almost the entire lower hall in the Smithsonian building has been devoted to the bird collection, though the Department of Mollusks still retains some of its specimens in the table cases between the bird cases in the alcoves. A small series of insects* has been installed in the southeast court of the Museum building, and the osteological collection has been largely extended. The collections acquired by the Museum at the close of the New Orleans Exposition have been received and assigned.

In connection with the administration of the collections, three hundred and twenty-two papers† have been published, of which a tabulated statement, by subjects, is given under the heading of "Publications."

In the report for 1884, when the last census of the collections was reported, the number of specimens in the Museum was estimated at 1,471,000. During the last eighteen months‡ the increase has been, as shown by the following table, 949,934 specimens:

CENSUS OF THE COLLECTIONS.

Estimated number of specimens in the several departments of the Museum, June 30, 1886.

Department of Arts and Industries:	No. of specimens.
Materia Medica	4, 850
Textile Industries §	3, 064
Fisheries	9, 870
Animal products	2, 792
Foods †	822
Historical relics	1, 002
Paints and dyes †	77
The Catlin Gallery	500
Physical apparatus	250
Oils and gums †	197
Chemical products †	659
Musical instruments	400
Modern pottery	2, 278
Coins and medals, paper money, etc	1, 055
II. (a) Department of Ethnology	§ 500, 000
II. (b) Department of Prehistoric American Pottery	25, 000
III. Department of Prehistoric Anthropology	65, 314
IV. Department of Mammals (skins and alcoholic specimens)	7, 451
V. Department of Birds	55, 945
V. (b) Department of Birds' Eggs	44, 163
VI. Department of Reptiles and Batrachians	25, 344
VII. Department of Fishes	75, 000
IX. Department of Mollusks (including Cenozoic fossils)	460, 000
X. Department of Insects	500, 000

* Perhaps one-fourth of the material on exhibition formed the exhibit prepared for the New Orleans Exposition.

† Ninety-five of these papers were prepared by investigators not officially connected with the Museum.

‡ January, 1885, to July, 1886.

§ Estimated.

	No. of specimens.
XI. Department of Marine Invertebrates.....	*350,000
XII. Department of Comparative Anatomy.....	10,210
Skeletons.....	1,987
Skulls.....	6,581
Antlers.....	89
Casts of brains.....	34
Birds' sterna.....	1,519
XII. (a) Department of Invertebrate Fossils (Palezoic).....	80,482
XIII. (b) Department of Invertebrate Fossils (Mesozoic).....	69,742
†XV. Department of Fossil Plants.....	7,429
XV. Department of Recent Plants.....	†30,000
XVI. Department of Minerals.....	18,401
XVII. Department of Lithology and Physical Geology.....	20,647
XVIII. Department of Metallurgy and Economic Geology.....	48,000
Total.....	2,420,944

There have been no important changes in the assignment of exhibition space since the last report was prepared. In the hall devoted to the display of the materia medica collection, a portion of the collection of food substances has been arranged, and in a corner of the north hall are exhibited a few of the objects collected for the section of steam transportation. A few cases in the north hall have also been filled with coins and medals. The east end of the northeast balcony in the Smithsonian building has been occupied by the department of Ethnology in arranging the collection of weapons. There are still several departments to which no exhibition space whatever has been assigned, on account of lack of room, and the only remedy is a new additional building. A great mass of material is at present stored in the Armory Building, and must remain there until Congress has provided more spacious accommodations for the collections.

CATALOGUE ENTRIES.

The number of entries made during the year in the Museum registers of the several departments is 52,115, are indicated in the following table:

Arts and Industries:	
Materia Medica.....	409
Textiles.....	624
Foods.....	274
Historical Relics, Coins and Medals, and Modern Pottery.....	1,507
Paints and Dyes.....	41
Oils and Gums.....	112
Chemical Products.....	38
Fisheries and Animal Products.....	226
	3,231
Ethnology.....	1,344
American Prehistoric Pottery.....	3,235
Archæology.....	647
Mammals.....	407
Birds.....	4,147

* Duplicates not included.

† Exclusive of Professor Ward's collection.

Birds' Eggs	253
Reptiles and Batrachians	444
Fishes	662
Mollusks (including Cenozoic Invertebrate Fossils). The total number of entries is made up from nineteen different series)	18,638
Insects	1,490
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Marine Invertebrates (excepting Mollusks):	
Crustaceans	1,483
Worms	238
Tunicates and Bryozoa	284
Radiates	3,741
Sponges and Protozoa	1,323
	<hr/>
	7,074
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Comparative Anatomy:	
Mammals	407
Birds	288
Fishes	137
Reptiles and Batrachians	185
	<hr/>
	1,017
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Invertebrate Fossils—Paleozoic	610
Invertebrate Fossils—Mesozoic	1,563
Fossil Plants	15
Recent Plants	40
Minerals	772
Lithology and Physical Geology	1,021
Metallurgy and Economic Geology	5,506
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	52,116

C.—REVIEW OF THE YEAR'S WORK IN THE SCIENTIFIC DEPARTMENTS.

DIVISION OF ANTHROPOLOGY.

DEPARTMENT OF ARTS AND INDUSTRIES.

The collection of textiles is installed in the northeast court of the Museum, and is provided with printed labels and illustrative diagrams: it includes a very full series of the animal and vegetable fibers of the world, together with devices for spinning and weaving, and the various products of the textile industries.

Much of the material intended for exhibition can not be installed in the now limited space available, and is stored away in boxes until increased space will warrant its display.

A few cases containing food specimens are on exhibition, and the composition of the human body is graphically illustrated, together with its daily expenditure of tissues, and the manner in which this is compensated for by daily rations of food. This collection is exhibited upon the plan of the famous collection of similar character prepared by Dr. Lankester and others for the Bethnal Green Museum in London. It is, however, based upon an entirely new series of analyses and a revised plan prepared by Prof. W. O. Atwater, of Wesleyan University.

The section of materia medica is under the charge of Dr. H. G. Beyer, U. S. Navy, who has been detailed for this work by the Surgeon-Gen-

eral of the Navy, under whose supervision the collection has been installed. Its increase during the year has been greater than during any previous year except the first, when the nucleus of the collection was formed from the collections received from different national departments at the Centennial Exhibition, and by the gifts of W. H. Schiefflin & Co., of New York, which were remarkable for their interest and value.

Among the most important accessions received during the year, were those presented by the Governments of Jamaica, Japan, and Mexico; the collection of Dr. Edward Palmer, from the States and Territories of the Southwest; and the gifts of F. Stearns & Co., of Detroit, Mich., and W. S. Thompson, of Washington, D. C. The curator has devoted much time to completing his arrangement of the collection, and has carried on several important investigations on the physiological action of drugs. Seven original papers embodying the results of his investigations have been published and are given in the bibliography, and two more are in press; others are in progress. The exhibition series now contains 3,326 specimens, and nearly half of these are provided with printed labels. The whole collection now includes 4,850 specimens, and 409 entries have been added to the catalogue during the year. A descriptive catalogue is now in preparation.

There has been a constant improvement in the condition of the fisheries collection, which, since its inauguration in the east north range in 1884, has been under the curatorship of Mr. R. E. Earll. The nucleus for this collection was obtained from the Philadelphia Exhibition in 1876. The fisheries of North America are now so thoroughly represented that there can be but little necessity for extending this portion of the department, except by keeping it abreast of the time, by exhibiting modern improvements in apparatus, and the building up of certain special subjects rather of local importance, such as the Chinese fisheries of the Pacific coast. Important contributions have been received from the Government of Siam through Minister Haldeman, from the Government of Japan, and the collections from Great Britain, Sweden, Spain, France, Holland, and Greece, acquired at the close of the London Exhibition, in 1883, have been incorporated in the exhibition series. The necessity of more exhibition space is very apparent. The fish-cultural objects are almost entirely crowded out, and many of the objects are now hung against the wall at such a height as to render them, and the labels attached to them, at least partially invisible.

The collection of animal products is also under Mr. Earll's charge. The nucleus of this collection was obtained at the Philadelphia Exhibition in 1876, and was greatly extended by the addition of material presented from the New Orleans Exposition. There are now on exhibition nearly 1,600 specimens, illustrating the applications of the products of the animal kingdom in the arts and industries.

In the north hall of the Museum are displayed several hundred objects relating to the history of soldiers and statesmen, and a large num-

ber of relics of important events. Here are the Washington relics, transferred in 1883 from the Patent Office, and which include much that is interesting in connection with the domestic and field life of Washington. Among other relics may be mentioned the gifts of foreign Governments to President Jefferson, Commodore Perry, General Ripley, General Grant, and others; as well as memorials of many of the Arctic expeditions sent out by the United States and English Governments during the last forty years, including those in charge of Sir John Franklin, McClintock, Kane, Hall, and De Long. During the year a large number of objects illustrating the history of the Southern Confederacy have been contributed; and it is hoped that the collections to illustrate the participation of the North in the war of the Rebellion may be similarly increased.

The arrangement of a collection of coins and medals has been begun, and about 2,000 specimens have already been placed on exhibition. A series of medals illustrating the history of the United States, including bronze copies in duplicate of all the medals that have been struck at the Mint since its organization, has been deposited in the Museum by the Director of the Mint. The coin series is increasing, and progress has been made in classifying and labelling about 2,000 specimens of ancient Greek and Roman coins recently presented to the Museum, and of the numerous foreign medals at various times presented to the Smithsonian Institution.

A section devoted to the history of transportation was organized under the supervision of Mr. J. E. Watkins in 1885. The exhibit, which is at present small, includes the engine "John Bull" imported from England in 1833 for the Pennsylvania Railroad Company, and some objects illustrating the beginnings of the American railroad system. The report of Mr. Watkins presented in Part II, contains an exhaustive plan in connection with the development of this section, and it is hoped that it may be practicable to carry it out.

A collection of some two hundred and fifty scientific instruments, consisting for the most part of apparatus used by Priestley, Henry, and Hare, is temporarily exhibited in the north hall, as well as the original Morse telegraph instrument deposited by Stephen Vail.

There are included in this department a great many other collections which at present have no organized supervision, and to which additions are not at present specially sought for several reasons. Among these are the collections of musical instruments, modern pottery, and porcelain, lacquer, and the various processes used in the reproductive industries. It is expected that the lithographic and allied exhibits will be shortly developed.

Four large and valuable tapestries, depicting scenes in the life of Alexander the Great, and executed by Jan Leyniers, a celebrated Flemish weaver who was born in 1627 and died in 1686, have been deposited by General P. H. Sheridan.

DEPARTMENT OF ETHNOLOGY.

Prof. Otis T. Mason, curator of Ethnology, has been constantly engaged in the preliminary classification of the immense collections of material under his charge, with special reference to their final installation, devoting his attention chiefly to certain classes of objects, such as weapons of war and the chase, implements of agriculture, and other primitive industries. In addition to these great series classified according to function, other groups of objects have been arranged with reference to ethnical considerations.

In the classification of the numerous groups of objects in this department, such as basket work, throwing-sticks, sinew-back bows, archery, transportation, and the several handicrafts of the various tribes of Indians, an effort is being made to introduce the strict methods of classification and nomenclature which are already applied in the other departments of natural science.

The Eskimo collection has been arranged in table cases in one of the exhibition halls in accordance with the ethnic idea, although in the minor details of classification function and form as well as geographical distribution have been followed.

In November, 1885, Lieut. T. Dix Bolles, U. S. Navy, having been detailed for service in the National Museum by the Secretary of the Navy, was assigned to duty in this department.

The number of specimens in this department is estimated by the curator at 500,000. During the year 1,344 entries were made in the catalogues.

The interest of this department is constantly increasing under its present energetic management, and its value to visitors has been greatly enhanced by the extension of the system of descriptive labels.

SECTION OF ABORIGINAL AMERICAN POTTERY.

The accessions to this section during the past year have been numerous and very important, especially those received from the Bureau of Ethnology. The material belonging to this department, together with the collections of South American aboriginal pottery, and of the extensive collections from the mounds, which have for many years been accumulating in the archæological hall of the Smithsonian building, and have now been transferred to the custody of this department, have completely filled the northwest court.

A special feature of this exhibition hall is the case, 260 feet long and 4 feet 8 inches deep. This is in two compartments throughout, that in the rear being used for the storage of the duplicate and unassorted collection of American pottery.

The value of these collections is practically inestimable, since even the modern tribes, who are still making pottery similar in its general character to that which is here preserved, have deteriorated to such a

degree in their artistic capacity or skill, that their products are not therefore an exponent of their original artistic capabilities. So exhaustive and monographic is this collection that any thorough study of American aboriginal pottery must of necessity in great part be based upon this collection.

In addition to his administrative work, Mr. Holmes, the curator, has been engaged in the preparation of a monograph of a number of collections from the Province of Chiriquí, in Colombia, and in investigating the influence of textile decoration upon the ornamentation of pottery.

The collections made under the direction of the Bureau of Ethnology in the Mississippi Valley by Dr. Cyrus Thomas are deserving of special mention, as well as those of Col. James Stevenson and Mr. E. W. Nelson in the Pueblo country of the Southwest.

The number of specimens in the collection is estimated at 25,000, and during the year 3,234 entries were made in the catalogues.

DEPARTMENT OF PREHISTORIC ANTHROPOLOGY.

The system of classification in this department is (1) by material, all objects of stone being placed together, as also of copper, shell, horn, clay, bone, and wood; (2) by form and function, thus, stone pestles, arrow-heads, knives etc., are placed together; (3) by development, in order to show the gradual progression from the crudest to the most perfect form.

The total number of accessions has been 2,751, and the more important of these are treated of on a geographical basis in the report on this department.

The reserve series includes more than 40,000 specimens.

In addition to the general collection, there is a special or "local" collection, in which sets of objects obtained from separate localities, such as a single grave, mound, or village site, are installed together.

During the year one hundred and nineteen of these special collections have been placed on exhibition. This form of special collection is becoming of great importance in the department.

Through the co-operation of the Bureau of Ethnology a large amount of valuable material has been obtained from West Virginia, Alabama, Mississippi, Ohio, Illinois, Tennessee, Wisconsin, and Arkansas.

Dr. Rau is engaged upon the preparation of an illustrated work on North American pre-historic relics, which is designed to serve as a guide for visitors to the department, and as an explanation of the terminology of North American archæology. This will bear the title "A Classification of the North American Pre-historic Relics in the U. S. National Museum."

No less than 3,667 specimens have been added to the exhibition and study series during the year, making a total of 40,231 specimens in this series. The duplicate collection numbers nearly 9,000 specimens. During the year 647 catalogue entries were made.

DIVISION OF ZOOLOGY.

DEPARTMENT OF MAMMALS.

The administrative work of the department has been directed mainly to the preparation for an entire re-arrangement of the exhibition series. Twenty new specimens have been placed on exhibition during the year. There have been made 407 entries in the catalogue of the department, the majority of the accessions having been received from the Central Park Menagerie, in New York City, the Zoological Gardens at Philadelphia, and Barnum's Menagerie.

The entire collection, with the exception of the shrew-mole (*Soricida*), has been studied and identified, and a card catalogue of the skins and alcoholic specimens, which now amount to 7,451, has been completed. A report was prepared during the year upon the mammals collected by E. W. Nelson and C. L. McKay in Alaska. Mr. F. W. True, curator, has in progress extensive investigations on American cetaceans, and is at present engaged upon a revision of the dolphins. During the year Mr. True visited various points on the coast of North Carolina, to study the dolphin and porpoise fisheries. He has continued his studies upon the toothed whales, and in connection with the comparison of skulls of the American species of lynx discovered cranial differences between *Lynx canadensis* and *Lynx rufus*. He has also made a new study of the kangaroo rats.

In the spring of 1886 Mr. William T. Hornaday, chief taxidermist, was sent by the Smithsonian Institution to Montana for the purpose of obtaining skins and skeletons of buffalo, now on the verge of extinction.

DEPARTMENT OF BIRDS.

An important part of the administrative work of this department has been the extension of the collections by means of exchange. Two thousand five hundred and eighty-one specimens have been sent out through exchange, and a full equivalent has been received. Altogether 4,147 specimens have been added to the collection during the year, the largest contribution having been made by the Fish Commission steamer *Albatross*, in the Bahamas, consisting of 1,000 specimens and about 75 species, 5 of which were new to science. Exchanges have been completed with the Musée d'Histoire Naturelle, in Paris, representing 86 specimens, 79 species, from Madagascar and Cochin China; with the British Museum, 235 specimens, 179 species, from India and Europe; with the Mexican Geographical Exploring Expedition, 135 specimens, 75 species; and with Count Hans von Berlepsch, of Münden, Germany, 60 specimens, 50 species, of South American birds.

More than half of the mounted collection has been transferred to exhibition stands of the improved standard recently adopted. The final labelling of the exhibition series has been deferred by delays at the Government Printing Office, and advantage has been taken of the delay to revise the labels in order that they may accord with the order of

classification adopted by the American Ornithologists' Union, which is described in the report of the curator, Mr. Ridgway.

Many important groups have been received for special critical revision, notably the various Procellarian genera *Æstrelata* and *Puffinus*, and the genera *Collinus*, *Larus*, *Lagopus*, and *Empidonax*. Dr. Stejneger has continued his revisions of Japanese ornithology.

An important research completed during the year was that upon the birds of Mexico, made by Professor Ferrari-Perez, of the Geographical Exploring Expedition of Mexico, who brought to Washington for the purpose the entire collection of birds in the National Museum of Mexico. Professor Ferrari-Perez's report was based upon the studies of the two national collections, and has been published in the Proceedings of the National Museum.*

There are now 55,945 specimens in the collection, of which 7,000 have been set apart for exhibition. The exhibition series might advantageously be made to include 15,000 specimens if space permitted

SECTION OF BIRDS' EGGS.

Much has been accomplished during the year by Capt. C. E. Bendire, U. S. Army, honorary curator, in the classification and arrangement of the collection of eggs and nests. The collection includes about 44,000 specimens, of which 1,491 are on exhibition, 31,124 are in the reserve series, and 11,548 are duplicate. More than 2,550 additions, in 253 lots, have been made during the year. It is to be hoped that before long it may be possible to give more space to this crowded collection. Captain Bendire has, as heretofore, made generous contributions from his private collection.

DEPARTMENT OF REPTILES AND BATRACHIANS.

The collections in this department are very inadequately provided with space, either for reserve or exhibition purposes. The collection, still under the honorary curatorship of Dr. H. C. Yarrow, U. S. Army, includes about 25,350 specimens, which represent nearly every species of North American reptiles and batrachians.

Prof. E. D. Cope has in preparation, under the direction of the Smithsonian Institution, a report on the reptiles of North America, and has made a large number of identifications and descriptions. He has also completed his report on the Batrachia of North America, and identified all the undetermined batrachians in the collection.

During the year 444 entries, including 1,705 specimens, were made in the catalogue of the department.

DEPARTMENT OF FISHES.

The curator, Dr. T. H. Bean, has re-examined the entire collection, now including some 75,000 specimens. No less than twenty-five barrels of alcohol were used in refilling the bottles and replacing the old alcohol.

* Vol. IX, pp. 125-199.

Nearly 15,000 specimens have been set aside for arrangement into sets for distribution and exchange. During the year, 662 entries have been made in the catalogue, bringing the total number of entries up to 37,893.

Much of the curator's time has been consumed by his work as editor of the Proceedings and Bulletins, and during the year Bulletins 23, 28, 29, 30, and 31, were sent to press under his editorial supervision.

The customary amount of special research has been carried on, and several reports upon special collections have been made. Considerable time has been devoted by Dr. Bean and myself to the preparation of a report upon the extensive deep-sea collections of the U. S. Fish Commission, and those obtained by Mr. Alexander Agassiz in connection with the work of the U. S. Coast Survey.

The work of this department was, during the months of August and September, 1885, transferred to the Fish Commission headquarters at Wood's Holl, where all of the deep-sea collections were concentrated, overhauled, classified, and catalogued, and a considerable amount of systematic investigation carried on, a portion of the results of which have already been made public, and the remainder, it is hoped, will soon appear in a monograph of the deep-sea fish fauna of the Eastern Atlantic, now for some years in preparation.

The ease with which this extensive collection was handled in the large rooms which were available for the purpose at Wood's Holl, offers an illustration of the great need for the better accommodation of the fish collection in Washington. Work was finished in a few weeks at Wood's Holl which would have occupied four or five months in the cramped work-rooms in the Museum.

DEPARTMENT OF MOLLUSKS (INCLUDING CENOZOIC INVERTEBRATE FOSSILS).

Under the curatorship of Mr. W. H. Dall, the department of mollusks has made extensive progress during the year, especially in the matter of cataloguing and arranging material which has accumulated in past years. The number of catalogue entries was 18,638, representing between fifty and sixty thousand specimens. Only about four times as many entries had been made during the preceding twenty years.

The classification and systematic arrangement of accessions received in previous years, especially the Jeffries and Stearus collections, have received special attention.

Among the named species received, which were found to be of more than ordinary interest, were 71 from Bering Sea, a small series of land and fresh-water shells from Manitoba, and a very fine series of Madagascar land shells. As in previous years, the U. S. Fish Commission made by far the most important contributions to the collection.

A beginning has been made in public exhibition, by placing on view an experimental case containing the chief types of Cephalopods, pearls

and pearl formations, cameo shells, and sections showing the internal structure of various large and ornamental species. A provisional display of the principal economic mollusks of North America has also been made. Under the supervision of Dr. R. E. C. Stearns, adjunct curator, an exhibit of the edible mollusks from the Atlantic and Pacific, of ornamental species from tropical seas, and of land and fresh-water species, has been installed. There is no room at present for the exhibition of the general collection.

The work of the curator and his assistants has consisted chiefly in the identification of specimens for teachers and others in various parts of the United States; the identification and classification of the recent or living mollusks of the Atlantic coast of North America, as well as those of the Antillean-Caribbean region; and the arrangement of land, pond, and fluviatile gastropods, as well as the fresh-water Acepala, for the purposes of comparison and investigation in the matter of geographical distribution and variation of species as related to and affected by environmental conditions.

Among the most important investigations in progress is that of Mr. Dall upon the deep-sea mollusks and his studies upon the Quaternary molluscan fauna of the United States; and the continuation of previous investigations by Dr. Stearns on the geographical distribution of the land and fresh-water mollusks of North America and the variation of the same, as related to and affected by the physical characters of their environment.

DEPARTMENT OF INSECTS.

This department was organized three years ago, but little has hitherto been attempted beyond the preservation of the collections; Dr. C. V. Riley, the honorary curator, having been without an aid. An assistant curatorship, to which Mr. John B. Smith has been appointed, was established at the beginning of this year, and additional accommodations in the laboratory and exhibition hall have been provided, thus permitting an important extension of the study and exhibition series.

In October Dr. C. V. Riley formally presented to the Museum his extensive private collection of North American insects, containing over 115,000 pinned specimens, representing over 20,000 species. This collection is the result of his labors in collecting and study for more than twenty-five years.

It is estimated that there are now at least 500,000 specimens in the collection.

The following table shows the estimated numbers of the pinned and mounted specimens in the collection :

	Boxes.	Specimens.	Species.
Hymenoptera	66	24, 796	2, 650
Coleoptera	127	43, 613	6, 558
Lepidoptera	338	17, 098	2, 308
Diptera	21	5, 646	699
Hemiptera	59	8, 862	1, 184
Orthoptera	64	6, 903	560
Neuroptera	14	868	169
Arachnida and Myriapoda	2	425	110
Insect architecture	16	1, 080	178
Miscellaneous (not yet arranged)	28	1, 610	178
Galls and gall insects	31	4, 152	734
Total	766	115, 053	15, 328

In addition to these pinned specimens, the collection contains some nineteen large boxes of alcoholic material, chiefly of the adolescent states of insects, comprising some 2,850 vials, in many cases several species being contained in a single vial. The collection contains a large number of undescribed species in all orders.

The early states of the minuter insects are mounted in balsam on slides (1 by 3 inches), of which the collection contains upward of 3,000, most of the slides holding the contents of three cover glasses.

The mounted material is contained for the most part in double-folding boxes in book form, about 32 by 22 by 8 centimeters, lined on both sides with cork and paper.

A certain proportion of the boxes are less than 7 centimeters wide, and are lined only on one side. There are also two cabinets, one with sixteen large, glass-covered drawers, and another (now at Dr. Riley's residence) of sixty glass-covered drawers. The specimens are all duly classified and labeled, and in excellent order and preservation. The labels include notes as to locality and food habit, and are also in many cases numbered to correspond to detailed notes as to adolescent states and habits.

The collection was begun twenty-five years ago, and represents Dr. Riley's continuous collectings since, including his own types and many of other authors received in exchange. It embraces few exotic species, and is more particularly rich in biological material, containing more blown and alcoholic larvæ and pupæ in connection with their imagos than perhaps any other collection of North American insects. Including the unarranged and alcoholic material not connected with the pinned specimens, there are over 20,000 species in the collection.

The curator has continued his work in re-arranging and perfecting different families in several orders, particularly among the micro-lepidoptera.

DEPARTMENT OF MARINE INVERTEBRATES.

By far the largest part of the material received by this department was obtained by the U. S. Fish Commission steamer *Albatross*, while engaged in making extensive explorations along the entire eastern coast of North America from the Grand Bank of Newfoundland to southern Florida and the Bahamas. The results of this exploration were of great value, since a large part of the region visited had never been systematically investigated before. Over two hundred and fifty successful hauls were made with the dredge and the trawl-net. Among important donations from other sources were a fine series of deep-sea soundings from the Southern Atlantic and Pacific Oceans, made by the U. S. steamer *Enterprise*, and large collections from the western and northwestern coasts of America and Siberia. A most interesting series of microscopical preparations of nearly two hundred species of British sponges, mainly described or identified by Dr. Bowerbank, was supplied by the Rev. A. M. Norman, a distinguished English naturalist.

The collection of Echini, or Sea Urchins, has now been completely identified and arranged for reference and study. Of this group the Museum possesses 152 species, many of which are represented by extensive series of specimens covering a wide range of distribution.

The curator has continued his studies of the parasitic copepoda of the Atlantic coast. He has also revised the collection of star-fishes, and thoroughly overhauled the species collected by the U. S. Fish Commission on the Atlantic coast north of Cape Hatteras.

Work upon the collection of Ophiurans has been continued by the Hon. Theodore Lyman, who is at present engaged in studying the material obtained by the *Albatross* south of Cape Hatteras, and that from the western coast of North America, including Alaska.

The number of catalogue entries during the year has been 7,074, a single entry often representing hundreds of specimens. The total number of specimens at present in the collection is estimated at 350,000.

DEPARTMENT OF COMPARATIVE ANATOMY.

The development of the osteological collection has been the chief work undertaken by the acting curator, Mr. True.

Mr. Lucas has rendered most efficient service in the development and arrangement of the collection. It has been the desire of the curator, to obtain a series of skeletons of thoroughbred domestic animals, and several specimens representing the important breeds of dogs have been obtained.

The number of catalogue entries during the year, embracing birds, mammals, fishes, reptiles, and batrachians, was 1,017. The total number of specimens in the collection is now 10,210. A card catalogue of the skeletons of the mammals has been completed.

DEPARTMENT OF INVERTEBRATE FOSSILS (Paleozoic).

This department is under the charge of Mr. C. D. Walcott, of the U. S. Geological Survey. The collection now includes over 80,000 specimens, of which perhaps one-third has been transferred by the U. S. Geological Survey to the Museum. During his connection with the Museum Mr. Walcott has thoroughly arranged this material. A very interesting series has been selected for exhibition, although up to the present time it has been impracticable to place any material upon view.

The curator has been engaged in a special research, in behalf of the U. S. Geological Survey, upon the stratigraphy and palæontology of the Cambrian system of North America.

Prior to the year 1884 the increase in the material of this department had been irregular, owing to the lack of time and means at the disposal of the curator; during that year, however, Mr. Walcott introduced a thorough system of classification, and began the formation of a systematic collection of Cambrian fossils.

DEPARTMENT OF INVERTEBRATE FOSSILS (Mesozoic).

The principal accessions to the collection have been those received from the U. S. Geological Survey. The curator, Dr. C. A. White, reports that a total number of 1,563 entries were made in the catalogue during the year. Among the accessions of special interest was a collection of Cretaceous fossils from Mexico, and another of Lower Cretaceous and Jurassic from France. The total number of specimens in the collection at present is 69,742.

Steady progress has been made in the work of arrangement and classification; and the collection is now accessible for purposes of study. The provisional arrangement which has been adopted, is purely stratigraphical; though a broad biological classification under each geological period has been attempted. Mr. J. B. Marcou has re-identified all the type specimens, and has published a catalogue of these in the Proceedings of the Museum.*

DEPARTMENT OF INVERTEBRATE FOSSILS (Cenozoic.)

Since the transfer of Mr. W. H. Dall from the Coast Survey to the U. S. Geological Survey, in which he is now serving as palæontologist in charge of the later formations, this department has been organized. It is, however, really inseparable from the department of mollusks, of which Mr. Dall has long been curator.

DIVISION OF BOTANY.

DEPARTMENT OF FOSSIL AND RECENT PLANTS.

The attention of the curator of these two departments, Prof. Lester F. Ward, of the Geological Survey, has been directed chiefly toward the study of the fossil plants: his sketch of the history and present

* Proc. U. S. Nat. Mus., VIII, 18-5, pp. 290-344.

condition of fossil botany, published in the Fifth Annual Report of the Director of the Geological Survey, gives an excellent idea of the character of the work which he has undertaken to accomplish in connection with the National Museum collections.

The work of classification and arrangement has progressed, and the herbarium of recent plants is now estimated at not less than 30,000 specimens: while that of fossil plants includes 7,439 specimens.

Dr. F. V. Havard contributed large and valuable collections of plants from Texas and the adjacent States and Territories, containing the types of his report on the "Flora of Western and Southern Texas," published in the Proceedings of the National Museum.*

A card catalogue of the Joad collection of plants from the Old World, recently acquired from the Royal Botanical Garden at Kew, has been completed. This collection contains over 10,000 species, 9,000 of which were new to the Museum.

DIVISION OF GEOLOGY.

DEPARTMENT OF MINERALS.

Under the direction of Prof. F. W. Clarke, the department of minerals is now making rapid progress. During the year exchanges have been carried on with private collectors and with a number of public museums, among which may be mentioned the *École des Mines*, at Paris; the *Musée d'Anancy*, in Savoy; the University of Sydney, Australia; and that of Amherst College. The total number of specimens received during the year was 800.

Nearly 4,500 of the 18,401 specimens constituting the collection of the Museum, are now on exhibition. Especial attention has been devoted to the development of the collection of gems and ornamental stones.

In connection with his official duties as chemist of the Geological Survey, the curator has been enabled to accomplish much scientific work upon the Museum collections. He has made a study of the minerals received from Litchfield, Me., and the turquoise from New Mexico, and is at present investigating the chemical structure of the silicates and preparing a revision of the borates, and is also making a full series of analyses of tourmaline.

DEPARTMENT OF LITHOLOGY AND PHYSICAL GEOLOGY.

Although the increase of material in this department has not been very great, during the year the number of catalogue entries has been 1,021.

The exhibition series has increased, and all the available cases are now filled. Much attention has been devoted to the preparation of the exhibition series and accompanying labels and to the completion of the study series.

* Proc. U. S. Nat. Mus., VIII, 1885, pp. 449-533.

Among the more important accessions have been several relief maps received from the Geological Survey, a collection of rocks and building stones from Mexico, a series of the rocks of Continental Europe, and a series of typical marbles and building stones from South Carolina, etc.

There are several groups of exhibition specimens in process of preparation, among them being a structural series, a lithological series, and a series of building and ornamental stones. These are in part on exhibition, though not in their proper places in the systematic collection.

The curator, Mr. Merrill, is engaged in investigations upon the mineralogy of the District of Columbia, the origin and nature of fulgurites, and the durability of building stones, besides carrying on studies on local petrography; and has just completed a catalogue of the collection of building stones now in the Museum.

The total number of specimens in the collection is estimated at 20,647, of which 17,647 belong to the reserve series. Of the latter number 5,313 are on exhibition, 2,730 being specimens of building and ornamental stones, and 1,829 belonging to the educational series of rocks and rock-forming minerals. There are, also, in the collection 3,400 thin sections of rocks prepared for microscopic study. Of these nearly 200 have been added during the year.

DEPARTMENT OF METALLURGY AND ECONOMIC GEOLOGY.

Owing to the fact that so great a mass of material is already assigned this department, which is under the curatorship of Mr. F. P. Dewey, it has not been considered wise to solicit additional collections, although much has been received during the year.

The special attention of the curator has been given to the arrangement and classification of the mass of material received from the Institute of Mining Engineers, part of which arrived during this year.

The preparation of the exhibition series has been going steadily forward, and a portion has been placed on exhibition as a preliminary display. The curator has commenced the preparation of a descriptive catalogue of the systematic collections, to serve as a guide to visitors.

For three years past the curator has been employed in an investigation of the physical properties of coke, and has published a paper upon the porosity and specific gravity of different kinds of this material.

The total number of specimens in the collection is estimated at 48,000, of which 17,000 are on exhibition. During the year 5,506 entries were made, including 8,552 specimens.

D.—REVIEW OF THE ADMINISTRATIVE WORK OF THE YEAR.

It will be evident from what has already been said that marked progress has been made in the arrangement and identification of the material in the custody of the staff curators. At no time in the history of the Museum has classification and installation received so much attention. For the past five years the Museum staff has been overburdened with the preparation of exhibits for Berlin, London, New Orleans, Louisville, and Cincinnati, and although much valuable material, which would otherwise have been lost to the Museum, has been obtained, it is equally true that during those years the progress of the Museum work proper has been necessarily made subservient, and has been seriously impeded.

The reports of the curators indicate that better progress has been made in the development of the exhibition series in the past than in any previous year. The systematic arrangement of many of the collections has been commenced, and although much yet remains to be done in the installation and labelling of specimens, the general appearance of the public halls is far more satisfactory than ever before. In the three geological departments this advance is especially manifest; as well as in that of comparative anatomy.

The Museum may well be congratulated upon this progress, for there is no reason to doubt that the systematic arrangement of all the collections will, during the next fiscal year, make still greater headway.

The advance of the work has given an opportunity for much experience in methods of installation and labelling, and the principles of administration which have been tentatively laid down in previous reports have been brought still further into experimental practice. It is still the belief of our administrators that there are certain cardinal principles which must be considered in the arrangement of collections in public museums. Each object should illustrate an *idea*, and no two objects should be shown, which illustrate the same idea in a similar manner. Further than this, the idea to be illustrated should be explained on the label in such a manner that any intelligent visitor, without previous special knowledge of the subject, may be able to learn why the object is shown and what lesson it is intended to teach. The objects, also, should be so carefully classified that their relations to each other may be recognized by the visitor, so that, taken together, they suggest certain general conclusions; and in arriving at them the visitor should be aided by certain general or collective labels, which should be supplemented, where practicable, by guide-books and manuals containing all the information upon the labels, arranged systematically and illustrated by engravings of the more important objects.

The study series includes those specimens which are not placed upon exhibition, but are retained in the laboratories or stored in the unit tables

in the exhibition halls. This series is kept for purposes of comparison and study, or as a basis for the preparation of monographic treatises. Numerous applications have been received for the loan of specimens in the Museum, constituting types of the species, and as on several occasions in previous years type specimens have been lost or otherwise destroyed whilst in the hands of the borrower, it has been found absolutely necessary to impose very strict limitations upon the sending away of type specimens. Free access is allowed to specialists in the examination of these specimens in the laboratories, but no type specimens are now sent to individuals. Formal applications by the authorities of other museums are always, when possible, favorably responded to. In this connection a circular (No. 35) has recently been issued. It reads:

Type specimens will in future not be sent out of the National Museum for purposes of study, except to officers of scientific institutions or societies who shall charge themselves with the responsibility of their safe-keeping and return.

This action on the part of the Museum is in no way intended to act as an obstacle to those engaged in scientific pursuits, but is a necessary step in order to insure the finding of any given types when desired for study.

1. PROGRESS OF GENERAL AND INCIDENTAL WORK.

LIBRARY.

The work of the library has been carried on without any important changes from the methods employed in the previous year: it is, however, becoming yearly more serviceable to the scientific staff of the Museum, as is shown by the fact that the number of books borrowed during the year is greater than ever before.

The total number of books and pamphlets received during the year was 2,424 (exclusive of regular periodicals). Of these, 1,372, or more than one-half, were books selected from the extensive accessions of the Smithsonian Institution to be retained at this library, while the rest were sent to the Library of Congress.

As usual, the chief contributor has been Professor Spencer F. Baird, to whom the library is indebted for 37 volumes, 192 pamphlets, and 2 maps.

Another important gift was that of Mr. J. C. Brevoort, of New York, which consisted of 16 volumes and 144 pamphlets, almost entirely on ichthyological subjects, and many of them of great value. Among other contributions the most important are those from Mr. Robert Ridgway, U. S. National Museum, 52 pamphlets; the Smithsonian Institution, 5 volumes, 25 pamphlets; the Royal Swedish Academy of Sciences, 10 volumes, 20 pamphlets; and the U. S. Geological Survey, 9 volumes and 2 pamphlets.

The periodical department of the library contains more or less complete sets of 570 periodicals, chiefly the proceedings of learned societies

and scientific serials. A systematic effort is being made with the cooperation of the Smithsonian Institution to fill up incomplete files and add new periodicals by means of exchange.

A slight change has been made in the method of keeping the record of books lent and returned. The "ledger by borrowers" has been discontinued, and, in place of it, the receipts or "call-cards," signed by the borrowers, are carefully filed, thus serving to show what books each borrower has in his possession. On the return of a book, the card is returned to the borrower, and the entry on the "ledger of books issued" is cancelled. This plan has been found more efficacious than the old system, since by substituting two entries for three, one possible source of error is eliminated. The number of books borrowed during the year was 3,867.

The card catalogue, by authors, has been continued as in previous years. The total number of books catalogued during the year was 2,923, of which 553 were volumes of more than one hundred pages, and the remainder pamphlets.

The library is especially rich in scientific pamphlets, particularly authors' "extras" of their publications in scientific periodicals; and it is particularly important that this collection should be extended.

The work of putting the pamphlets into covers was begun in March; and at the end of the year, 1,706 pamphlets had been thus bound.

The library is still in great need of money for the purchase of the latest editions of books of reference. Its most pressing necessity, however, is more room for the large and constantly increasing number of periodicals.

EXCHANGES AND DISTRIBUTION OF DUPLICATES.

The customary distribution of duplicate specimens has been continued during the year. The importance of this work was well characterized by Professor Baird in his report to the Secretary of the Institution in 1861: "When it is considered that all these [specimens] have been named and labelled by naturalists admitted to be of the highest authority in their respective departments, and that all have thereby the character and value of types, many of them belonging to species first described from Smithsonian specimens, or serving as the materials of elaborate monographs, it will be readily understood how much their systematic and judicious distribution by the Institution all over the world must conduce to the advancement of science."

The extent of the work is shown by the table here presented. Of the 118 distributions included in the table, 41 were to foreign institutions and individuals.

Table showing the nature of duplicate material distributed between July, 1885, and July, 1886.

Objects.	Species.	Specimens.
Fishes	14	26
Pottery		626
Fossils		42
Mollusks	295	759
Ethnology		1,453
Archæology		241
Minerals	318	1,862
Marine invertebrates, 32 sets	200	18,000
Miscellaneous	61	260
Plants		49
Rocks	145	221
Mammals	61	98
Casts of fishes	12	12
Reptiles	7	7
Textiles		331
Total number of specimens		23,987

The number of applications for drawings and photographs of the standard styles of cases used in the Museum, which have been favorably acted upon during the year, has been 115. In addition, 57 sample cases and drawers have been lent to colleges and other institutions desirous of examining their construction, with a view to adopting similar forms in their own museums and laboratories.

The Mexican Geographical and Exploring Commission, from which were received valuable collections of birds and other natural history objects, requested to be supplied with a full series of papers, working-drawings, etc., in connection with the operations of the Museum. In response to this request, a box was forwarded, containing thirteen cyanotypes of working-drawings of Museum cases, sixteen photographs of cases, a complete set of blanks and circulars used in the administration of the Museum, together with a set of Museum circulars and plans of the Museum buildings. The Smithsonian Institution and U. S. Fish Commission also sent specimens of blanks and circulars.

The preparation of a set of casts of fishes and reptiles for the American Museum of Natural History, in New York, was commenced and partially completed during the year.

In October, 1885, the preparation of a duplicate collection of building-stones for the museum above referred to, was completed. This task was undertaken in continuation of an engagement entered into between the American Museum of Natural History and the late Dr. George W. Hawes, while in charge of the collection of building-stones in the Museum and of the work of gathering material for the Tenth Census.

Foreign exchanges.—Exchanges have been made with several foreign museums and institutions. Nine mammal skins have been received from

the Australian Museum, Sydney. An extensive exchange of ethnological material is being arranged with the ethnological department of the Royal Museum of Berlin. Negotiations for an exchange of mammals, birds and insects with the Musée d'Histoire Naturelle, Paris, are in progress. Thirty-five species of Jamaican fishes have been received from the Public Museum of the Institute of Jamaica. From the Canadian Geological Survey have been received 67 species of Cambrian fossils; and skeletons of *Python molurus* and *Cercopithecus rufo-viridis*, a specimen of *Pentacrinus* and a set of marine invertebrates have been sent in exchange. M. Charpy,* director of the Musée d'Annecy, Annecy, Haute-Savoie, France, has sent four boxes of minerals, rocks, fossils, and shells, etc., and an equivalent in Ohio and Cincinnati Silurian fossils has been promised in exchange. The museum has sent to the Auckland Museum, New Zealand, large collections of ethnological material, bird-skins, ores, and minerals, and has received in exchange 104 specimens of New Zealand bird-skins. An offer of ethnological material has been made to Mr. S. H. Drew, of Wanganui, New Zealand, in exchange for marine invertebrates, fresh-water shells and fossils. From the École des Mines, Paris, has been received a collection of French minerals, in exchange for which 71 specimens of United States minerals have been sent. Dr. Julius von Haast, director of the Canterbury Museum, Christ Church, New Zealand, has sent 7 fine specimens of nephrite, and has received a set of marine invertebrates. Dr. von Haast has promised to collect skeletons of whales and seals for the National Museum, and has offered a series of New Zealand timbers, for which ethnological material has been promised. Extensive exchanges have been conducted with several of the musées under the direction of the Ministère de l'Instruction Publique, Paris. Six boxes of ethnological material were sent in August, 1885, and a number of casts of Indian heads in March, 1886, to the Trocadéro Museum. The Minister of Public Instruction has recently announced the transmission of 9 vases, from the Manufacture Nationale de Sèvres, 8 pieces of tapestry from the Manufacture Nationale des Gobelins, and some specimens of tapestry work from the Manufacture Nationale de Beauvais. An exchange of birds, fishes, and shells is being arranged with the Imperial Zoological Museum of the Academy of Sciences, St. Petersburg, Russia. Negotiations are pending with Dr. F. R. Jentink, director of the National Museum of Natural History, Leiden, Holland, for an exchange of mammals from the East Indies and Africa, for American birds, reptiles, fishes, and marine invertebrates. Collections of mammal skins and skulls, materia medica, and reptiles have at various times been received from the Kurrachee Municipal Library and Museum (James A. Murray, curator), in exchange for which 390† specimens of birds and 24 mammals have been sent.

* Deceased.

† Two hundred and seventy-eight of these were transmitted in 1881.

Bird skins have been exchanged with M. Milne Edwards,* of the Musée d'Histoire Naturelle, Paris.

Dr. T. Jeffrey Parker, Otago University Museum, Dunedin, New Zealand, has offered fishes, and desires American species in return. Negotiations are pending for an exchange of ethnological material with Signor L. Pigorini, director Museo Preistorico-Etnografico, Rome, Italy. A series of textile fabrics (manufactured and raw) has been sent to Count Ito, minister of the Imperial household department, Tokyo, Japan, for the Japanese Government. Four boxes of Japanese porcelains have been received from the Educational Department in Tokyo. An exchange of mammal skins has been effected with Prof. Tycho Tullberg, Upsala, Sweden, and an offer of birds and marine invertebrates in return for similar material has been made by the National Museum.

Seventeen mammal skins have been received from Dr. C. W. de Vis, director of the Queensland Museum, Brisbane, Australia. Specimens in exchange are being prepared for shipment. Dr. de Vis also offers a fœtus and skeleton of dugong in exchange for a manatee. This offer is now under consideration. Mr. L. Wray, jr., curator of the Perak Government Museum, Perak, Straits Settlements, has offered to present mammals, and to exchange tin-sand and wash-dirt from Perak tin-mines for mineralogical or geological specimens from the United States.

Extensive exchanges have been arranged with Prof. Fernando Ferrari Perez, of the Mexican Geographical and Exploring Expedition.

PUBLICATIONS.

The eighth volume of the Proceedings has not yet appeared, although the last signature is dated December 7, 1885. A list of the signatures of this volume is given in Part IV of this report.

During the year Bulletins 23, 28, 29 and 30 were issued, and are briefly reviewed here.

Bulletin 23 forms Part II of "Bibliographies of American Naturalists," and is entitled PUBLISHED WRITINGS OF ISAAC LEA, LL. D., by Newton Pratt Scudder, 8vo., pp. lix + 278. The list of writings is preceded by a biographical sketch. The bibliography is arranged chronologically. A list of genera and species, discussed and described, is arranged alphabetically; in addition there is a general index.

The collections of the National Museum were largely increased by gifts from Dr. Lea's collections, and his writings are based, in large part, upon this and other material belonging to the National Museum.

Bulletin 28. A MANUAL OF NORTH AMERICAN LAND SHELLS, by W. G. Binney, 8vo., pp. 528.

This bulletin is an enlarged edition of a work entitled "The land and Freshwater Shells of North America, Part I," published by the Smith-

* Before completion of this exchange M. Milne Edwards died, and the negotiations were continued with M. Oustalet.

sonian Institution in 1869. More attention is given in the present work to the subjects of geographical distribution, organs of generation, lingual dentition, and classification; and species are grouped geographically.

Bulletin 29. "RESULTS OF ORNITHOLOGICAL EXPLORATIONS IN THE COMMANDER ISLANDS AND IN KAMTSCHATKA," by Leonhard Stejneger; 8 vo., p. 382; 8 colored plates and map.

This work is the result of the author's explorations in the Commander Islands and in Kamtschatka, and contains the conclusions at which he has arrived after careful examination of the avifauna of that region, his investigations being based both upon material observed and collected by himself, and also upon specimens in the collection of the National Museum. This bulletin consists of three sections: (1) A review of the species of birds collected or observed by the author at the Commander Islands, and at Petropaulski, Kamtschatka; (2) a synopsis of the birds reported to inhabit Kamtschatka; and (3) conclusions.

The first section, which occupies the larger portion of the work, contains one hundred and forty descriptions and numerous tables. Besides technical descriptions there are references to the habits of the birds, and a few illustrations.

The second section, a synopsis of the birds reported to inhabit Kamtschatka, contains a list of one hundred and eighty-six species, an attempt being made to enumerate all the species which have been recorded from that place. A few names of species accredited to Kamtschatka without any reliable authority for the statements, are also included.

The chief sources from which knowledge of the Kamtschatkan ornithology is derived, are the explorations of Steller, Vossnessenski, von Kittlitz, and Dybowski; and the author has based some of his statements upon their writings, as well as upon his own explorations. There is an appendix to this section, incorporating information from "Liste des Oiseaux du Kamtschatka et des îles Commandeurs par le Dr. B. Dybowski et L. Taczanowski," with comments by the author.

The third part—conclusions—is based upon the two preceding sections of the work. The relations of the avifauna of the peninsula to that of the islands are briefly discussed, and are exhibited chiefly in the form of tables giving the circumpolar, palæartic, Pacific, American, Siberian, East Asiatic, and other forms. The residents and migrants are described at some length, and are catalogued in tables.

Bulletin 30. BIBLIOGRAPHY OF PUBLICATIONS RELATING TO THE COLLECTION OF FOSSIL INVERTEBRATES IN THE UNITED STATES NATIONAL MUSEUM, INCLUDING COMPLETE LISTS OF THE WRITINGS OF FIELDING B. MEEK, CHARLES A. WHITE, AND CHARLES D. WALKER, by John Belknap Marcou, 8vo., pp. 333.

This Bulletin is third in the series of "Bibliographies of American Naturalists," and consists of four parts: I, A biographical sketch and list of the published writings of Fielding B. Meek; II, Published writ-

ings of Charles Abiathar White, introduced by a short biographical sketch; III, A list of the writings of Charles Doolittle Walcott; IV, Bibliography of publications based upon the palæontological collection of the National Museum, by J. W. Bailey, F. A. Conrad, J. D. Dana, C. G. Ehrenberg, James Hall, Angelo Heilprin, Alpheus Hyatt, Jules Marcou, J. S. Newberry, D. D. Owen, James Sbiel, B. F. Shumard, R. P. Whitfield, and a bibliography of the writings of J. W. Bailey, F. N. Nicollett, H. A. Prout, B. F. Shumard.

The manuscript for Bulletin 31: THE NORTH AMERICAN SPECIES OF SYRPHIDÆ, by S. W. Williston, A. M., M. D., was sent to the Public Printer on January 11.

In order to insure a more systematic and satisfactory criticism of the papers offered for publication in the Proceedings and Bulletin, an advisory committee composed of Dr. Bean, chairman, Professor Mason, Dr. Stejneger, Professor Ward and Mr. True, has been appointed to examine manuscripts offered for publication.

Part IV of this report contains a statement of the publications of the Museum during the fiscal year, and also a bibliography of the papers by officers of the Museum, and by other investigators whose writings are based upon Museum material. The authors of these papers number 71, 26 of whom are connected with the Museum, 8 being honorary officers. The papers number 323, and are thus distributed under the following subjects :

Subjects.	By Museum officers.	By other investigators.	Total.
Materia Medica	4	0	4
Fisheries	5	0	5
Ethnology	38	0	38
Mammals	9	6	15
Birds	37	19	56
Fishes	12	32	44
Mollusks	7	4	11
Insects	57	2	59
Marine Invertebrates	6	8	14
Invertebrate Fossils	4	1	5
Plants	0	2	2
Minerals	2	1	3
Lithology	2	0	2
Metallurgy	3	1	4
Chemistry	1	1	2
Experimental Physiology and Histology	0	17	17
Microscopy	19	0	19
Taxidermy	1	0	1
Biography and Bibliography	1	1	2
Miscellaneous	19	1	20
Total	227	96	323

VISITORS.

During the year* the number of visitors to the Museum Building has been 174,225, or an average of 563 persons each day, and to the Smithsonian building 88,960, or an average of 288 each day, as shown in the following table :

Month.	Museum Building.	Smithsonian Building.
1885.		
July	12,509	6,219
August	12,574	9,484
September	14,520	8,313
October	14,001	6,487
November	12,164	5,774
December	15,463	7,550
1886.		
January	12,057	6,235
February	14,398	6,373
March	16,935	8,194
April	20,099	9,318
May	15,034	7,261
June	14,471	7,752
	174,225	88,960

The total number of visitors to both buildings since the record was first kept is given below :

Year.	Museum Building.	Smithsonian Building.
1881	*150,000	.....
1882	†167,455	152,744
1883	202,188	104,823
1884	195,322	91,130
1885 (January-June)	107,365	60,438
1885-86	174,225	88,960
Totals	996,485	498,085

* Estimated on basis of register.

† Estimated on basis of attendance from February 8 to December 31.

STUDENTS AND LECTURES.

As in previous years, all reasonable applications for permission to study the Museum collections have been granted. Mr. G. F. Matthew studied the Lower Cambrian fauna of New Brunswick in the Department of Paleozoic Invertebrate Fossils. Dr. C. Hart Merriam, Dr. R. W. Shufeldt and others have published papers† based upon material

* The Museum was open to the public 309 days in the year.

† See Part IV of this report.

belonging to the Museum. Mr. R. B. Riggs, under Professor Clarke's direction, made full analyses of the lepidolites from Maine, and the cryophyllite and aurite of Rockport, Mass., belonging to the Museum collection, and Mr. George F. Kunz has prepared a description of the collection of gems and ornamental stones.* The material belonging to the Department of Mollusks which was taken north of Cape Hatteras, has been retained for study by Prof. A. E. Verrill, at New Haven. During the winter Prof. E. D. Cope was engaged at the Institution upon special work, on the collections of reptiles; in the course of which he identified all the undetermined Batrachia in the Department of Reptiles, and identified and described collections made by the various correspondents of the Institution in Mexico and in Central and South America. He also completed 650 pages of the report upon the Batrachia of North America. Mr. H. J. Biddle examined a large series of ores from Mexico and Missouri, and metallurgical specimens acquired for the Museum at the New Orleans Exposition, making in all 2,400 determinations. Prof. Fernando Ferrari-Perez, of the Mexican Geographical and Exploring Commission, at the close of the New Orleans Exposition, and at the invitation of the Institution, brought to Washington for examination a large collection of natural history specimens. Every possible facility was offered him at the Institution for the arrangement and study of this collection, the curator of birds and the curator of mammals assisting him in determining the species. The visit of Professor Perez resulted beneficially for the Museum, since a large portion of this collection was given the Museum in exchange for material afterwards sent him. The curator of birds says concerning the collection of birds received from the Commission: "This exceptionally fine collection, as regards preparation of the specimens, which had been mounted entirely from fresh specimens, was of very great interest and benefit to the department, affording as it did several suggestions of practical value and much-needed material for study, including no less than five more or less remarkable new species." A catalogue of this collection was prepared by Prof. Ferrari-Perez and was published in Proceedings U. S. National Museum, Vol. IX, pp. 125-299.

A number of students were granted permission to associate themselves with a department in the Museum as volunteer workers. Lieut. T. Dix Bolles, U. S. Navy, rendered valuable assistance in the Department of Ethnology. Mr. H. H. James was received into the Mineral Department. Lieut. Charles Barnes, U. S. R. M., spent a short time in the osteological laboratory previous to his departure for Texas. In the taxidermist's laboratory Mrs. Berdell and Mr. William Crane received instructions in skinning birds and making bird skins. Mr. E. S. Lewis studied in the Department of Lithology and Physical Geology. Eight pupils have been instructed in Photography: Mr. George P. Merrill, Mr. J. T. Brown, and Mr. W. Hough, of the Museum; Mr. O. H. Dodge;

* Popular Science Monthly, April, 1886.

Lieutenant Winterhalter and Dr. Nash, of the U. S. Navy; Mr. Thomas Lee, of the U. S. Fish Commission, and Mr. H. L. Turner, of the Geological Survey. Mr. Dodge has already rendered valuable services in photography to the Museum. Mr. Merrill has photographed for his own department numerous stone quarries, mud cracks, drift bowlders, etc. From Mr. Thomas Lee have been received several valuable negatives which he made on the cruise of the *Albatross*.

The Saturday Lectures, given under the joint auspices of the Anthropological and Biological Societies of Washington, were delivered, as in previous years, in the Lecture Hall. The programme of the course was as follows:

- Saturday, March 6.*—Mr. WILLIAM HALLOCK: The Geysers of the Yellowstone.
Friday, March 12.—Prof. WILLIAM HARKNESS: How the Solar System is Measured.
Saturday, March 30.—Prof. T. C. MENDENHALL: The Nature of Sound.
Saturday, March 27.—Prof. F. W. CLARKE: The Chemistry of Coal.
Saturday, April 3.—Dr. C. HART MERRIAM: The Migration of Birds.
Saturday, April 10.—Dr. WASHINGTON MATTHEWS, U. S. Army: The Gods of the Navajos.
Friday, April 16.—Dr. D. B. SIMMONS: Social Status of the Women of Japan.
Saturday, April 24.—Prof. W. K. BROOKS: Life.
Saturday, May 1.—Mr. LESTER F. WARD: Heredity and Opportunity.
Saturday, May 8.—Dr. J. S. BILLINGS, U. S. Army: Animal Heat.

(f) MEETINGS OF SOCIETIES.

As in previous years, several societies have availed themselves of the privilege of using the Lecture Hall for their meetings. These have been the National Academy of Sciences, the Biological Society of Washington, Entomological Society of Washington, and the Meteorologists' Convention.

Since the papers read at the meetings of these societies have in many instances related to the work of the Museum, and were illustrated by Museum specimens, the titles are given below:

NATIONAL ACADEMY OF SCIENCES.

(Meetings April 20, 21, 22, 1886.)

- G. K. GILBERT.—The Geologic Age of the Equus Fauna.*
 T. STERRY HUNT.—The Cowles Electrical Furnace.*
 E. D. COPE.—On the Phylogeny of the Batrachia.*
 E. D. COPE.—On the Phylogeny of the Placental Mammalia.*
 H. A. NEWTON.—The Comet of Biela.*
 ELIAS LOOMIS.—Areas of High Barometric Pressure over Europe and Asia.†
 S. H. SCUDDER.—The Cockroach in the past and in the present.†
 ALFRED M. MAYER.—On the diathermancy of Ebonite and Obsidian, and on the production of Calorescence by means of screens of Ebonite and Obsidian.†
 ALFRED M. MAYER.—On the Coefficient of Expansion of Ebonite.†
 ALFRED M. MAYER.—On the determination of the Cubical Expansion of a solid by a method which does not require calibration of vessels, weighings, or linear measure.†
 ALFRED M. MAYER.—On Measures of absolute Radiation.†
 E. D. COPE.—On the Geology of the region near Zacualtipan, Hidalgo, Mexico.†

* Read April 20.

† Read April 21.

‡ Read April 22.

- EDWARD S. MORSE.—On ancient and modern methods of arrow release.*
 THEODORE GILL.—The ordinal and super-ordinal groups of Fishes.†
 H. A. ROWLAND.—On the absolute and relative wave lengths of the lines of the Solar Spectrum.†
 WOLCOTT GIBBS.—Platinous compounds as additive molecules.†
 IRA REMSEN.—Influence of Magnetism on Chemical Action.†
 ALEXANDER GRAHAM BELL.—Upon the Deaf and Dumb of Martha's Vineyard (continuation of research relating to the ancestry of the Deaf).
 S. P. LANGLEY.—On the Invisible Spectra.*
 G. F. BECKER.—Cretaceous Metamorphic Rocks of California (by invitation).†
 OGDEN N. ROOD.—On color contrast.
 CHARLES D. WALCOTT.—Classification of the Cambrian System of North America (by invitation).
 A. W. WRIGHT.—Crystallization of Platinum by means of the electric discharge in vacuo.†
 W. K. BROOKS.—The Stomatopoda of the "Challenger" collection.†
 W. K. BROOKS.—Budding in the Tunicata.
 A. W. WRIGHT.—Effect of Magnetization on the electrical resistance of Metals.
 R. E. PEARY, U. S. Navy.—On a proposed expedition into the interior of Greenland during the present summer with Disco as a base (by invitation).

BIOLOGICAL SOCIETY OF WASHINGTON.

The first of the fortnightly meetings held during the year was the eighty-second regular meeting of the society.

(October 31, 1885.)

- MARSHALL McDONALD.—Fish-culture a necessity for the maintenance of the shad fishery.
 WILLIAM H. DALL.—Deep-sea Mollusks and the laws illustrated in their development.
 RICHARD RATHBUN.—Remarks on the Wood's Holl Station of the U. S. Fish Commission.
 ROMYN HITCHCOCK.—Notes on the Red Snow, with exhibition of specimens.

(November 14, 1885.)

- RICHARD RATHBUN.—Remarks on the Wood's Holl Station of the U. S. Fish Commission.
 W. S. BARNARD.—Specimen mounting case and method.
 JOHN A. RYDER.—A new and practical system of raising oysters on a large scale.
 FREDERICK W. TRUE.—On a spotted dolphin apparently identical with the *Prodelphinus doris* of Gray.

(November 28, 1885.)

- THEOBALD SMITH.—A simple device for storing cover-glass preparations illustrative of bacterial disease.
 W. S. BARNARD.—1. Environmental digestion; 2. Specimen mount, tube-holders, labels and stoppers.
 C. HART MERRIAM.—The work of the U. S. Department of Agriculture in economic ornithology.
 CHARLES D. WALCOTT.—Evidence of the loss of vital force in certain Trilobites on approaching extinction.
 FREDERICK W. TRUE.—A new study of the American pocket-rats: genus *Dipodomys*.

* Read April 21.

† Read April 22.

(December 12, 1885.)

J. M. FLINT, U. S. Navy.—Exhibition of representative specimens of *Foraminifera* from the dredgings of the U. S. Fish Commission steamer *Albatross*.

ROMYN HITCHCOCK.—The Red Snow.

W. S. BARNARD.—Digestion; environmental, etc.

C. V. RILEY.—The Mildews of the Grape-vine.

C. HART MERRIAM.—Description of a new subspecies of the common eastern Chipmunk, *Tamias striatus*.

(December 26, 1885.)

C. HART MERRIAM.—Contributions to North American Mammalogy. 1. The genus *Tamias*.

FRANK H. KNOWLTON.—Multiplication in the Gynæcium of *Datura stramonium*, L.

OTIS T. MASON.—Mutilations of the human body.

On January 9 and 23, 1886, the sixth annual meeting (eighty-seventh and eighty-eighth regular meetings) for the election of officers was held.

On February 6, 1886, the annual address was delivered by Mr. G. Brown Goode, the president of the Society, the subject being "The beginnings of American Natural History."

(February 20, 1886.)

ROMYN HITCHCOCK.—Demonstration of the resolving power of a new one-sixteenth-inch objective.

D. E. SALMON and THEOBALD SMITH.—On a new method of producing immunity from contagious diseases.

C. V. RILEY.—A carnivorous butterfly larva.

LESTER F. WARD.—The Plane-tree and its ancestors.

C. HART MERRIAM.—Contribution to North American Mammalogy. 2. Description of a new species of *Aplodontia*.

GEORGE VASEY.—New and recent species of North American Grasses.

(March 6, 1886.)

GEORGE VASEY.—New and recent species of North American Grasses.

CHARLES HALLOCK.—Hyper-instinct of animals.

W. S. BARNARD.—Exhibition of a fungus, with remarks.

H. G. BEYER, U. S. NAVY.—Remarks on Antipyretics.

(March 20, 1886.)

D. E. SALMON and THEOBALD SMITH.—Notes on some biological analyses of Potomac drinking-water.

H. G. BEYER, U. S. NAVY.—Remarks on Antipyretics.

W. S. BARNARD.—Exhibition of a fungus, with remarks.

FRANK H. KNOWLTON.—Additions to and changes in the Flora Columbiana for 1885.

FRANK BAKER and J. L. WORTMAN.—Recent investigations into the mechanism of the elbow-joint.

(April 3, 1886.)

FRANK BAKER and J. L. WORTMAN.—Recent investigations into the mechanism of the elbow-joint.

JOHN B. SMITH.—Some peculiar secondary sexual characters in the Deltoids, and their supposed function.

C. HART MERRIAM.—Contributions to North American Mammalogy. 3. Description of a new subspecies of Gray Squirrel.

R. W. SHUFELDT, U. S. ARMY—Some early, and as yet unpublished, drawings of Audubon.

THEODORE GILL—The characteristics and families of inionous fishes.

(April 17, 1886.)

THEODORE GILL—The characteristics and families of inionous fishes.

FREDERIC A. LUCAS—Notes on the vertebræ of *Amphiuma*, *Siren*, and *Menopoma*.

FREDERICK W. TRUE—1. Exhibition of a wood hare with abnormal growth of fur. 2. Some distinctive cranial characters of the Canadian Lynx.

R. E. C. STEARNS—Instances of the effect of musical sounds on animals.

JOHN B. SMITH—Ants' nests and their inhabitants.

(May 1, 1886.)

R. E. C. STEARNS—Instances of the effect of musical sounds on animals.

JOHN A. RYDER—The evolution of the mammalian placenta.

T. H. BEAN—The trout of North America, with exhibition of specimens.

WILLIAM H. DALL—1. On the attachment of *Lingula*, with exhibition of specimens. 2. On the divisions of the genus *Pecten*.

(May 15, 1886.)

JOHN B. SMITH—Ants' nests and their inhabitants.

T. H. BEAN—The trout of North America, with exhibition of specimens.

L. O. HOWARD—On some new *Chalcididæ*.

C. HART MERRIAM—Habits of the Short-tailed Shrew.

(May 29, 1886.)

JOHN B. SMITH—Ants' nests and their inhabitants.

T. H. BEAN—The trout of North America, with exhibition of specimens.

L. O. HOWARD—On some new *Chalcididæ*.

LESTER F. WARD—Exhibition of a specimen of the Palo la Cruz, or Wood of the Cross.

ENTOMOLOGICAL SOCIETY OF WASHINGTON.

(November 18, 1885.)

OTTO LUGGER—On the earlier stages and habits of *Cænia dimidiata*.

B. P. MANN—On the Dewey decimal system of classifying and arranging books.

J. B. SMITH—On Dr. Gerstæcker's paper on the systematic position of the genus *Pleocoma* Le C.

L. O. HOWARD—On *Thoracantha floridana* Ashmead.

(December 3, 1885.)

J. B. SMITH—On the occurrence of *Pleocoma Behrensi* in Utah Territory.

J. B. SMITH—On the larva of *Aphorista vittata*.

C. V. RILEY—On the larval habits of *Lixus macer* and *L. parvus*.

E. A. SCHWARZ—On the food-habits of an undescribed calandrid beetle.

L. O. HOWARD—On the larval respiration in *Corydalus cornutus*.

B. P. MANN—On the use of the Dewey decimal system.

(January 7, 1886.)

Annual address of the retiring President, Prof. C. V. Riley,

H. OSBORN—Observations on certain species of *Hemiptera*.

OTTO LUGGER—On the life-habits of *Mesites subcylindricæ* and *Platypus flavicornis*.

C. V. RILEY—On the larvæ and pupæ of *Aphorista vittata* and *Epipocus punctatus*.

(February 12, 1886.)

- C. V. RILEY—On the food-habits of the larva of *Fenesica tarquinius*.
 L. O. HOWARD—On the Chalcid genus *Podagrion*.
 OTTO LUGGER—On a new pattern of Aquarium.
 J. B. SMITH—On the odoriferous apparatus in *Lepidoptera*.

(March 4, 1886.)

- L. O. HOWARD—On a parasite of *Cynips quercus-saltatorius*.
 J. B. SMITH—On the structural characters of the *Attacinae* and *Ceratocampinae*.
 GEORGE MARX—On the structural characters of *Thelyphonus giganteus*.
 E. A. SCHWARZ—On the rediscovery of *Rhyncolus corticalis* Boh.

(April 1, 1886.)

- E. A. SCHWARZ—On the life-history of some North American *Scolytidae*.
 J. B. SMITH—On some features in the structure of the family *Saturniidae*.

(May 13, 1886.)

GEORGE MARX—On the structural characters of the genus *Phrynus* and on the classification of the family *Phrynidae*.

E. A. SCHWARZ—On the oviposition of *Xyleborus cœlatus* and on the galleries of *Monarthrum mali*.

(June 3, 1886.)

J. B. SMITH—On the scent organs in the males of *Leucarctia aceræ* and *Pyrrhæctia isabella*.

E. A. SCHWARZ—On a new food plant of *Pieris rapæ*.

OTTO LUGGER—On the introduction of certain foreign *Coleoptera* into North America.

OTTO LUGGER—On the fertilization of *Cypripedium acaule* and the Hard Maple.

L. O. HOWARD—On a remarkable case of muscular force exhibited in *Canthon vigilens*.

E. A. SCHWARZ—On the Braconid parasite of *Pissodes strobi*.

A convention of meteorologists was held on February 24 and 25: General William B. Hazen, Chief Signal Officer, in the chair.

2. CURRENT ADMINISTRATIVE WORK.

(a) BUILDINGS AND LABOR, POLICE AND PUBLIC COMFORT.

The regular staff for police and inspection under the supervision of Henry Horau, superintendent of buildings, has included an assistant superintendent, a clerk, an inspector, eight watchmen, five door-keepers; for construction, care of buildings, and repairs, five carpenters, a painter, and a stone-cutter; for labor and cleaning, nineteen laborers (three of whom are constantly detailed to watchmen's duty), three attendants, and five cleaners. For heating and lighting there were employed an engineer and, for the greater part of the year, five firemen. In the department of police and inspection, the services of an assistant superintendent and four watchmen have been dispensed with. For construction and repairs, the force has been decreased by three carpenters and two painters.

The following abstract of the report of the Superintendent of Buildings for the year will serve to show the various ways in which the mechanics and laborers have been employed :

July.—The unloading and storage of the metallurgical exhibits from Philadelphia were completed. The arrival from the New Orleans Exposition of the Smithsonian collections commenced, and the boxes as soon as received were stored temporarily in the lecture hall. This was a work of great labor, and demanded the assistance of almost the entire laboring force. A portion of the collection of fossil plants was removed to the northwest gallery in the Smithsonian building, which had been assigned as a laboratory for the department. The Indian spears were removed from the Anthropological Hall in the Smithsonian building to the northeast gallery, for classification and re-arrangement. The exhibit of the Department of Agriculture at New Orleans was received and placed in the Museum building. The shelving in the main hall of the Smithsonian building—devoted to the display of mounted birds—was changed in accordance with the wishes of the curator of birds. This work occupied the time of carpenters and painters for several weeks. Five one-fourth unit sections were constructed for the Department of mammals, and the flat-top cases in which the gem collection had been exhibited at New Orleans were restored to the Mineral Hall.

August.—The carpenters commenced fitting and arranging shelving in the floor-upright cases in the west hall. Nine pedestals for the Department of Comparative Anatomy were finished and placed in the Exhibition Hall.

September.—The erection of a new case for the Department of Birds was commenced. The work of making and fitting shelving for the slope cases in the Department of Minerals, and the construction of diaphragms for the cases in the Department of Metallurgy were begun. The wooden annex building was moved 60 feet towards the west. Slope cases were arranged in the Gothic Hall, Smithsonian building, for the reptile casts. Table-cases were arranged in the laboratory and exhibition hall of the Department of Mollusks, and five hundred trays fitted for the same.

October.—Screens were placed along the galleries in the Smithsonian building in order to secure greater privacy to the curators to whom laboratories have been assigned there. The columns and walls of the main hall of the Smithsonian building were cleaned and repainted. The boat models, returned from New Orleans, were unpacked and replaced on exhibition in the hall assigned to the section of naval architecture. A portion of the metallurgical exhibit in the west hall of the Museum building was transferred from temporary pedestals to exhibition cases. The Mexican casts were installed on pedestals prepared by the carpenters for their reception. A large number of empty cases were removed from the northeast court. The re-opening of the Exposition at New Orleans caused the repacking and reshipment thither of a large portion of the exhibit of the State Department, which had been transferred to the custody of the Museum. Shelves were arranged in the balconies of the rotunda for the reception of living plants.

November.—The collection of musical instruments was removed from the east hall to the north hall, and the ethnological exhibits were re-arranged.

Models and relief maps, received from the Geological Survey, were placed upon exhibition. Shelving was arranged around the west basement of the Smithsonian building for the convenience of the department of fishes. The repair of cases injured on the journey to and from New Orleans was commenced. The work-rooms of the taxidermist and osteologist, in the annex building, were ceiled. The collection of scientific instruments was removed from the east to the north hall.

December.—Skylights were placed in two of the rooms on the west balcony and in one room on the south balcony. The "knock-down" cases from New Orleans, which had been temporarily stored in the lecture hall, were removed to the east entrance, preparatory to being taken apart and placed in storage. A re-arrangement of the mass of material in the Armory building was effected, under the supervision of the

registrar. A partition was built in the northeast end of the annex building, and the gallery and ceiling extended.

The hip-cases, returned from New Orleans, were placed in the hall devoted to the fishery exhibit, and the fish-casts removed from the southeast court and arranged in them. The radiators were removed from along the wall in the northeast court further out into the hall, in order to admit the wall-cases intended for the display of furs. An experiment was made in frosting one of the windows in the main hall, Smithsonian building, in order to exclude the strong sunlight from the bird exhibit. A new style of case, resembling a bay window, was constructed for the northeast court, and proved satisfactory. The locomotive "John Bull," presented to the Museum by the Pennsylvania Railroad Company, was removed from the Armory building and placed on exhibition in the north hall of the Museum building. Shelving for cases, the fitting of locks and of trays, the construction of packing-boxes, the glazing of cases, the erection of screens, painting of walls, etc., the construction of new doors for some of the cases used in the department of birds, the relaying of floors, the fitting up some of the galleries in the Smithsonian building, and the construction of pedestals for exhibition purposes, occupied a great deal of time.

January.—The construction of a half-pillar case was commenced. The work of making diaphragms for hanging photographs in the Fishery Hall was continued. A small room on the south balcony was fitted up for the curator of plants. The long hip-case in the Fishery Hall was painted and glazed. All the boxes, etc., which had been stored in the Lecture Hall, were removed, and the hall prepared for the course of Saturday lectures, to commence March 6. Pedestals were made for the Egyptian figures in the north hall. Much time was spent by laborers in clearing snow from the sidewalks. The dark room on the second floor of the northwest pavilion was fitted with shelves. A file-case was constructed for the assistant director's office. The large Indian canoe in the section of naval architecture was suspended from the ceiling. Several of the doors leading to the vaults and storage-rooms in the Smithsonian building were lined with tin, with a view to rendering these apartments comparatively fire-proof. The totem-posts were removed from the statuary hall to the south wall of the west hall.

February.—A portion of the annex building was partitioned off as a laboratory for the Invertebrate Fossils. A railing was built in the Pottery Hall, thus cutting off a portion of the hall required for assorting and repairing specimens. The construction of settees for the rotunda was commenced by the Museum carpenters. The shelving in some of the cases in the Anthropological Hall was refitted.

March.—The tin roof over the Gothic Hall, Smithsonian building, was repaired. A railing was built around the lecture hall to protect the Catlin pictures, and in the section of naval architecture as a protection to some of the boat models which are fastened against the wall. An extension of the diaphragms to which the Catlin pictures are fastened was commenced. A sloping map-case for the department of lithology was completed. An old vault under the north entrance to the Smithsonian building was fitted with shelving for the storage of fish-casts, molds, etc. The settees, diaphragms, etc., already referred to, were painted, and also the five pine table-cases for the department of invertebrate of fossils. The Peruvian pottery was removed from the Smithsonian building to the Museum. Two storage rooms in the west basement of the Smithsonian building were arranged with shelving for the departments of marine invertebrates and mollusks. The Indian pottery, which had been stored behind the wall-case in the northeast court, was removed to the basement rooms in the east wing of the Smithsonian building. Three arch-screens were finished by the Museum carpenters. Unit table-cases were painted for the department of ethnology, and a double arch-screen was erected at the entrance to the lecture hall. Work upon eight settees for the Rotunda were commenced by the Museum carpenters.

April.—The construction of a large open screen by the Museum carpenters for the west entrance was commenced. The telephone room was frescoed and painted. A

large case was made for the filing of duplicate labels. The large sheet of plate glass was fitted in the fur-seal case. A large sink with water connection was provided for the annex building. The collection of snow-shoes was removed from screens in the east hall and arranged on diaphragms over pier-cases.

May.—The painting of some old flat-top cases in the main hall of the Smithsonian building, for the department of mollusks, was commenced. Carpenters were engaged for eight days in making alterations in the large wall-case at the west end of the Anthropological hall, Smithsonian building. Casters were placed on some of the cases in the southeast court, thus removing the cases and their contents out of the way of dampness. The large wall-case just referred to was painted. Work was commenced on the preparation of two hundred oak blocks for the installation of spears. A car-load of specimens received from New Orleans was stored in the southeast court.

June.—The construction of settees for the Rotunda was completed. The large ebonized cases for the Pottery hall were glazed, and locks were adjusted to cases in the departments of lithology and comparative anatomy. Much was done in painting walls, glazing and painting cases, diaphragms, pedestals, blocks, and label frames. During the year, besides the regular force, there were employed additional carpenters, laborers, and painters, as occasion demanded.

(b) ELECTRIC SERVICE.

In the basement of the Smithsonian building and in the main and anthropological halls there have been placed electric call-bells for the purpose of calling the superintendent during business hours and the watchmen during the hours after the building is closed to the public. Signal buttons have been placed near the bells.

The watch-clock system, which has been in use for eight years, has been re-constructed and put in good order. Three electric time-clocks have been placed in the main exhibition hall and connected with the standard clock in the Museum building. The annex building, carpenter-shop, and paint-shop have been furnished with watch-clock service.

A large gong has been placed outside of the east entrance for the purpose of calling employes outside of the main building.

The library has been connected with the office of the mammal department by means of a call-bell, and the engine-room is now similarly connected with the photograph gallery.

The time service, watch-clock service, and call-bell service have been kept in good order.

An electrical hydrostatic indicator has been placed in the Armory building.

Two call-bells have been placed in the south towers. The time clocks are worked by a battery of fifty cells, a battery of forty-five cells working the other systems. These are in excellent condition.

Considerable difficulty has been encountered in keeping the intrenched wires in order, on account of the heat and condition of the trenches.

A list of the electrical apparatus in the National Museum at the end of June, 1885, was given in the last report,* since which date no important additions have been made.

(c) CASES AND FIXTURES.

During the year ending June 30, 1886, \$21,521.24* was expended out of the \$40,000 appropriated for furniture and fixtures, for exhibition cases, screens, unit drawers and trays, tablets, stands, unit boxes, lumber, plate glass, locks, brackets, and other necessary fittings; \$3,171.93 has been expended for glass jars for holding specimens; \$632.91 was expended for furniture for exhibition halls and offices; \$1,771.96 was expended for apparatus for laboratories, halls, and repairs; \$278 was expended for grate and boiler fixtures—a total of \$27,376.04.

There was also expended, out of the furniture and fixtures appropriation, for wages of mechanics and laborers, and salaries of property clerk, accountant, copyist, and other necessary employes, \$12,578.91,† leaving a balance of \$45.05.

(d) PROPERTY AND SUPPLIES.

The methods employed in the department of supplies have been greatly improved during the year under the administration of W. V. Cox, chief clerk of the Museum. The force of clerks has been temporarily increased, and steps have been taken toward the completion of the records, some of which were in an imperfect condition, owing to the rapid growth of the Museum since its reorganization.

Experience has proven that when a large supply of articles is kept in stock there is a greater tendency to waste and extravagance than when the supply is limited. In other words, no economy has been found

* The following cases, screens, unit drawers, etc., have been made for the Museum during the year by outside constructors:

25 mahogany unit table cases.....	\$2,150.00	1 pair storm doors.....	83.50
15 white pine unit table cases.....	672.45	15 mahogany and ash frames.....	26.26
16 mahogany half unit table cases.....	768.00	1 white pine base.....	20.00
5 white pine half unit table cases.....	150.00	5,429 unit drawers and trays.....	2,871.74
2 white pine Salvia bird cases.....	157.88	54,440 pasteboard trays, boxes, and covers.....	1,309.69
1 white pine sectional library case.....	21.00	14,984 tablets for mounting specimens..	935.18
4 white pine $\frac{1}{2}$ -unit table cases.....	78.40	763 bird stands and wire nests.....	95.96
1 white pine card catalogue case.....	16.00	100 insect boxes and cork for lining...	128.50
7 Kensington cases.....	478.00	18,200 label-holders.....	85.55
1 white pine photo-microscope case.....	36.00	1,689 plate glass.....	2,324.43
1 white pine file case.....	32.50	530 locks.....	817.95
2 herbarium cases.....	165.00	1,000 brackets and hooks.....	199.00
10 redwood insect cases.....	607.00	File boxes and holders.....	50.48
1 ash seal case.....	135.00	Drawings for cases, etc.....	896.60
1 walnut case remodeled.....	85.00	Traveling expenses to inspect cases....	12.91
9 fold screens, one-half pillars.....	667.00	Interior and other necessary fittings...	2,674.55
10 poplar arch screens.....	150.00	Lumber.....	2,467.71
1 oak mosaic screen.....	59.00		
30 fold screens.....	69.00		
1 mineral dresser.....	24.00		
		Total.....	21,521.24

The following cases, diaphragms, pedestals, etc., have been made in the Museum carpenter shop.

7 mahogany slope cases, half size.
3 storage cases.
7 poplar arch-screens.
10 oak settees.
26 white pine bases.
4 oak bases.
16 diaphragms.

1 cherry desk.
1 walnut file case.
1 mahogany file case.
1 mahogany case for maps.
1 mahogany file and drawers for case.
20 walnut pedestals, assorted sizes.

† The highest salary paid was that of property clerk, \$100 per month; lowest, copyist, \$30 per month; average, \$62.50. The greatest number of employes in a month was 30; the smallest, 7; an average of 16 $\frac{1}{2}$. The highest wages paid mechanics and laborers was \$3 per day; lowest, \$1.50; average, \$2.25.

in buying larger quantities, even at a cheaper rate, than when only sufficient supplies for immediate use are procured. Therefore only articles of every-day use are now kept on hand.

The method of procedure in issuing supplies has been changed. The usage of the present time provides that the heads of departments shall file a requisition, as formerly, for whatever may be required in his work. If the articles are of a kind usually kept in stock, this requisition is presented to the property clerk, who attends to it and makes proper entries in his books. If the articles are not in stock, the requisition is sent to the chief clerk of the Museum, who mails proposals to established firms or manufacturers for the articles required. Upon the return of the proposals, the prices are inserted on the original requisition and it is sent to the Assistant Secretary for action. If the expenditure be authorized, the requisition is approved and returned to the chief clerk of the Museum, who makes out an order for the articles, sending also a notification to the property clerk for his guidance. The firm is required to deliver the articles, with a memorandum bill, to the registrar, who makes an entry of them in his books and turns the articles over to the property clerk. This officer delivers them to the person making the requisition, at the same time obtaining his receipt. This form is filed by the property clerk in his office. Itemized bills, giving the number of the orders, are required to be presented in duplicate each month. These bills are examined by the property clerk, and if found to correspond to the notification in regard to quantity and price are certified to by him. The property clerk retains one of the certified bills and sends the other to the chief clerk of the Museum, who compares it with the stubs in the order-book. If it is found to correspond to the orders, it is referred to the Assistant Secretary, who directs that it be paid. The bill is then sent to the chief clerk of the Smithsonian Institution, to be transferred to official forms. The voucher passes through the same hands as did the original bill and undergoes the same scrutiny and is ready for payment when it receives the approval of the Secretary of the Smithsonian Institution.

Should a curator desire to make the selection of the articles himself, as scientific apparatus, for instance, a special form giving him that permission is furnished. This form, which states that the charges are just and reasonable, the curator signs, after obtaining the articles, and transmits with the bill to the property clerk, as in the case just mentioned. Proper entries are made in the books, so that at any time it is easy to ascertain the cost of articles and the amount expended for any department. It will be seen that, with so many checks and counter-checks, the Museum interests are in every particular safely guarded, and what may appear cumbersome routine after all greatly facilitates the obtaining of supplies, accounting for the same, as well as the settlement of bills.

All the cases, furniture, etc., belonging to the Museum are stamped

with the Museum cipher and numbered. Supplies are issued upon requisitions approved by the Assistant Secretary, which are filed with the property clerk, and the articles in each case are charged up to the department to which they have been assigned.

Another change that has been made during the year has been the appointment of a committee of experts to examine all cases, articles of furniture, etc., to see that the contractor has performed his part of the contract, and that the articles are up to Museum standard, and therefore in proper shape for acceptance. A second committee inspects lumber, in order to see that it is of the kind ordered, of the proper dimensions, and is satisfactory for the purposes for which intended. A third committee examines the unserviceable property of the Museum, and reports what action in their judgment is desirable. These committees have performed their duties faithfully and with very satisfactory results, relieving this office at the same time of much detail and labor.

(e) CORRESPONDENCE AND REPORTS.

The Museum correspondence, which is under the charge of the executive clerk, Mr. R. I. Geare, has very largely increased during the year. There have been written for the signatures of the Secretary and Assistant Secretary 1,169 letters and 1,001 acknowledgments of accessions, and 209 reports upon specimens sent for examination have also been prepared.

(f) PREPARATION OF LABELS.

Five thousand eight hundred and sixty forms of labels have been printed at the Government Printing Office, as shown in the following table:

Department.	No. of forms.	Department.	No. of forms.
Metallurgical	1,111	Ethnological	122
Materia medica	1,407	Mammals	34
Birds	940	Textiles	274
Shells	264		
Fishes	503	Total	5,860
Building stones	1,205		

Several hundred labels have also been printed in the Museum.

3. THE WORK OF THE MUSEUM PREPARATORS.

(a) TAXIDERMISTS.

The work of the year was opened by a journey of the chief taxidermist to Keene, N. H., in company with Mr. F. A. Lucas, the osteologist, to receive a full-grown Indian elephant, named "Albert," which was shot by order of Hon. P. T. Barnum at that town on July 20, and presented to the National Museum. The preparators reached the elephant about thirty-four hours after its death, and, with the aid of four butchers, the animal was quickly dissected. In two days the skin was removed

and successfully preserved. All the bones of the skeleton were "roughed out," and on the third day skin and skeleton were boxed securely and shipped to Washington. The skin weighed 1,080 pounds, and when removed was in some places $1\frac{1}{4}$ inches in thickness. Upon its arrival at the taxidermic laboratory it was preserved in a soft state, to be mounted as soon as practicable.

Among the other important acquisitions of fresh specimens received during the year were a very fine Burchell's zebra, a royal Bengal tiger, a horse antelope, water-buck, white-faced antelope, an eland, a llama, and a black macaque.

Of the specimens mounted by the chief taxidermist, Mr. William T. Hornaday, the Bengal tiger and the Burchell's zebra seem worthy of especial mention.

These two specimens may fairly be regarded as showing the possibilities of taxidermy in the treatment of difficult subjects. It is especially worthy of note that they are both so substantially mounted in every part as to render them essentially imperishable if kept under glass.

Among other specimens mounted during the year were a number of very fine and rare ungulates of large size, including a water-buck, African wild sheep, white-faced antelope, llama, and others; a very large and handsome leopard; a cheetah; an elephant-seal 11 feet in length, and a series of very fine kangaroos.

Work in the laboratory was interrupted during seven weeks of May and June by the exploration for buffalo in Montana, undertaken by Mr. Hornaday and his assistant, A. H. Forney, accompanied by Mr. George H. Hedley, of Medina, N. Y. On account of the fear that it might be impossible to find buffalo at all, or at least without a search of three or four months, a start was made in the spring with the hope of finding animals before they would commence to shed their hair.

By hard work and good fortune a few buffalo were found in Montana, but by the time the first specimens were killed they had shed their hair to such an extent as to render their skins not fit to mount as typical specimens of the species. Accordingly the party returned immediately with the collection already made, to go out again in October to finish the work. A report of this exploration will be published after the work is completed, including a list of the collections made by the party during the month spent in the field.

A very important item of the work done by the chief taxidermist has been the installation of the exhibit of the Society of American Taxidermists, which is now very attractively displayed along the north side of the northeast court. It is greatly admired, and by many visitors is carefully studied.

List of mammals, etc., mounted by the Taxidermists of the U. S. National Museum during the year 1885-'86.

PRIMATES.

15323. *Macacus maurus* (Black Macaque).
15126. *Semnopithecus cucullatus* (Black Langur).

CARNIVORA.

14337. *Felis leopardus* (Leopard).
14397. *Felis jubata* (Cheetah).
13661. *Felis ornatus*.
1638. *Felis catus*.
15041. *Canis occidentalis* (Gray Wolf).
14267. *Canis familiaris* (St. Bernard Dog).
15173. *Cercoleptes caudivolvulus* (Kiuk-ajou).

PINNIPEDIA.

14629. *Macrorhinus angustirostris* (Elephant Seal, 11 feet long).

UNGULATA.

15120. *Equus burchelli* (Burchell's Zebra).
14997. *Kobus ellipsiprimnus* (Water-Buck).
14956. *Damalis pygarga* (White-faced Antelope).
13069. *Ovis tragelaphus* (African Wild Sheep).
13829. *Nemorhedus crista* (Japanese Goat).
14114. *Cervus columbianus* (Black-tailed Deer). Head.
14999. *Cervus dama* (Fallow Deer).
15250. *Llama glama* (Llama).

RODENTIA.

15172. *Syntheres prehensilis*.

MARSUPIALIA.

15772. *Macropus rufus* ♂ (Red Kangaroo).
15228. *Macropus rufus* ♀ (Red Kangaroo).
15297. *Macropus rufus* ? (Red Kangaroo).
15295. *Macropus robustus* (Great Rock Kangaroo).
15299. *Macropus parryi* (Parry's Kangaroo).
15300. *Halmaturus dorsalis* (Black-striped Kangaroo).
15302. *Halmaturus ruficollis* (Red-necked Kangaroo).
15303. *Halmaturus temporalis*.
15304. *Halmaturus thetidis* (Pademelon Kangaroo).
15310. *Phascolarctos cinereus* (Koala).

MISCELLANEOUS OBJECTS MOUNTED.

- Hexanchus griseus* (Gray Shark), 10 feet 8 inches long.

MISCELLANEOUS WORK DONE.

- 33 mounted mammals were repaired.
154 mounted mammals from New Orleans were cleaned and cased.
20 skulls were removed from skins of mammals.
24 dry skins were relaxed, shaped, dried, and dressed.
5 dry skins were poisoned.
1 fur suit was repaired and dressed.
17 boxes of specimens were packed for shipment.
43 boxes of specimens were unpacked and distributed.
4 students received instructions in taxidermic methods.

One circular of directions was written for publication, and material for four illustrations was prepared.

The exhibit of the Society of American Taxidermists was prepared for exhibition and installed.

List of mammals in the flesh secured during the year.

<p>PRIMATES.</p> <p>15323. <i>Cynopithecus niger</i>. 15357. <i>Cebus hypoleucus</i> (White-throated Capuchin). 15381. <i>Cercocibus albigena</i>. 15482. <i>Cercopithecus diana</i> (Diana Monkey). 15251. <i>Macacus pelops</i>.</p> <p>UNGULATA.</p> <p>15120. <i>Equus burchelli</i> (Burchell's Zebra). 15215. <i>Hippotragus equinus</i>. 15250. <i>Llama glama</i> (Llama). 15318. <i>Cervis axis porcarius</i>. 22185. <i>Oreas canna</i> (Eland). 22187. <i>Ovis tragelaphus</i> (African Wild Sheep). 15347. <i>Cervus porcinus</i>.</p> <p>PROBOSCIDEA.</p> <p>15142. <i>Elephas indicus</i>, "Albert" (Indian Elephant), 8½ feet high.</p>	<p>CARNIVORA.</p> <p>15387. <i>Felis tigris</i> (Tiger). 15230. <i>Felis leopardus</i> (Leopard). 15173. <i>Cercoleptus caudivolvulus</i> (Kin-kajou). 15258. <i>Putorius erminea</i> (Ermine).</p> <p>RODENTIA.</p> <p>15172. <i>Syntheres prehensilis</i>. 15220. <i>Syntheres prehensilis</i>. 15249. <i>Sciurus niger cinereus</i> (Northern Fox Squirrel). 15320. <i>Sciurus aureogaster</i> (Red-bellied Squirrel). 15280. <i>Erethizon epixanthus</i> (Western Porcupine). 15352. <i>Dasyprocta isthmica</i>.</p> <p>MARSUPIALIA.</p> <p>15174. <i>Macropus walabatus</i> (Black-tailed Kangaroo). 15228. <i>Macropus rufus</i> (Red Kangaroo).</p>
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Mr. Henry Marshall has, as usual, worked under the direction of the curator of the department of birds, and a great deal has been accomplished by him during the year.

(b) OSTEOLOGICAL PREPARATOR.

The following table shows the number of osteological specimens prepared or mounted by Mr. F. A. Lucas during the year, as well as the number of animals received in the flesh, whose rough preparation involved an outlay of considerable time and labor:

	Mammals.	Birds.	Reptiles.	Batrachia.	Fishes.
Received in the flesh:					
Entire skeletons	39	6	3	1	6
Incomplete skeletons.....	8	1	.....	.....	.....
Cleaned:					
Entire skeletons	23	9	11	5	5
Skulls	25	14	.....	.....	90
Incomplete skeletons.....	4	7	.....	.....	.....
Mounted:					
Entire skeletons	19	12	10	2	12
Skulls	11	9	.....	.....	.....
Limbs and other pieces....	25	8	4	.....	3

This table gives a total of 372 specimens on which work was done during the year, including one whale 20 feet in length, and the full-grown elephant "Albert." In addition to the work noted above, the plaster cast of the Giant Tortoise (*Colossochelys*) has been mounted in

the Museum Building and completely repaired, and numerous skeletons transferred from pedestals of various patterns to others of the now adopted standards. The rapid accession of material has necessitated numerous re-arrangements of both the study and exhibition series, requiring the expenditure of much time and labor. This and the preliminary work of rendering the collection of bird skeletons accessible for study have consumed a great portion of the osteologist's time.

The specimens in the department of comparative anatomy have long been in confusion, and it has taken several weeks to arrange them temporarily. Before the close of another year it is hoped that the work of installation, if not completed, will be well advanced. Since the specimens added to the exhibition series are dwelt upon at some length in the report of the curator of comparative anatomy, it will be necessary in this connection only to acknowledge the valuable services of the assistant preparator, Mr. J. W. Scollick. The skeleton of Python in particular bears witness to his skill and patience.

The osteologists now have in use three tanks, thirty-five barrels, and six kegs, containing seventy-one skeletons and thirty-one skulls, a considerable number of skeletons being ready for maceration, but not placed in barrels owing to the impossibility of cleaning them during the present year. Two years ago the yard and shed, devoted to the cleaning of skeletons, were enlarged to three times their previous capacity, but now the working space has become greatly cramped and still further enlargement is extremely desirable.

(c) MODELERS.

Mr. J. W. Hendley has been occupied in modeling and painting a large number of food specimens, and has repaired several lay figures. He has also made casts of numerous archæological and ethnological implements for the departments of pre-historic anthropology and ethnology.

Mr. Joseph Palmer has made casts of fishes and reptiles, and of several Indian heads and busts. He has also thoroughly cleaned and repaired the casts of seals, porpoises, and reptiles returned from the New Orleans Exposition.

(d) PHOTOGRAPHER.

Mr. T. W. Smillie reports that during the year 617 negatives have been added to the permanent files, the greater portion of which were distributed as follows :

Ethnological and archæological, 359; lithological, 1; mineralogical, 74; ornithological, 3; metallurgical, 20; miscellaneous, 160.

Three thousand two hundred and nineteen prints were made, as follows: Ethnological and archæological, 1,317; mineralogical, 87; lithological, 1; ornithological, 3; metallurgical, 58; fishing vessels, etc., 232; miscellaneous, 1,521.

In addition, 770 blue prints and enlargements were made, as follows: Cyanotypes (plans of working drawings of Museum cases, etc.), 704; enlargements (medium size), 65; enlargements (4 feet by 7 feet), 1.

Eight pupils have been instructed in photography.

Every facility is afforded these students for acquiring sufficient knowledge of photography to be of practical use to them in the field. In addition to this, a large amount of routine work has been done, numbering and filing of negatives, making up outfits for expeditions, etc.

Negative paper has been adopted for field work; and in part the use of bromide paper for making enlargements.

The following apparatus has been purchased: Two Français lenses for field work, one roll-holder, one balance.

At the request of the Post-Office Department, Mr. Smillie was ordered, as an expert in testing inks, to test eleven cancelling and record inks for the Department. As none of the inks were indelible, a comparative test was made and a report on their relative values submitted. Upon this report was based a decision for making contracts for ink during the coming year.

(e) ARTIST.

Mr. A. Zeno Shindler has painted 218 casts of Indian heads and several casts showing the anatomical structure of fishes. He has retouched 27 Corean pictures, and has colored 33 photographs of machinery, Indians, etc. He has painted 110 casts of reptiles, mammals, fishes, mollusks, etc. He has also painted a collection of 23 Zuñi masks, and performed a considerable amount of additional incidental work.

(f) PREPARATOR IN THE DEPARTMENT OF ARTS AND INDUSTRIES.

Mr. E. H. Hawley has continued his work of preparing specimens for exhibition. This work is varied in character, including the repair of musical instruments, the framing of pictures, the arrangement of fibers and cloths in frames, the mounting of photographs, the installation of costumes. Considerable time has been devoted to the preparation of the various Japanese collections for exhibition.

4. ACCESSIONS.

The number of boxes and packages received during the year was 6,890, including those which contained that portion of the objects exhibited at the New Orleans Exposition, which arrived in Washington after June 30, 1885. The number of accessions represented by these packages was 1,496 (Nos. 16207-17704).

The geographical sources of these accessions is shown in detail in the geographical index to the list of accessions in Part v of this Report. It is thought proper also to present in this place a running review of the most important of the general collections. Every State and Territory of the United States, excepting the Indian Territory, is represented in the list, and from the most of them have been received contributions to the departments of zoology, botany, mineralogy, and anthropology. Many of the accessions are small, consisting of a single object or of a few specimens.

AFRICA.

Several portions of this continent are represented in the Museum by small collections of material received from the New Orleans Exposition. These are principally ethnological, consisting of clothing, musical instruments, etc., and objects of art-work, such as carved brass trays, samples of leather-work, and stone carvings of Scarabeus. Twenty-three species of African mammals were received from the Museum of Comparative Zoology, Cambridge, Mass., and a few birds.

From Algeria we have five slabs of marble from the old Roman quarries, for many years lost sight of.

An Egyptian mummy* in excellent state of preservation and obtained at Luxor, in Upper Egypt, by Hon. S. S. Cox, United States minister to Turkey, was presented by him to the Museum.

This mummy measures 5 feet 6 inches, is delicately proportioned, and is altogether a very good specimen. No hieroglyphics or inscriptions have thus far been found, either on the mummy or on the outer case, which is also in a good state of preservation. The face and head of the mummy are covered by a mask of green cement, the part covering the face being gilded. A black streak one-half inch wide extends down the cheeks and across the chin, from eye to eye. Side by side on the chest lie four small tablets about the size of playing-cards, each one having upon it a mummied figure of Osiris in a standing position.

Two shield-shaped ornaments lie across the breast and stomach respectively; the upper one has upon it the sacred beetle with spread wings, beneath which is a Nilometer standing between the two figures which support a globe upon the head. The faces of the figures are covered by a square piece of gold-leaf; at the end of the wings is represented the hawk head of Ra, also supporting a globe. Over the surface of the shield are painted representations of jewelry. On the lower figure appears a kneeling figure of Nepte, with extended arms and wings. She wears a head-band upon her head, upon which rests a globe; on either side of the head of Nepte are two groups, each containing three small figures. Ostrich plumes appear in the corner of the shield. Along the leg of the mummy lies a sheet of linen, cemented (*papier mâché*) at the top of which is a mummy on a dog-shaped bier. At the head of the bier is a kneeling figure, holding an ostrich plume. Below this is a row of kneeling figures holding plumes. Further down is a second Nilometer, on either side of which a figure, with an implement in each hand, faces two mummied figures, both of which have the faces concealed with a square piece of gold-leaf. The feet are encased in a covering of cemented linen.

Lieut. M. A. Shufeldt, U. S. Navy, contributed a collection of shells from Madagascar.

*Accession 17401. See Part V.

NORTH AMERICA.

BRITISH AMERICA.

Canada.—Among the objects received from the various provinces of Canada were bird-skins, minerals, ores, mammals, photographs of natural scenery, ethnological material, etc.

A large series of fossils, from the St. John group, was presented by Mr. W. B. Hamilton.

Mr. G. F. Matthews presented fifty-three specimens of Cambrian fossils from the St. John group.

UNITED STATES.

Alabama.—Interesting mineralogical and ethnological collections have been received from S. E. Johnson and Frank Burns, of the U. S. Geological Survey, as well as various ores and minerals sent for examination and report.

Alaska.—From Fort Alexander, Mr. J. W. Johnson, Signal Service observer, sent an important collection of bird-skins (one hundred and five specimens) including skins of the recently discovered *Plectrophenax hyperboreus*, also a collection of quaternary fossils in clay concretions, as well as stone implements and objects illustrating the domestic life of the Eskimo.

From Lieut. T. Dix Bolles, U. S. Navy, come an Eskimo mask, and various implements and carvings, taken from graves of Shuani in southeastern Alaska.

From Henry D. Woolfe, in charge of the coaling station at Cape Lisburne, Alaska, belonging to the Pacific Steam Whaling Company, have been received collections of great interest and of varied character, full lists being given in Part V; not the least interesting are the nests and eggs of several species of birds which breed in this remote locality.

Mr. Charles H. Townsend, an assistant of the U. S. Fish Commission, was sent to Alaska by the Commission to make some investigations into the fur-seal fisheries on the Pribyloff Islands, and during his stay, through the courtesy of Captain Healy, he accompanied the United States revenue steamer *Corwin* to Hotham Inlet. Thence in the steam-launch Mr. Townsend proceeded, under the guidance of Lieutenant Cantwell, to the mouth of the Kowak, and up the river to the head of navigation. On this occasion a large collection* of fishes, birds, mammals, and plants, together with a valuable series of ethnological objects, was secured.

The collection of birds is especially valuable, and among the rarest species may be mentioned: *Tringa damacensis*, an Asiatic sandpiper, new to the North American fauna; *Plectrophenax hyperboreus*, which was found breeding on Hall Island, in Bering Sea; a good series of the Una-

* Accession 16914.

lashka rock ptarmigan (*Lagopus rupestris nelsoni*), and a new species of Chickadee from the Kowak River, lately described as *Parus stoneyi*.

Dr. T. Hale Streets, assistant surgeon U. S. Navy, of the Coast Survey steamer *Carlisle Patterson*, sends collections of fishes and marine invertebrates from Alaska.

The latter are referred to at length in the report of the curator of marine invertebrates.

Mr. N. Grebnitzki, the Russian governor of Bering Island, has sent important zoological collections from the Bering and Commander Islands. These are referred to in the reports of the curators and in Part v. Especially noteworthy are the skeletons of a ziphoid whale, *Xiphius Grebnitzkii*, and of the Northern mountain sheep, *Ovis nivicola*.*

Arkansas.—Dr. J. Guy Lewis, of Little Rock, gives a number of valuable minerals. C. F. Brown, of Hot Springs, also gives minerals; and W. W. Morrison sends a series of quartz crystals. In addition, various minerals and ores have been received for identification.

Arizona.—Maj. J. W. Powell, Director of the Bureau of Ethnology, has placed in the Museum a large collection of pottery, stone-perforators, grooved axes, mortars, pestles, grinding-stones, rubbing-stones, arrow-shaft straighteners, stone carvings, bone whistles, and paint-stones, obtained by Col. James Stevenson.

Mr. E. W. Nelson, formerly connected with the Museum, now living at Springerville, Arizona, has sent in interesting archaeological specimens from the headwaters of the San Francisco River. These are described in the report of the curator of archaeology.

Roswell Wheeler, jr., of Sacaton, has sent some rare birds' eggs.

Dr. B. J. D. Irwin contributed a skull of a bay lynx and also an Indian strainer used by Apache Indians in the preparation of "tiswin," an intoxicating drink made from the mescal plant.

A collection of seventy-five specimens of stone implements was obtained by purchase from J. H. Carlton, of Fort Thomas.

Maj. Anson Mills, U. S. Army, Tenth Cavalry, sends living specimens of the Gila monster, *Heloderma suspectum*.

California.—One of the most interesting contributions from this State was that sent by Lieut. P. H. Ray, U. S. Army, illustrative of the domestic arts and industries of the Indians of Hoopa Valley. This is the subject of a special illustrated paper by Professor Mason, and a descriptive list of the one hundred and twenty-six objects in this collection is given in Part v.†

Lieut. L. W. Green, of Baird, Cal., obtained a series of tools used by Shasta Indians in making bows and arrows, with specimens of their work.

C. B. Orcutt, of San Diego, sent fossil argonauta in indurated clay from southern California. A large number of horned lizards, *Phrynosoma coronatum*, was obtained by Miss Rosa Smith, of San Diego.

* Accession 16878.

† Accession 17239.

Gustav Eisen, of Fresno, has sent interesting fishes and birds. C. H. Townsend contributed bones of whales and dolphins obtained at San Luis Obispo. Many zoological and mineralogical specimens were also received for identification.

Colorado.—Specimens of Zuneite were received from W. F. Hillebrand, of the U. S. Geological Survey, who also sent some examples of argyrodite, obtained from Himmelfurst in Saxony, and from which was obtained the new metal Germanium. William F. Doty, of Durango, Dr. William Hall, of Central City, Louis R. Sharpe, of Leadville, O. H. Hahn, of South Pueblo, and others, send minerals and ores. H. A. Tamen, of Denver, presented his "Rocky Mountain Mineral Cabinet," containing some very interesting specimens.

James L. Foley presented a specimen of Williamson's white fish from White River, and a botanical specimen for identification.

Connecticut.—A. F. Wooster, of Norfolk, contributed brook trout, melanistic examples of star-nosed mole, *Condylura*, and the horned owl, *Bubo virginianus*. He also sent a stone ax, and a brass idol from Japan. Lewis B. Woodruff contributed bird skins and a number of sets of birds' eggs. E. B. Hodge, of Plymouth, N. H., sends a remarkable specimen of the brook-trout, *Salvelinus*, allied to the blue-black trout of northern New England, whose relations have not yet been thoroughly investigated.

From George W. Lendereg, of Roxbury, were received minerals.

Dakota.—From this State only minerals have been received, and from the following persons: R. E. Fleming, of Mandarin; H. I. Brown, of Ponca; S. H. Buchanan, of Custer City, and Samuel Scott, of Rapid City.

District of Columbia.—Capt. Thomas W. Symons, U. S. Army, assistant engineer of the District, gives a rock-drill of the kind used in the construction of the Washington aqueduct tunnel. George P. Merrill, of the National Museum, Prof. Thomas Robinson, of Howard University, and Dr. William S. McIlhenny, present minerals.

James Watson sent specimens of fossil wood from the reservoir cutting near Howard University.

T. E. Skinner and Clarence Burke send specimens of birds. Charles W. Richmond presented the nests of fourteen species of birds. Milton Smith gave a small mammal, and J. H. Kuehling, Charles A. Bruff, and H. W. Henshaw, of the U. S. Geological Survey, contributed serpents.

Florida.—Prof. O. P. Hay, of Indiana University, gave a collection of fishes. J. H. Batty and E. C. Greenwood presented a specimen of the young of the new sub-species of owl, *Syrnium nebulosum alleni*, a form new to the collection. Mr. Greenwood also sends several birds from the Thousand Islands. Dr. B. H. Warren, of West Chester, Pa., sent a collection of insects, mostly Diptera, and George W. Roberts, of the same place, contributed a collection of bird skins. Several desirable forms were purchased from C. J. Maynard, of Boston.

Charles T. Simpson sent a collection of marine shells, one hundred and eight species, and other similar contributions from Boca Ciega Bay were received from the U. S. Geological Survey.

From Dr. J. C. Neal, of Archer, was obtained a collection of fossils. He also sent some Indian beads from a mound.

John R. Jones, of Tampa, and Hon. W. H. Sebring contribute some invertebrates, and Mr. Joseph Wilcox, of Media, Pa., sends a very interesting collection of chipped-stone implements from the mouth of the Chesowishka River.

S. F. Walker, of Milton, and T. A. Britt, of Jacksonville, presented minerals.

Georgia.—Specimens of stalagmitic deposit containing bones of mammals from Todd's lime-kiln quarry near Cartersville, were presented by the U. S. Geological Survey. Fossil teeth of a horse and a skeleton of snake from the same locality were lent for examination by John P. Rogan.

From T. D. Perry, of Savannah, and W. B. Johnston, of Macon, were received zoological specimens.

Henry Weidenbach, of Washington, presented archæological objects from Fairfax County. Minerals and ores were sent by William Beal, of Murphy, N. C., N. P. Pratt, of Atlanta, and J. P. Elrod, of Jefferson.

Idaho.—From Francis Jefferey, of Ketchum, were received samples of the so-called American jute, proposed as a substitute for the jute of commerce. This is probably a species of rush, *Scirpus validus*.

Col. J. S. Shoup, of Salmon City, sends a large and valuable collection of ores of the Territory; and C. Overman, Joseph Hostetter, and T. J. Turpin, of Grangeville, send minerals.

From Capt. J. M. Lee, U. S. Army, of the Ninth Infantry, acting Indian agent at Darlington, were obtained two sets of bows and arrows from the Arapahoe and Cheyenne Indians. These form a very important addition to the collection.

Illinois.—During a vacation trip to Richmond County Mr. Robert Ridgway, curator of birds in the National Museum, obtained a valuable collection of birds, nests, and eggs. Zoological contributions were also made by J. Schneck, of Mount Carmel; J. P. Leach, of Rushville; John K. Walker, of Rushville; O. P. Rogers, of Marengo; E. B. Hoke, of Cordova, and H. G. Hodge, of York, who also sent an interesting collection of the fruits and woods of native trees.

C. Armstrong, of Carrollton, made an archæological contribution, and A. N. Abbott, of Union Grove, sent specimens illustrating the formation of fulgurites.

Indiana.—A large number of archæological objects obtained in this State were forwarded to the Museum, the most notable being those sent by J. R. Nissley, of Mansfield, Ohio; George Spangler, of Madison; George A. Becker, of South Bend; B. F. Stalker, of New Providence; A. C. Black, of Washington, D. C., and Dr. E. C. Black, of Wheatland.

Collections of a similar character were also received from Col. J. T. Abert, of the Engineer Corps, Washington, D. C., and from B. W. Evermann, of Indiana University.

Geological specimens were contributed by O. A. Blackman, N. W. Wood, and O. Whitcomb, of Leavenworth, and a collection of coal plants by Fletcher M. Noe, of Indianapolis. Some interesting fishes were sent by Prof. David S. Jordan, president of Indiana University.

Iowa.—J. W. Preston, of Baxter, and R. J. Haight, of Davenport, sent zoological specimens.

From the Charles City Marble Company was received a beautiful specimen of the so-called madreporite marble, a form of ornamental stone not hitherto known in the arts.

Kansas.—Reptiles from southern Kansas have been received from Charles Ruby, U. S. Army, stationed at Fort D. A. Russell, Wyo. Various zoological specimens have also been received from A. M. Fuller, of Lawrence; E. Bumgardner, of Holton, and Warren Kenaus, of Selina. Dr. W. S. Newlon, of Oswego, has sent mollusks from the Neosho River and neighboring streams for identification. From A. B. Baker, of Banner, Trego County, were purchased skeletons of the black-footed ferret, *Putorius nigripes*, one of the rarest of American mammals.

Dr. A. C. Peale, of the U. S. Geological Survey, sends an interesting contribution to the department of physical geology, and Dr. A. R. Chase, of Millwood, contributes bones and teeth of mastodon obtained at a depth of 30 feet below the surface. Fossil shells were sent by Robert Hay, of Junction City.

Kentucky.—Zoological specimens were presented by Mrs. Richard Carter, of Cloverport, and T. H. Morgan, of Lexington.

Prof. J. R. Procter, director of the Geological Survey of Kentucky, presents a large collection illustrating the coal formation of the State, including eight carefully prepared groups of specimens showing sections of different veins. Geological specimens were also received from M. E. Morgan, of Gratz. Kentucky Q. Smith (Gerard Fowke) sent two collections of archaeological objects.

Louisiana.—C. J. Barrows, commissioner for Louisiana at the New Orleans Exposition, presented an exceedingly interesting collection of the clothing and weapons of the Shetimasha Indians, including several of their curious blow-pipes, used for the propulsion of arrows—the only weapons of the kind found among natives of North America; also samples of basketry from the Choctaw Indians; corn-husk basketry made by the negroes, and specimens of nankeen cotton and decorticated moss fabrics.

Minerals were received from S. H. Houston, of New Orleans. John M. Avery, of New Iberia, who has made many valuable contributions to the Museum from the salt works on the island of Petit Anse, presents beautiful specimens of salt illustrating cleavage.

Maine.—Samples of basketry from the Passamaquoddy Indians were received from Mrs. Fannie Pattaugal, of Washington, D. C.

Mineral collections were contributed by George P. Merrill, of the National Museum; T. T. Lamb, of Portland; N. H. Berry, of South Paris; H. M. Meling, of Portland, and E. M. Bailey, of Andover.

William Herrick, of Swan's Island, contributed some fishes and sea-snails.

Maryland.—A large number of birds and other zoological specimens from various places in this State were sent by Dr. T. H. Bean, U. S. National Museum; George L. Mezell, of Middlebrook; John P. Hamlin, of Washington, D. C.; George Marshall, of Laurel; H. M. Smith, U. S. National Museum; L. M. Turner, Smithsonian Institution; J. D. Farden, of Washington; Gwynn Harris, of Washington, D. C., and J. H. Tolbert, of Havre de Grace.

Geological contributions were received from Michael Dooley, of Lonaconing; Dr. F. M. Chatard, of Baltimore, and C. E. Coffin, of Muirkirk.

A collection of coins of the United States, Germany, Great Britain, and Ireland was obtained from Ralph Collier, of Laurel.

Massachusetts.—An exchange of rocks was effected by Mr. G. P. Merrill with Prof. W. O. Crosby, of Boston, and with Prof. B. K. Emerson, of Amherst. Mr. C. W. Chamberlain, of Boston; Mr. E. C. Greenwood, of Nantucket; and Mr. Willard Nye, jr., of New Bedford, contributed birds. Mr. J. Henry Blake, of Cambridge, sent parasitic copepods from Provincetown. From Captain Doane, Mr. Henry M. Low, of Rockport, and Mr. W. A. Wilcox, of Gloucester, were received fish. A grooved stone implement from Vineyard Haven was sent by Mr. Thomas Lee, of the U. S. Fish Commission. Specimens of feather-work, which had been exhibited at the New Orleans Exposition, were received from Milton J. Flood, of Sterling. Mr. William Brewster, of Cambridge, forwarded bird-skins for examination and report.

Michigan.—Geological specimens were received from F. W. Noble, of Detroit.

An interesting series of materia medica specimens was sent by Frederick Stearns & Co., of Detroit.

A. R. Dodge, of East Saginaw, presented a specimen of Ermine, *Putorius erminea*, in the flesh.

Minnesota.—A collection of minerals and rocks, exhibited at the New Orleans Exposition by the State of Minnesota, was afterwards presented to the National Museum by Prof. N. H. Winchell, of Saint Paul, who also sent a specimen of Duluth gabbro. From H. D. Gurney, of Saint Paul, were received samples of red granite.

Mississippi.—An interesting series of specimens illustrating negro manufacture, exhibited at the New Orleans Exposition, was presented by General Stephen D. Lee and Professor Phares.

A botanical contribution was received from Hon. James L. George, United States Senator.

Fossils from the Colorado group of the Cretaceous were sent by Miss May Halstead, of Lexington.

Harvey C. Medford, of Tupelo, sent minerals and fibers for examination; and S. S. Mitchell, of Columbus, presented samples of sandstone.

Missouri.—Zoological specimens were received from J. G. W. Steedman, of Saint Louis, and F. A. Lampson, of Sedalia.

Fossil shells were sent by Wiley Brittain, of Springfield.

A stone idol was transmitted by T. L. Whitehead, of Dexter, for examination.

B. A. Shepley, of Des Arc, gives mineral specimens.

Montana.—The most important contributions were made by Captain Chas. E. Bendire, who sent thirty-one bird-skins from Fort Custer, a revolver found on the site of the Custer massacre in 1876, and some interesting concretions.

Lead, silver, copper, and other ores were received from John S. Harris, of Helena; W. A. Clark, of Butte; F. J. Parker, of Washington, and Bush & Meyers, of Sheridan.

Nebraska.—Nothing of special importance was received. W. C. Knight, of Lincoln, sent a bird-skin. S. F. Fleharty, of Antelopeville, contributed fossil bones of horse, and Jerome Wiltse, of Falls City, sent an Indian implement.

Nevada.—A valuable collection of Trenton fossils (2,183 specimens) collected by C. D. Walcott, of which a full list is given in Part V under acc. 17447, has been received from the U. S. Geological Survey, and also specimens of silver ore from the Raymond and Ely mine at Pioche. W. M. Havenor, acting commissioner for this State at the New Orleans Exposition, presented ores and mining pictures, and also an interesting series of implements, including a jug, basketry, and cradles, made by the Ute Indians.

Hon. R. W. Furnas, commissioner for Nevada at the New Orleans Exposition, sent plants.

New Hampshire.—From C. H. Hitchcock, of Hanover, comes a large collection of rocks, and also a vertical column of slate, showing the relative age and comparative thickness of the Archæan, Cambrian, and Silurian formations.

Fishes were received from E. P. Hodge, of Plymouth, and I. P. Miller, of Portsmouth.

W. H. Fox, of Washington, contributed several specimens of birds.

New Jersey.—An extensive collection of carboniferous fossils, made by C. D. Walcott, numbering three hundred and eighteen specimens, was received from the U. S. Geological Survey.

Zoological specimens were obtained from J. M. C. Eaton, of Irvington, and W. L. Green, keeper of Long Branch life-saving station.

From C. I. Grimm, of Loveladies Island, was obtained a whale, *Kogia breviceps*.

The Pennsylvania Railroad Company, through J. E. Watkins, honorary curator of steam transportation in the National Museum, presented drawings, sections of iron rails, castings, etc.

Mineralogical material came from Prof. George J. Cook, of New Brunswick, from the Bloomingdale Graphite Company, and from George P. Merrill, of the National Museum.

Ten argillite implements, found by Dr. C. C. Abbott in a gravel bed at Trenton, were presented by Dr. Charles Rau, curator of archæology in the National Museum.

New Mexico.—Dr. R. W. Shufeldt, U. S. Army, stationed at Fort Wingate, has made very extensive gifts to the departments of mammals, birds, and reptiles.

Mr. J. B. Bowman, of Aleman, has sent numerous birds.

The geological departments in the Museum have been enriched with one hundred and eight specimens of turquoise from the U. S. Geological Survey; silver and iron ores from Professor Spateier, of Las Cruces; obsidian from the commissioner of New Mexico at the New Orleans Exposition, and meteoric iron from Albuquerque, sent by L. G. Eakins, of Denver, Colo. Fred W. Taylor, of Lake Valley, sent pressed sulphide of silver, in the form in which silver is recovered from the leeching solution.

New York.—Zoological contributions were made by Dr. C. S. McKnight, of Saranac Lake; Dwight D. Stone, of New York; S. E. Meek, of Cayuga; James T. Walker, of Palmyra; A. G. Cheney, of Glens Falls; F. C. Jessup, keeper of Petunk Life-Saving Station; and Mrs. F. L. Lee, of Westport.

Ores and minerals were received from Charles Miller, of Sanborn, who also sent fossil shells; L. W. Ledyard, Cazenovia; and George W. Watkins. Miss Mary E. Mann sent samples of deposit from Geyser Springs, Saratoga.

Fossil plants from Allegany County were received from William H. Dall. R. E. C. Stearns also sent fossils.

A necklace of wampum beads, representing the work of the Mohawk Indians, was presented by Prof. Otis T. Mason.

A remarkable stone carving, representing a human head, was given by the Natural Science Association of Staten Island.

North Carolina.—Zoological specimens were sent by Dr. H. C. Yarrow, U. S. Army, honorary curator of the department of reptiles; William Brewster, of Cambridge, Mass., and Mrs. H. K. Morrison, of Morgantown. The Wilmington Oil and Leather Company presented skulls of a porpoise, *Tursiops tursio*.

Ores of various kinds were received from C. H. Waring, of Knoxville, Tenn.; Col. P. M. Wilson, of Raleigh; S. M. Dugger, of Banner's Elk, and Robert Claywell, of Morgantown.

Indian implements were contributed by Dr. J. M. Spainhour, of Lenoir; J. C. Russell, of Richmond, Va., presented a "puller," an implement used (in North Carolina) for chopping pine trees.

Ohio.—William Kayser, of Wapakoneta, sent some phyllopod crustaceans. John S. Pollock, of the Smithsonian Institution, presented a

box tortoise, *Cistudo carolina*. Specimens of moths, etc., were sent for examination.

The archæological accessions were among the most important from this State. T. F. Spangler sent flint implements. H. C. Duvall, of Washington, sent a pierced tablet. Ceremonial and other objects were received from Dr. L. B. Welch, of Wilmington, and from Kentucky Q. Smith.

Oregon.—Ores and minerals were received from J. C. Swash, of Union; Allen D. Wolcott, of Randolph; and F. J. Parker, of Washington, D. C. William H. Dall presented a cap and woven basket made by the Rugue Indians.

A collection of fossils for examination and report was forwarded by H. E. Dore, of Portland.

Pennsylvania.—Zoological contributions came from S. M. Sener, of Lancaster; F. G. Galbraith, of Wrightville; Dr. A. Van Cleef, of Scranton, who also sent samples of coal formation; and George W. Roberts, of West Chester.

Several important lots of geological material were received, notably, from Joseph W. Wilcox, of Media; Capt. John J. Williams, of Thurslow; H. M. Ingram, of the National Museum; R. P. Janus, of Washington; and Henry J. Biddle.

Interesting archæological objects came from Dr. T. H. Bean, of the National Museum; A. F. Wooster, of Norfolk, Conn.; and A. F. Berlin, of Allentown.

A box of invertebrate fossils was sent by R. P. Sharpless, of Phoenixville.

John W. Brock sent specimens of fossil corn from the slope of the mine of the Lehigh Coal and Navigation Company.

George W. Snyder, of Somerset, sent a collection of Pennsylvania State-bank bills.

Rhode Island.—Joseph Wharton, of Newport, and E. G. Blackford, of Fulton Market, New York, sent fishes, and H. C. Bumpus, of Providence, presented reptiles.

The Newport Natural History Society sent mortar from an old tower at Newport.

South Carolina.—Arthur T. Wayne, of Charleston, sent a specimen of Swainson's Warbler, *Helinaia swainsoni*, with nest and eggs.

Geological material was sent by W. F. Chaplin and F. A. Scheffler, of Orangeburgh, for examination and report.

The U. S. Geological Survey, through Frank Burns, sent fossil wood and berries; also bricks from a corner-stone of the old court-house in Orangeburgh, and two mullers.

Tennessee.—Ornithological specimens were sent by James W. Rogan, of Rogersville. R. Ellsworth Call presents mollusks.

Ores and minerals were received from the U. S. Geological Survey; William Beall, of Murphy; A. J. McWhirter, of Nashville; C. H. War-

ing, of Knoxville; C. C. Hoffmeister, of Mossy Creek; and Dr. J. Berrein Lindsley.

C. D. Walcott and Frank Burns, of the U. S. Geological Survey, presented fossils; and James W. Rogan, of Rogersville, and John T. Irwin, of Paris, sent botanical specimens.

Texas.—Zoological specimens from this State were received from Thomas McIlwraith, of Hamilton, Ontario, Canada, and Col. A. G. Brackett, U. S. Army, of Fort Davis.

Geological material was sent by W. H. Stephens, of Hiner; D. H. Gibson, of Mineral Wells; Larkin King, of San Saba, and Dr. G. P. Hachenberg, of Austin.

An interesting leaf-shaped implement of brown jasper, from the Che-
note Mountains, was presented by Thomas R. Stewart, of Presidio.

Fossils were transmitted by Capt. W. H. Clapp, U. S. Army, of Fort Stockton, and botanical specimens by Dr. W. Thornton Parker, of Newport, R. I.

Utah.—An interesting series of thirty-one articles collected by Dr. H. C. Yarrow, U. S. Army, among the Gosh Utes, was added to the ethnological collection. This consisted of baskets, berry-wands, moccasins, basket-hat, water-jars, doll, leather bag, and cradle-back.

Fossil plants from Wales, collected by Dr. C. A. White, were presented by the U. S. Geological Survey.

Several geological specimens were forwarded for examination and report.

Vermont.—Geological material was sent for examination and report.

Virginia.—Forty-two accessions of various kinds were received from this State.

From the Wytheville hatchery of the U. S. Fish Commission come specimens of California Mountain Trout and Penobscot Salmon. Col. Marshall McDonald sent several large and varied collections of fishes, insects, mollusks, invertebrates, reptiles, and two mammals. Other contributions of fishes were received from James Godden, Maurice Cropley, who also sent a star-fish, *Asterias forbesii*, Gwynn Harris, of Washington, W. Yeatman, keeper of the light-house at Point Lookout, Md., and Thomas Lewis, of Roanoke. Lucien M. Turner, William Palmer, of the National Museum, and H. P. Hoare, of Phœbus, sent reptiles. Birds were presented by John Dowell, of Washington, James Deane, of Alexandria, and Russell Robinson, of Richmond. Robert Ridgway, of the National Museum, contributed a nest of the Blue Grosbeak, *Guiraca carulea*. Howard Shriver, of Wytheville, Frank P. Gold, of Rest, and John S. Webb, of Totaro, sent insects. Prof. I. H. Morrison, of Lexington, contributed specimens of snail-shell, *Helix hortensis*. This locality is new for this species. A. B. Johnson, of the Light-House Board, sent a section of a pile from a wharf at Cape Henry, completely riddled by the boring of the ship-worm, *Teredo navalis*.

Fossil coal, from the Piedmont district, was received from Court Hamilton, of Bunker Hill, W. Va.

An interesting collection of minerals, numbering one hundred and thirty-eight specimens, came from Prof. M. B. Hardin, of the Virginia Military Institute at Lexington. Minerals were also received from Myron B. W. Hough, of Washington, F. W. True, of the National Museum, D. W. M. Wright, of Holly Brook, J. H. Brumwell, of Roanoke, and J. H. Mitchell, of Philadelphia. Henry Horan, of the National Museum, gave a specimen of stalagmitic marble from the Luray Cave.

H. M. Smith, of the National Museum, presented canister shot and minie-balls from the battle-field of Bull Run, and Capt. C. W. Dunnington, of the National Museum, added to the historical collection a military pass to Fredericksburgh, dated September 2, 1861, and signed by John Letcher, governor of Virginia.

Washington Territory.—Zoological specimens were received from Lieut. H. E. Nichols, U. S. Navy, R. D. Nevins, of Olympia, and Dr. Basil Norris, U. S. Army. James G. Swan forwarded mollusks and marine invertebrates from Cape Flattery, and a sample of parchment composed of kelp, and prepared for printing.

John W. McGee, of Seattle, John J. Burns, of Sprague, and I. A. Crawford, of Spokane Falls, forwarded minerals and ores. Similar material for examination and report was also received from several individuals.

West Virginia.—Specimens of *Micropterus dolomieu* and *Ambloplites rupestris* from Fairmount were collected by the Fish Commission.

Geological material was presented by Maj. Jed. Hotchkiss, of Staunton Va., Frank Smith, of Cincinnati, Ohio, and Timothy Nihon, of Hedgesville. Minerals and ores were sent for examination and report.

Wisconsin.—A collection of three hundred and thirty-nine Trenton fossils was given by H. C. Powers, of Beloit.

J. L. De Witt, of Newton, presented two drilled bear's teeth, two bone ornaments, two small sheets of native silver, shaped by beating, and six cylindrical copper beads from a mound at Warner's Landing. The sheets of silver are of special interest, and are the first specimens of the kind in the possession of the Museum.

Wyoming.—Insects were received from N. H. Brown, of Lander, and mammals from Charles Ruby, U. S. Army, stationed at Fort D. A. Russell.

CENTRAL AMERICA.

From the Central American states were received minerals, bird skins, insects, etc.

Mr. Harry Stewart, of Nicaragua, contributed two ancient iron stirrups, and a number of wooden crosses obtained in an ancient graveyard.

From Nicaragua were also received a plow and yoke, and a collection of ethnological objects, pottery, etc.

From Yucatan a collection of one hundred and thirteen bird skins, including a new species, was sent by George F. Gaumer.

Specimens of reptiles and insects were received from Panama.

MEXICO.

Mr. Louis H. Aymé forwarded ethnological material, stone carvings, and pottery, as the results of his investigations in Yucatan and Mexico.

From Mr. E. Wilkinson was received a collection of reptiles embracing four hundred and seventy-one specimens, and also two mammal skins.

Prof. Alfred Dugès transmitted several collections of objects of natural history, including mammals, bird skins, reptiles, ores, insects, and plants.

The commission representing the Mexican Government at the New Orleans Exposition transferred to the Museum a large collection of gums, dyes, foods, animal products, ores, baskets, textiles, etc.

Hon. Warner P. Sutton, United States consul, contributed two stone mortars and a musical instrument.

From the Mexican Geographical and Exploring Commission was received an interesting series of ninety-five specimens (fifty-nine species) of bird skins. This contribution formed a part of the Mexican Government exhibit at New Orleans, and contains five species new to the Museum collection.

Specimens of gold, silver, and copper ores were received from several of the Mexican States.

WEST INDIES.

Mrs. C. H. Dall contributed a collection of fifty specimens, fifteen species, of marine shells.

The U. S. Fish Commission steamer *Albatross*, in a cruise among the Bermuda and Bahama Islands, secured nine hundred and fifty specimens of bird skins, and also a number of archæological implements, etc., including polished celts, chisels, rubbing stones, and pendants.

The natural history of the islands is represented by numerous contributions of mollusca, marine invertebrates, reptiles, insects, mammals, fishes, birds, etc.

From other contributors, minerals, crustacea, fishes, materia medica, and reptiles were received.

Professor Poey sent specimens of Cuban fishes.

SOUTH AMERICA.

From Brazil were received a series of fibers and also a collection of the various woods of that country.

A collection of thirteen reptiles from Ecuador was presented.

From Venezuela a collection of bird skins, including twenty-one specimens, thirteen species; also a small collection of bird skins from

Brazil and Peru, and a few specimens of birds, mammals, seed, and a fish-trap used by the natives of Venezuela.

ASIA.

Commodore R. W. Shufeldt, U. S. Navy, presented a Damascus sword and eight knives mounted in ivory and gold, of Arab manufacture, from Muscat, given to him by the Sultan of Zanzibar. N. Carandonis deposited a Grecian bowl from an Ephesian tomb, and an ancient costume found in a cavern at the castle on the island of Calumnos. Mr. Otis Bigelow presents a considerable collection of ethnological objects from Egypt and the Holy Land. Other objects of similar character were received from the Department of State after the close of the New Orleans Exposition, as was also an important collection of minerals from Teheran, Persia.

Mr. William H. Dall presents a model of a Madras *câtamaran*, obtained by Rev. C. H. A. Dall, and other articles from India. Mr. A. G. Studer, U. S. consul at Singapore, sent through the State Department the implements and materials used by those who chew the betel-nut, and also a collection of the native woods of Singapore.

Various single objects and small collections, ethnological and zoological, from other portions of the East Indies, were received from different individuals.

From China the accessions were for the most part obtained through the State Department after the close of the New Orleans Exposition, and included a number of interesting products of the native arts, and a series of specimens illustrating the ramie industry of that country. Dr. Bethune McCarthy, for nearly half a century a medical missionary in China and Japan, has given and deposited a small but very useful and interesting collection of books, pictures, and other objects.

From Corea, Ensign J. B. Bernadou, U. S. Navy, obtained a large and valuable collection, including fishes, marine invertebrates, cephalopods, pottery, ethnological material, and drugs. Some of the pottery in this collection is said to be from three hundred to seven hundred years old.

In addition to this collection three specimens of lacquered ware—cup, can, and tube—which were exhibited at the New Orleans Exposition, were added to the ethnological collection.

From Japan was received a collection of minerals presented by General Thomas B. Van Buren, U. S. consul at Kanagawa.

A very beautiful helmet of silver, with bosses of steel and with leather cape, lined with embroidered silk, was presented by D. W. Zantzinger, of Washington.

An interesting series of bird-skins from Japan was given by Henry Seeborn, of London, besides various smaller collections. The most important of all the accessions from Japan was a most instructive series of ninety-two specimens, illustrating the manufacture of pottery and porcelain, showing the materials, appliances, the objects in various

stages of manufacture, and the final products. This, together with a detailed catalogue, was sent by the Department of Education in Tokyo, and is referred to at length in Part v, under accession 17339.

EUROPE.

AUSTRIA.

The Austrian exhibit at the New Orleans Exposition, consisting of textile goods, dried fungi (one hundred specimens), grains, foods, and musical instruments, was transferred to the National Museum.

BELGIUM.

Eleven geological maps were received from the Belgian Commission at the New Orleans Exhibition.

ENGLAND.

A most interesting addition was an "exchequer tally" presented by A. W. Franks, esq., of the British Museum, and referred to in Part v, under accession 66213.

This was used by the court of exchequer of England as a record of and receipt for money loaned to or by the Government. Tally sticks circulated as money in England in 1697. The tally now presented is for £100,000, in part principal of the loan of £1,400,000 from Government, and for £6,049 6s. 3d. for interest thereon, due September 30, 1776. Paid November 28, 1776.*

* The Saxon kings of England kept the record of their public accounts on notched sticks, and the same system of registering loans was practised by the Court of Exchequer until the year 1783, when by Act of Parliament, under George III, a new method was adopted.

A supply of hazel, ash, or willow sticks was kept for the use of the Treasury; when seasoned and prepared, notches were made on one side by the cutter of tallies, and Roman numerals were inscribed on the opposite side by the writer of tallies. The notches were made of different sizes to represent pounds, shillings, pence, and a hundred or even a thousand pounds. The stick was then split through the center by the Deputy Chamberlain, with a knife and mallet; one portion being called a tally, or the scacha, stipes, or kaucia, and the other portion the counter-tally, or folium. The date of the deposit or credit and that when payment would fall due, and the name of the person having the claim upon the Treasury was also inscribed upon the tally. When payment was due, the counter-tally was presented at the Treasury, and, if it fitted with the tally the money was paid, and the two parts put together and filed away as a permanent record of settlement.

In 1697, while the metallic currency of England was being recoined, there was a great scarcity of currency, and exchequer tally sticks were put in general circulation as money. The regular currency, also the exchequer tallies, depreciated greatly. The Bank of England advertised a new loan of £1,000,000, offering to take 80 per cent. of the same in tally sticks, and this relieved the Government of £800,000 outstanding promises to pay, which became due the Bank, an easy creditor of the King.

In 1834, by order of Parliament, the great quantity of tallies which had accumulated in hundreds of years were burned in the stoves at the House of Lords, and, unfortunately, the great heat set fire to the building and consumed the Houses of Parliament, October 16, 1834.

Several large collections of pottery, exhibited at New Orleans, were afterwards sent to the Museum.

Mr. Edward Hargitt contributed bird skins.

By exchange with R. Bowdler Sharpe, esq., of London, the Museum has obtained three hundred and twelve specimens (one hundred and forty-nine species) of birds, chiefly new to the collection, and for the most part from Turkey, France, South Africa, Asia Minor, India, England, Malay Peninsula, Borneo, Pegu, British Burmah, Timor Laut, Papua, Australia, Brazil, and Peru.

Minerals, fishes, and materia medica specimens also added to the Museum collections.

FRANCE.

Mr. Thomas Wilson, United States consul at Nice, France, forwarded a collection of prehistoric stone implements.

Collections of bird skins, fibers, and two mammals were received.

Two manikins of Africans and one of an Arab Sheikh were prepared for the Museum by M. Jules Hébert, under the supervision of the director of the Trocadero Museum, Paris.

GERMANY.

From E. Rey a collection of bird skins was purchased.

The following material, forming part of the German exhibit at New Orleans, was received: a collection of baskets and other industrial products, and two figures illustrating dress and occupation of peasants.

HOLLAND.

Four large pieces of Flemish tapestry* (Acc. 16707) have been deposited by Lieut. Gen. P. H. Sheridan, U. S. Army. These are four of a series of six pieces illustrating scenes in the life of Alexander the Great, made by Jan Leyniers (1627-1686) from designs by artists of the school of Rubens, and presented by John W. Mackay to General P. H. Sheridan.

The legends are translated as follows:

1. Alexander kills a lion with a severe wound.
2. Alexander draws up the line of battle and exhorts his men to fight.
3. To Alexander, on account of his victories in divers places, arms are surrendered and he is adored as a god by his men.
4. Alexander covered with dust and sweat, bathing himself in the river Cydnus, is taken out thence like one breathing his last.

Through the New Orleans Exposition was received a collection of industrial products.

IRELAND.

Four specimens of basalt, box of magnesia, and a specimen of lace were received.

* Size 14 feet by 13 feet 3¼ inches.

ITALY.

Among the accessions from this country were a collection of ancient Roman coins, blocks of lava from Vesuvius, eight specimens of cinna-
bar, and fourteen specimens of sulphur, and ores.

NORWAY.

Several domestic utensils and a collection of marine shells (thirty
species) were received.

RUSSIA.

A collection of reptiles, and a collection of leather and cotton fabrics.

SAXONY.

A collection of majolica-ware and china.

SCOTLAND.

Specimens of cotton and worsted fabrics.

SWEDEN.

A Chukchee cross-bow, an assortment of seeds from the Experiment-
al Gardens, and a few specimens of ores were contributed.

OCEANICA.

A collection of textiles, mammal skins, bird skins, botanical speci-
mens, nuggets, and a fossil plant were received from Australia, and a
collection of nine mammal skins from New South Wales and Tasmania.

From New Zealand, a necklace and a wallet made of seeds from Papua
and Samoan Islands, specimens of bird skins, and a collection of twenty-
three mammal skins from Queensland and Tasmania were received.

From the Samoan Islands comes a Kava bowl, cocoanut-shell cup,
and root used in preparing a drink called "Kava," together with some
specimens of Tapa cloth and a rug.

A few mammal skins, five carved gourds, and specimens of sugars
were sent from the Sandwich Islands.

A collection of mollusks and marine invertebrates was obtained by
the U. S. S. *Enterprise* in the islands of the South Pacific.

5. CO-OPERATION OF THE DEPARTMENTS AND BUREAUS OF THE GOV-
ERNMENT.

As in previous years, the National Museum has enjoyed the valuable
co-operation of the various Departments of the Government.

A number of collections have been received from various agents em-
ployed by the Departments at home and abroad, who during time not
occupied in official duties have employed themselves in scientific in-
vestigations and in collecting material for the Smithsonian Institution.

President Cleveland presented a bowl, cocoanut-shell drinking cup, used in the ceremony of kava drinking, and a fan, two pieces of the root from which the "kava" is made; and also a rug of native manufacture. These objects were presented to the President by the King of the Samoan Islands.

STATE DEPARTMENT.

The material received through this Department was collected by the United States consuls in various foreign countries. The contributions here mentioned do not include the material received from the New Orleans Exposition through this Department.

Hon. S. S. Cox, U. S. minister to Turkey, sent an Egyptian mummy. This specimen is fully described on p. 150 of this report.

Hon. G. W. Griffin, U. S. consul, Sydney, Australia, forwarded Australian wool.

Hon. Otto Reimer, U. S. consul, Santiago de Cuba, sent some minerals, among which was a very interesting variety of garnet.

Hon. Edward Thompson, U. S. consul, Merida, Yucatan, sent a bird skin.

Hon. Albert Woodcock, U. S. consul, Catania, Sicily, sent a plow, which is of great interest, from the fact of its being similar to those used in Sicily more than two thousand years ago.

Samples of Russian petroleum refined at Marseilles, and of milk sugar from Germany and Switzerland, were also received.

TREASURY DEPARTMENT.

Bureau of Engraving and Printing.—A small collection of materials illustrative of the engraver's work was received.

U. S. Coast Survey.—Dr. W. H. Rush, of the steamer *Blake*, sent a collection of mollusks from the Gulf of Mexico, and a parasite worm taken from a rock cod. A case of salinometers and an optical densimeter were deposited by this Bureau.

Light-House Board.—A series of models of light-houses, light-ships, etc., which were exhibited at the New Orleans Exposition, were placed on deposit.

U. S. Revenue Marine.—Capt. M. A. Healy, of the steamer *Corwin*, sent a collection of fishes, marine invertebrates, etc.

WAR DEPARTMENT.

Lieut. Gen. P. H. Sheridan, lent, for exhibition, four large specimens of Flemish tapestry. These represent scenes in the life of Alexander the Great, and are described on page 65 of this report.

Capt. Charles E. Bendire, honorary curator of birds' eggs in the National Museum, contributed during the year a collection of fishes, birds, birds' eggs, reptiles, and three concretions from near Fort Custer, Mont., a Smith & Wesson revolver found on the Custer battle-field in 1883, and a bird from Fort Lowell, Ariz.

Col. A. G. Brackett, of Fort Davis, Tex., sent a nocturnal hawk-moth.

Dr. J. C. Merrill, of Columbus Barracks, Ohio, sent a nest and eggs of Acadian fly-catchers.

Lieut. P. H. Ray, Fort Gaston, Cal., gathered a large and valuable collection of ethnological objects used by the Hoopa Natano and Klamath Kenuck bands of Indians in California.

Dr. Samuel Q. Robinson, U. S. Army, sent an American Egret.

Charles Ruby, U. S. Army, of Fort D. A. Russell, Wyoming, contributed the following specimens: Indian saddle, axolotl, necks and tongues of two horned owls, gopher skins, and spermophiles.

Dr. R. W. Shufeldt, U. S. Army, of Fort Wingate, N. Mex., has continued his valuable assistance to the Museum, and has sent large collections of birds, reptiles, insects, mammals, etc.

From the Surgeon-General of the Army was received a collection of 513 crania and 322 skeletons, which were eliminated from the collections of the Army Medical Museum during its reorganization. Many of these were improperly mounted, however, and not of sufficient value to be placed in the exhibition series, and are useful only for purposes of study.

U. S. Signal Service.—General A. W. Greely contributed some bones of Atlantic walrus and Polar bear, obtained by him while in the Arctic regions.

J. W. Johnson, of Fort Alexander, Alaska, sent a collection of ethnological objects, fossils, shells, stone implements, and bird skins.

NAVY DEPARTMENT.

Ensign J. B. Bernadou, U. S. Navy, while stationed in Corea, forwarded a valuable collection of Corean material, including table-ware, bottles, water jars, wine-cups, drugs, musical instruments, fabrics, fishes, turtles, marine invertebrates, cephalopods, ethnological objects, etc.

Lieut. T. Dix Bolles, stationed in Alaska, contributed a wooden mask, war knife, and a pipe taken from the Indian graves in southeastern Alaska.

Dr. J. T. Bransford, while in Nicaragua, forwarded a collection of the fishes, reptiles, and birds of that country.

Dr. W. H. Jones sent a collection of fishes, insects, and a water-snake from Panama.

Admiral J. E. Jouett contributed an agouti from Central America.

Lieut. W. A. Mintzer donated several Corean coins.

Lieut. H. E. Nichols sent from Sitka, Alaska, a collection of alligator fishes.

Commodore R. W. Shufeldt contributed a Damascus sword and eight small ivory and gold-mounted knives of Arabian manufacture.

Dr. T. H. Streets, passed assistant surgeon, contributed a collection of fishes, shell, reptiles, marine invertebrates, etc.

Bureau of Navigation.—A collection of marine invertebrates made by the U. S. steamer *Enterprise*, in the South Pacific and Atlantic Oceans, was transferred to the Museum.

INTERIOR DEPARTMENT.

U. S. General Land Office.—A large collection of minerals, ores, and building stones, exhibited by this office at the New Orleans Exposition, was, at the close of the exposition, transferred to the Museum.

U. S. Geological Survey.—Numerous collections, large and small, were received from the U. S. Survey, among which were the following: Minerals and rocks from California, Kentucky, New Mexico, North Carolina, and Alabama; silver ore from Nevada; a large collection of plants from the Yellowstone National Park; birds' nests from Virginia; natural coke, furnace slag, reptiles; marine shells from Florida; fossil wood and berries, and relics from Orangeburgh, S. C.; stalagmite deposit, containing bones of animals, from Cartersville, Ga., and collections of Trenton, Devonian, Carboniferous, Silurian, and Ordovician fossils.

There was also received a series of geological relief maps of Mount Taylor, New Mexico; Washoe district, Nevada; Uinta and Wasatch Mountains; Eureka district, Nevada; Leadville and vicinity; high plateaus of Utah; Elk Mountains (colored); Ruby Hill Mines, Nevada (model); Leadville (dissected); Henry Mountains, Utah. Topographical models of the Yosemite Valley, Yellowstone National Park, ancient province of Tusayan. Models of the following mounds: Great Serpent; section of Little Etowah; Pit of Nelson; Great Etowah; Linn, and Great Elephant, five cliff ruin models and seven pueblo models.

BUREAU OF ETHNOLOGY.

From the Bureau of Ethnology were received a model of Wejegi, one of the Chaco ruins, prepared under the direction of the Bureau, and seventeen photographs of Osage and Ute Indians; life-size busts of "Prairie Chicken" and "Little Wolf," and some Zuñi gods. Twenty-two boxes of pottery, baskets, and blankets were also transmitted to the Museum.

GOVERNMENT ASYLUM FOR THE INSANE.

Dr. W. W. Godding, Superintendent, sent a black bear.

U. S. FISH COMMISSION.

The material received from the Fish Commission consisted of collections of fishes, marine invertebrates, mollusks, reptiles, birds, mammals, insects, oysters, porpoises, stone implements, bones, birds' nests and eggs, rushes, etc. Mr. James E. Benedict, of the Fish Commission, sent a carrying basket, obtained by him on Cozumel Island, and a water-vessel from Old Providence Island. Col. Marshall McDonald sent several large collections of fishes, reptiles, crayfishes, insects, fungi, marine

invertebrates, etc. Mr. C. H. Townsend sent from California a collection of birds, mammal skins, and fishes, and from Alaska a skin canoe, fossil shells, actinians, bird skeletons, mammals, birds, etc.

6. REPORT UPON THE EXHIBIT MADE BY THE SMITHSONIAN INSTITUTION AT THE NEW ORLEANS EXPOSITION.

BY R. EDWARD EARLL.

In accordance with an executive order of May 13, 1884, there was organized a Board of Government Commissioners charged with making the necessary arrangements for a general Government display at three exhibitions, namely, the Southern Exposition at Louisville, Ky., opening August 16 and continuing until October 25; the Cincinnati Industrial Exposition to be held at Cincinnati, Ohio, between September 3 and October 4; and the World's Industrial and Cotton Centennial Exposition at New Orleans, beginning December 16, 1884, and continuing till May 31, 1885. The board consisted of one representative from each of the Government Departments; and, in addition, a representative from the Smithsonian Institution, including the U. S. National Museum and the U. S. Fish Commission; and one from the Department of Agriculture.

To this board were referred all questions relating to the participation by the Government in the various exhibitions. Each Representative was charged with the preparation of an exhibit for the Department with which he was connected, and the funds placed to its credit by Congress were to be disbursed under his direction. Prof. G. Brown Goode, Assistant Secretary of the Smithsonian Institution, in charge of the U. S. National Museum, who had represented the U. S. Fish Commission at the Fisheries Exhibition at Berlin in 1880, and that at London in 1883, was nominated by Professor Baird, to represent the three organizations above named, and a day or two later he received an official appointment from the President of the United States. The board held an informal conference in Washington, beginning May 7, for the purpose of drawing up an outline of the work in connection with the several expositions, and for submitting estimates of the amount of money required by each Department for preparing a satisfactory exhibit. The passage of the bill authorizing the expenditure of money in connection with these exhibitions was considerably delayed, and the funds did not become available until July 7. At this time there were placed to the credit of the Smithsonian Institution \$75,000 for the preparation of exhibits for the exposition at New Orleans, with \$2,500 additional for Louisville and \$2,300 for Cincinnati. Only a few weeks remained before the opening of the two last-named exhibitions, and the exhibit for each of these, owing to the limited time remaining, was necessarily less complete than it would otherwise have been; though the work was pushed vigorously, beginning immediately after the appropriations became available, and continuing till a few days before the opening of

the exhibitions, when the exhibits were shipped and officers of the Museum proceeded to the respective cities to see to the proper installation of the collections.

THE EXHIBIT AT LOUISVILLE.

In 1883 the people of Louisville obtained control of a large plat of ground within easy access of the city and erected a building 920 feet by 630 feet, with extensive galleries, where they held a large and successful exposition, continuing for three months. The exposition of 1884 was held under the same auspices and in the same building, opening August 16 and closing October 25.

Immediately upon the passage of the bill by Congress, correspondence was opened with the management of the exposition, and space obtained in different portions of the building for the several Executive Departments, 4,500 feet being assigned to the Smithsonian Institution, in one of the most prominent locations. The time being short, the work of preparing the exhibit was vigorously prosecuted, and on August 12 three cars, containing ninety-five cases, with a weight of 23,553 pounds, were shipped. These arrived at Louisville on the morning of the 16th, and by the evening of the 19th were fully installed.

The industrial interests of Kentucky were taken into consideration in deciding upon the character of the exhibit, which it was thought desirable to make as instructive as possible. It was largely an educational exhibit, showing the processes of manufacture of raw materials which are abundant in the State, to which were added specimens illustrating certain subjects which it was thought would prove both novel and interesting to the people of Kentucky. One of the prominent features of the exhibit was a large collection showing the process of manufacturing textiles from raw materials, including flax, hemp, jute, grasses, and silk. A collection illustrative of articles derived from the animal kingdom was also shown. This included a series of furs, another of crude and manufactured leathers, a third of natural and ornamental shells and shell-work, a fourth illustrating the uses of feathers in the arts, and a fifth showing the manufacture and uses of glues derived from the sounds, bones, and skins of various species of fish. An extensive collection of photographs and drawings, illustrative of the great ocean fisheries of the New England coast, was also shown. The whale fishery was illustrated by means of a full-sized whale-boat, fully equipped with sails, oars, harpoons, lines, and guns; also by a model of a whale-ship with a whale alongside, showing the method of stripping the blubber and trying it out on the vessel's deck; and by paintings of whaling scenes. The other fisheries, including those for cod, mackerel, menhaden, and herring, and the apparatus and methods of fish-culture, were fully shown by models of the most important vessels and boats, and by a series of photographs, 30 by 40 inches, neatly framed, and mounted on screens. The natural history collections included

representations of nearly all of the snakes and reptiles found in the United States, and a fine series of many of the water-birds of the country.

An attendant was left in charge of the exhibits during the continuance of the exposition, and at its close the collections were carefully packed and a majority of them forwarded direct to New Orleans, a few being returned to Washington to be remounted, as a part of larger and more complete collections, before shipping to the New Orleans Exposition.

THE EXHIBIT AT CINCINNATI.

The Cincinnati Industrial Exposition is an institution of some years' standing, and receives the cordial support of the most prominent business men of the city. Expositions have been held here with considerable regularity, and a suitable and substantial brick building has been erected by the management. It is located in the heart of the city, and the attendance is usually large. For the season of 1884 the Exposition opened on September 3, closing on the 4th of the following month.

As most of the space was allotted before the bill authorizing Government participation in the Exposition had become a law, a second building, to accommodate the Government exhibits, was found necessary, and the management erected a temporary structure near the main entrance, having dimensions of 50 by 200 feet. This was divided between the several Departments, 3,322 square feet, or nearly one-third of the entire building, being allotted the Smithsonian Institution. This space was situated at one end of the structure, thus admitting of a satisfactory and very pleasing installation.

As soon as the Louisville exhibits were in place, the work of preparing those for Cincinnati was vigorously pushed, and the entire collection, consisting of eighty cases, with a weight of 24,321 pounds, was shipped on August 26, reaching the exposition on September 1. A very large force of men was at once set to work to unpack and install the exhibits, and by the opening of the exposition the arrangement was practically completed.

As at Louisville, the exhibits were largely educational, and included such objects as it was thought would be most appreciated by those who saw them. One of the striking features was an alcove containing a collection illustrative of the social life and industries of the Eskimo and the Indians of the Northwest coast; the dwellings, household utensils, and implements of war, hunting, and fishing, as well as the arts of the two races, being shown in such a manner as to afford accurate means of comparison. A life-size bust, in plaster, of one of the prominent Indian chiefs, and portraits in oil of thirteen others, were also exhibited. Another important feature was a large and valuable collection of minerals yielding gems and ornamental stones. The natural history department contained a small but choice collection of taxi-

dermy, including game and water-birds, sparrows, and a few mammals, while a number of Audubon's colored plates of North American birds were framed and hung upon the walls. Two cases were devoted to a large collection of plaster casts of the more common snakes and turtles of the United States. The methods and apparatus employed in the great ocean fisheries and in fish-culture were graphically represented by means of two extensive series of photographs, the larger series being solar enlargements, having dimensions of 30 by 40 inches. In the fisheries section was also shown a large and valuable collection of plaster casts of the important food-fishes of the country, including both fresh and salt water species. The collection of textile fabrics was very complete, including samples of many American and foreign fabrics, from the cheapest to the most expensive. Two alcoves, which attracted considerable attention, were devoted to photo-lithographs of Japanese pottery, and to a large collection of photographs showing the art and sculpture of the early Saxons.

As at Louisville, the collections were placed in charge of an attendant, who looked after the interests of the Smithsonian during the continuance of the Exposition, and at its close the exhibits were packed, and the bulk of them shipped to New Orleans, to be installed with other exhibits at the Exposition in that city.

NEW ORLEANS EXPOSITION.

It was not definitely known until the passage of the appropriations for the New Orleans Exposition what amount of money would be placed to the credit of the Smithsonian Institution, and it was, therefore, impossible to make any definite and detailed plans in connection with this work; but when the amount so appropriated had been ascertained, the plans were matured, and immediately upon the shipment of the materials to the expositions at Louisville and Cincinnati, attention was turned to the work of collecting, arranging, mounting, and labeling materials for New Orleans.

A force was organized by Professor Goode for this work, of which Mr. R. Edward Earll was the executive officer and Mr. W. V. Cox was the financial agent. The curators of several departments of the Museum were designated by Professor Goode to undertake the preparation of special exhibits for their respective departments, and definite sums of money were placed at their disposal for this work. Such assistants as were needed were furnished to each department for the preparation and mounting of material; and much of the duplicate material under their charge in the Museum was utilized. A number of the curators visited different localities for the purpose of obtaining specimens to complete their series. Much of the material exhibited at Louisville and Cincinnati was forwarded direct to New Orleans immediately upon the close of those expositions, and by the middle of November the shipping of material from Washington was begun, and the en-

tire collection, consisting of seventeen car-loads, was forwarded within a few weeks.

A separate building was provided for the display of Government and State exhibits, this being 885 feet long by 565 feet wide. A strip 185 feet wide, extending entirely across the center of the building, was assigned to the Government Departments, the space on either side being assigned to the several States, the Educational Exhibit, the Woman's Department and the exhibits of the colored people, occupying the galleries of the building. At a meeting of the Government board for the assignment of space to the various Departments, a strip 20 feet wide, extending entirely across the center of the building, was set apart for a main aisle or thoroughfare; the remaining space was distributed among the different Departments, the Smithsonian occupying a position immediately at the left of the main or Prytania street entrance, 82½ feet wide, and extending along the central aisle for a distance of 300 feet, or to a point somewhat beyond the center of the building, and, in addition, the two large offices adjoining the entrance. On December 6, Professor Goode, accompanied by Mr. Earll, left Washington for New Orleans, for the purpose of making preliminary arrangements and supervising the installation of the exhibits, having been preceded by Mr. Henry Horan, with a force of mechanics and trained workmen from the National Museum, consisting of Messrs. Reed, Deery, Kenyon, Neale, and Wallingsford. As soon as the exhibits arrived telegrams were sent to a number of the curators who had prepared the collections for their several departments. These reported in person or by representative to make the necessary installation of their material. Such additional labor as was required was obtained in New Orleans, and the work of installing the exhibits was pushed as rapidly as possible, until everything was finally arranged, after which the curators and mechanics returned to Washington.

The Smithsonian space, covering an area, exclusive of offices, of 24,750 feet, was divided among the different departments as follows:

	Square feet.
Ethnology	1,904
Archæology	406
Textiles	1,624
Naval Architecture	686
Graphic Arts	652
Fisheries and Fish-culture	2,345
Animal Products	2,400
Mammals	1,082
Exhibit of Society of American Taxidermists	595
Birds	540
Reptiles	300
Mollusks	1,328
Minerals	1,290
Lithology and Physical Geology	384
Metallurgy and Economic Geology	2,274
Workshop	500
Aisle space	6,450

Professor Goode remained until after the opening of the Exposition, when pressing duties at Washington required his return. In his absence, Mr. Earll was designated as Deputy Representative, with Mr. M. P. Snell as secretary, and W. H. Abbott, Arthur Brauer, and E. W. Atfield as assistants, these constituting the permanent force during the continuance of the Exposition. Mr. J. Warner Edwards, of Philadelphia, a scientist of wide experience, and a specialist in mineralogy, crystallography, and lithology, who was spending the winter at New Orleans, kindly volunteered his services, which were very gladly accepted. Mr. Edwards remained during the entire period of the exposition, and rendered the most valuable assistance, not only in connection with the departments in which he was especially interested, but in the general work of administration.

THE ETHNOLOGICAL EXHIBIT.

The ethnological exhibit prepared under the direction of Prof. Otis T. Mason, curator of the department of ethnology, consisted of a collection illustrating the social condition of the various tribes of North American Indians and Eskimos. It contained a large series of the costumes, weapons of war and chase, household utensils, tools, and games of the different tribes, with samples of their basketry and decorative work, including painting and carving, with full-sized busts, in plaster, of several of the leading chiefs. This exhibit occupied twenty-seven cases, the educational idea, which was carefully worked out being prominent in its arrangement.

Adjoining this department were six cases set apart for the archæological collections, consisting of stone implements from various localities in North America, arranged and mounted under the direction of Dr. Charles Rau, curator of the department of prehistoric anthropology.

TEXTILE EXHIBIT.

A large and interesting collection of textiles was prepared under the direction of Mr. Romyn Hitchcock, acting curator of the section of textiles. This collection was intended primarily to show the numerous fibers used in the manufacture of textiles, and, as far as practicable, the different stages of preparation and the processes of manufacture, beginning with the raw material and ending with the finished product. It was not limited to American fibers, but included textiles from the Philippine Islands, Japan, China, Siam, Spain, Portugal, England, and other countries. Prominent among the exhibits were esparto grass, agavi fibers, jute, flax, Spanish hemp, ramie, Chinese grass cloth, a large collection of raw cotton and cotton cloths, a collection of silk, including the cocoons and raw silk and the manufactured goods. The collection also contained specimens illustrating the manufacture of hair-cloth and carpets of various kinds. The whole was neatly mounted in standard Museum

trays, each specimen being provided with a printed descriptive label. The collection filled twenty-one standard cases, occupying floor-space of more than 1,600 square feet.

EXHIBIT OF NAVAL ARCHITECTURE.

The preparation of a collection illustrating the development of the vessels of the merchant marine was undertaken by Capt. J. W. Collins, of the U. S. Fish Commission, who visited the different centers of the ship-building industry and obtained builders' models of vessels of different types, the series beginning with the primitive forms, and ending with those of the most modern pattern. Prominent among these were models showing the development of cotton ships. In addition to the above were exhibited several fine models, belonging to the section of naval architecture in the National Museum. These included a full-rigged whaling-ship, a Chinese war-junk, and a three-masted schooner of modern build. Messrs. Higgins & Gifford, a firm engaged extensively in the manufacture of all kinds of sail-boats, row-boats, and yachts, sent an interesting collection showing the different types of boats manufactured by them, including a model of the dory "*Centennial*," the smallest boat that ever crossed the ocean.

THE ART EXHIBIT.

A collection to illustrate the growth of art was prepared by Prof. G. Brown Goode. It consisted of about one hundred and twenty autotypes, representing the most noted pictures of the principal artists of the world arranged chronologically by countries. The collection began with Cimabue, the most noted artist of the thirteenth century, and contained representations of the work of prominent artists from that time to the present.

In addition to the foregoing, the collection contained a very interesting series of autotypes representing noted pieces of sculpture, these being confined chiefly to representations of the works of Greek and Italian sculptors.

Besides the autotypes, there was an exhibit prepared by the Photo-Engraving Company, of New York, to illustrate the process of photo-engraving; another, prepared by H. C. Whitcomb & Co., illustrating the process of stereotyping; and a third, by the same firm, showing the most modern methods of electrotyping.

THE FISHERIES AND FISH-CULTURAL EXHIBITS.

The collection illustrating the fisheries consisted of about one hundred and fifty framed photographs, solar enlargements, and drawings in crayon illustrative of the apparatus and methods employed in the sea and river fisheries of the United States, and, in addition, a very complete collection of models in plaster of the principal food-fishes of North America, including both the marine and fresh-water species. There were also exhibited a series of diagrams prepared by Prof. W. O. At-

water showing the nutritive qualities of the leading food-fishes, and tabulated statements of the nutritive values of fish as compared with other foods. The exhibit also contained a full-sized whale-boat, thoroughly equipped with apparatus for the capture of whales, including not only the old-style hand harpoons and lances, but also the modern swivel-gun and the explosive cartridge used in connection with the same.

The fish-cultural exhibit, prepared under the direction of Col. Marshall McDonald, of the U. S. Fish Commission, consisted of a series of six tables containing hatching apparatus in which the embryos of the whitefish, salmon, and other species were kept during their development, and small aquaria in which the newly hatched fry were exhibited. In addition there were six large aquaria containing a number of different species of fish from the ponds of the U. S. Fish Commission at Washington, including the gold-fish, golden ide, German carp, trout, salmon, and other kinds. There was also a series containing numerous forms of hatching apparatus used at different hatcheries belonging to the U. S. Fish Commission, and models of various kinds of fish-ladders or fish-ways. Arrangements were made with the management of the Exposition for having a supply of water for conducting the hatching operations, and at intervals of two or three weeks quantities of eggs of different species were shipped to New Orleans and placed in the hatching apparatus, where they were allowed to remain until hatched. This exhibit was, perhaps, the most popular in the entire exhibition, and during the time when clear water could be obtained and the young fish were hatching, a majority of the people attending the exposition found their way to the space, some of them lingering for hours.

On February 18, Colonel McDonald arrived with U. S. Fish Commission car No. 3, containing a full equipment of hatching and transporting apparatus. This car was placed on a side track at the Prytania street entrance of the exhibition, adjoining the Smithsonian space, and was open for inspection daily from 8 in the morning until 6 in the evening. In it were shown not only the processes of hatching, but also the methods employed in transferring the fry to waters very remote from the hatchery. After the fish-cultural exhibit had been installed, Colonel McDonald returned to Washington, and J. Frank Ellis was placed in charge of the car, and James Carswell assumed control of the fish-cultural display in the Smithsonian space in the Government building. The car remained until the middle of May, when it was recalled, to be used in the distribution of shad from the Fish Commission stations in Washington and Maryland.

THE FISH COMMISSION STEAMER ALBATROSS.

The steamer *Albatross*, belonging to the U. S. Fish Commission, was engaged during the winter of 1884-'85 in an investigation of the cur-

rents, temperature, and life of the ocean in the vicinity of the West Indies and in portions of the Gulf of Mexico. By permission of the U. S. Commissioner of Fisheries, the vessel made a visit of a few days to New Orleans. On her arrival in that city the exposition management placed a portion of the exposition wharf at her disposal, where the steamer was thrown open for inspection by visitors to the exposition as a part of the exhibit of the U. S. Fish Commission. The apparatus employed in her scientific investigations was arranged on deck; and interesting forms of marine life recently taken in the deep waters of the Gulf of Mexico were removed from the tanks and placed in glass bottles in the steamer's laboratory, where they could be viewed by those who were interested. At the request of Capt. Z. L. Tanner, an efficient corps of officers and scientists remained constantly on duty to inform the visitors of the general character of the work in which the steamer was engaged, and to explain the workings of the apparatus. After a stay of ten days, during which time she was visited by a very large number of people, she left the exposition in order to resume her work which had been temporarily discontinued.

THE ANIMAL PRODUCTS EXHIBIT.

Adjoining the fish-cultural exhibit was a large collection of material showing the products of the animal kingdom, and, as far as practicable, the methods employed in their preparation. In this collection were shown the methods of utilizing the hair, fur, feathers, skin, scales, flesh, bones, horn, teeth, claws, viscera, and excrements of various animals. Portions of this collection were very complete, the exhibit of furs, for example, containing specimens of nearly every fur-bearing animal in the United States. The collection was installed in thirty-five cases, occupying a floor space of 2,400 square feet.

At one end of this collection, and serving as a connecting link between it and the natural history department, were several cases illustrating the methods employed in the capture of animals. In these were shown, either by models or pictures, various forms of traps used in different portions of the country by the Indians and whites in the capture of birds, mammals, and fishes.

MAMMAL EXHIBIT.

As soon as it became evident that the Smithsonian Institution would be required to send material to New Orleans, the subject of getting a large and complete exhibit of the mammals of the country was discussed; but when the definite amount of the appropriation was ascertained it became necessary to materially change the plan, in order to bring the exhibit within its proportional limit as compared with other departments. The exhibit was prepared under the direction of Mr. F. W. True, curator of the department of mammals, and from his

Museum report on the subject the following description has been obtained:

It was intended that the entire existing mammalian fauna of North America from the Isthmus of Panama northward should be exhibited species by species, both by skins or casts and skeletons, and that some of the more important extinct fauna should be restored. This plan necessarily suffered much modification after a short time, when it was found that neither money, time, nor materials sufficient to assemble such a collection before the opening of the exposition, were at command.

With the intention, however, of having every important species represented, the curator visited the establishments of all the principal dealers in natural history material, and the collection of duplicates in the Museum was also drawn upon very largely. It was found that only a very small number of species were anywhere on sale, and that the Museum must rely upon its own resources. This it was able to do to a very considerable extent, although it was found necessary to withdraw some mounted specimens from the regular exhibition series; a proceeding which the curator carried out with great reluctance.

The total number of specimens exhibited was one hundred and sixty, representing one hundred and fifty species and varieties. The series includes all the North American ruminants except the musk-ox; all the important carnivores, both aquatic and terrestrial (especially the fur-bearing family, *Mustelidæ*); all the native beneficial or noxious rodents; representative species of porpoises; the manatees; and the more characteristic monkeys, sloths, bats, and insectivores. In addition, a series intending to represent all the orders of the class mammalia was prepared.

The collection was exhibited in four large cases, except the ruminants, for which a separate large terraced stand was provided. The first case contained the cats, dogs, bears, etc.; the second, the seals and whales; the third, the monkeys, weasels, bats, and insectivores, and the first group of rodents, the edentates and opossums, and the series representing the orders of mammalia. The large terraced stand, as already stated, supported only the ruminants.

It will be observed that this collection, although considerably smaller in point of number of specimens than that exhibited at the Centennial Exposition, still contained representatives of almost the same number of species.

In addition to the specimens already mentioned, another small series was sent to New Orleans, representing the character of work done in connection with the department of osteology. It was at first intended that the different species of animals should be represented by skeletons as well as by mounted skins, but this plan was in the end found impracticable and was finally abandoned.

Mr. William T. Hornaday, chief taxidermist of the National Museum, visited New Orleans for the purpose of unpacking and installing this collection.

THE BIRD EXHIBIT.

Mr. Robert Ridgway, curator of the department of birds, was charged with the collection and preparation of the material for this exhibit. It consisted largely of specimens selected by him from the duplicates of the collections under his charge, these being finely mounted with a view to their display at the exposition. From Mr. Ridgway's report on these collections the following description is obtained:

The department of birds prepared for exhibition at the New Orleans Exposition a collection of North American game birds numbering one hundred and sixty-three finely mounted specimens, and representing nearly all the species. The exhibit was at first intended to be much more comprehensive, the original plan being to exhibit

all the known species of North American birds, so far as could be secured, together with typical groups to illustrate the avian faunæ of the several zoogeographical divisions of the earth's surface. The collection had been nearly completed on the original plan when it became necessary, on account of the limited space available at New Orleans, to greatly reduce the exhibit, and to limit it to the game birds above mentioned. This collection was installed by Dr. Leonhard Stejneger, assistant curator, who left Washington January 3, and returned on the 16th of the month. The collection filled two double museum cases, fitted with rows of terraced shelves. Each specimen was mounted on a stand of polished black walnut, and provided with a printed label, on which were given, in large, clear type, both the scientific and popular names.

THE REPTILE EXHIBIT.

This exhibit included a large and exhaustive series of life size models in plaster of the turtles and snakes of North America, each having been carefully colored by Mr. Schindler from living specimens or from colored sketches.

THE MOLLUSK EXHIBIT.

The exhibit in this department was prepared under the direction of Dr. William H. Dall, curator of the department of mollusks in the National Museum, and Dr. R. E. C. Stearns, assistant curator. Dr. Dall, in his report for 1885, described it as follows:

The exhibit in this department of natural history probably surpassed in extent and general excellence any previously made at the great expositions. It was arranged in twenty-one flat table cases, the specimens being placed in trays inside of the cases, and each of the trays fully labeled.

The general system followed was a geographical one, and presented a characteristic representation of the more conspicuous and interesting forms of the various zoogeographical provinces.

The exhibit included several cases of the fresh-water mussels (*Unionidæ*) of the Mississippi drainage area, remarkable for the great number and beauty of the shells, also the rare and peculiar forms belonging to this group from other parts of the world. The land and pond snails of the Mississippi basin were each represented by a single case.

The marine shells of the Atlantic coast of America from the Arctic Sea to the Caribbean, and the sea shells of the Pacific coast from Bering Sea to Panama, including the principal species inhabiting the tidal areas of Puget Sound, to the north, and the Gulf of California, to the south, were similarly displayed.

Other cases contained selected specimens from the Indo-Pacific region, such as live in the great coral areas of the warm seas between western America and eastern Asia.

Four cases were devoted to the edible mollusca of the United States. Two of these contained the clams, cockles, etc., of the Atlantic sea-board, and in the other two were exhibited those of the shores of western America, from Alaska to San Diego.

The preparation of the material was completed under the supervision of Dr. Stearns, who visited New Orleans and gave his attention to the proper installation and labeling of the exhibit.

EXHIBIT OF THE SOCIETY OF AMERICAN TAXIDERMISTS.

At the invitation of the Smithsonian Institution the Society of American Taxidermists prepared for exhibition at New Orleans a series of specimens illustrative of the work of members of that society. Mr.

William T. Hornaday, president, and Mr. F. A. Lucas, secretary, gave their personal attention to obtaining and arranging the material. The exhibit was large and instructive, occupying a floor space of nearly 600 square feet. It contained specimens of the best work of the leading members of the society, including Messrs. Hornaday, Lucas, Fraine, Webster, William Palmer, Joseph Palmer, Hedley, Forney, Bailly, Wallace, Jeremiah, and Richardson.

THE MINERAL EXHIBIT.

The exhibit of minerals was collected and arranged under the direction of Prof. F. W. Clarke, curator of the department of minerals, and Mr. W. S. Yeates, assistant curator. From the annual report of the curator the following account of the exhibit is taken :

The department of minerals was represented at the New Orleans Exposition by a collection of the minerals which afford gems and ornamental stones, and by a collection of cut and polished stones. The minerals were classified after Dana's system, and were displayed in seven flat-top table cases. The gems were more difficult to classify, it not being possible to arrange them with advantage, according to their chemical constitution. The best arrangement seemed to be one which would have reference to their intrinsic value; but it was found more convenient to allow the more uncommon stones a place near the lower end of the case in which the gems were exhibited. The second and last cases began with quartzes, and was followed by the feldspars and other ornamental stones. The specimens in these two cases were mounted on white and black velvet pads, which displayed them to great advantage.

The exhibit was arranged by Mr. Yeates, who visited New Orleans for that purpose.

THE LITHOLOGICAL EXHIBIT.

Under the direction of Mr. George P. Merrill, acting curator of the department of lithology and physical geology in the National Museum, a large collection of materials was prepared for New Orleans. Many of the specimens in this exhibit were taken from the duplicates belonging to the National Museum, but in order to complete the series Mr. Merrill visited numerous quarries and obtained suitable specimens, many of them being cut and polished before shipping. Mr. Merrill has given the following account of the exhibit prepared by him :

This exhibit consisted of (1) a collection of three hundred and fifty-eight specimens of building and ornamental stones in the form of 4-inch cubes; (2) a collection of some twelve specimens of foreign and native marbles in the form of polished slabs; (3) a collection of one hundred and fifty specimens of rock-forming minerals; (4) a collection called a "structural series," intended to represent all the more common forms of rock structure and texture; (5) a collection of one hundred and ninety-eight specimens of rock illustrating the geology and lithology of the Comstock Lode and Washoe district, Nevada; and (6) a lithological collection comprising five hundred specimens of rock of various kinds and from many sources, both native and foreign, this last, together with collections number three and four, forming a part of the regular educational series of the Museum.

Mr. Merrill went to New Orleans and arranged his exhibit, which was neatly installed, the collection occupying a floor space of nearly 400 square feet.

THE METALLURGICAL EXHIBIT.

One of the largest exhibits in the Smithsonian collection at the exposition was that prepared under the direction of Mr. Fred P. Dewey, curator of metallurgy and economic geology, who, with several assistants, devoted his entire time, for several months prior to the exposition, to the collection and arrangement of materials, James Temple Brown being detailed to make a special collection of coals and articles illustrating the processes of coal mining. From Mr. Dewey's report the following account of the exhibit is taken :

In the first division of this collection—that of economic geology—it was designed to exhibit collections illustrating the different kinds and grades of the ores of each metal, and also a few collections of non-metallic minerals of economic importance.

In the second division—that of metallurgy—it was designed to exhibit collections representing the processes for the extraction of the metals from their ores by specimens, where practicable, filling the gaps by means of illustrations and descriptions, and accompanying them by general illustrations and descriptions, so as to fully explain these processes.

The ore collection was made up with a view to represent all the different varieties of each ore and many of the most prominent mining regions.

The Lake Superior copper region was very thoroughly represented, both on account of the value of the mines, and as representing the kind of collections it is desirable for the Museum to possess to illustrate a region or mine. The region was represented by three prominent mines, showing three different and characteristic occurrences of the ore. In the first place, the so-called mass mines, which are characterized by the occurrence of large masses of free copper, amounting in some cases to many tons of metal in a single mass, were represented by the Central Mine. Mines of this kind also carry considerable quantities of disseminated free copper. In the second place, the amygdaloid mines, which are distinguished by the occurrence of free copper in amygdules, bunches, strings, and sheets, from the size of a pin-point up to a few hundred pounds in weight, disseminated in a soft amygdaloid trap-rock, were represented by the Osceola Mine. In the next place, the conglomerate mines, which are characterized by the presence of free copper mostly in the form of strings in a hard conglomerate of ferruginous quartz pebbles, were typified by the Conglomerate Mine.

Taking the Conglomerate Mine as an example, the collection showed, first, the general character of the ore and the inclosing wall rocks; secondly, the occurrence of the ore at various prominent points in the mine, which were accurately located; and, thirdly, a section of the rocks over a distance of 631 feet, by specimens taken at suitable distances to illustrate the different characters and changes of the material.

The collection in economic geology included placer gold, gold quartz, auriferous gravel, auriferous pyrite, telluride ores, iridium (iridosmine), native silver, wire silver, horn silver, ruby silver, base ores carrying silver, argentiferous lead ores, tin ores, sulphide ores of antimony, cinnabar, sulphide ores of lead; native copper, including water-worn specimens; mass copper, chips, amygdaloid and conglomerate disseminated free metal, sulphides of iron and copper, oxides, oxidized ores of bismuth, sulphide ores of nickel and cobalt, five hundred specimens of iron ores showing all the different kinds of iron ore found in the country, manganese ore, ores of zinc; anthracite, semi-bituminous, bituminous, splint, and cannel coal, and a large collection illustrating the methods of coal mining, including large photographs (taken by electric light) of the interior of a coal mine, the first views of the kind ever produced; native sulphur, and iron pyrites.

In making up the metallurgical collection it was not possible to exhibit the production of each metal exhaustively, owing to the small amount of suitable material previously in the department and the short space of time available for making new

collections. A few systematic illustrations of metallurgical operations were shown. It was thought best to treat a few subjects thoroughly rather than a large number superficially. After suitable consideration, a few representative works were selected for illustration, and were worked up as completely as possible.

Beginning with the ore as mined, each step in its preparation for smelting was shown, together with the by or waste products of such treatment. To illustrate the smelting operation, the ores, the fuels, the fluxes, and every other material entering the process, each product of each operation up to the final product of the works was shown. To these were added, where practicable, illustrations of materials of construction, such as fire-clays, sands, etc. The furnaces and tools were shown by specimens, views, and descriptions. The interest and value of these collections did not lay so much in the specimens themselves as in their being thoroughly connected, and in the kind and amount of information that was given in regard to them.

The collections in metallurgy comprised collections illustrating the extraction of gold and silver; the manufacture of lead, steel, coke, sulphuric acid, and alloys; the smelting and refining of copper, iron, and zinc. There was also illustrated the practical application of the non-metallic ores by specimens showing the manufacture of sand-paper, asbestos and its uses, abrading and polishing materials, and the utilization of barytes.

This collection, filling nineteen cases, occupied a floor space of nearly 2,300 square feet. Mr. Dewey visited the exposition and remained until all of the collections in his department had been installed.

The Smithsonian exhibit occupied more than a quarter of the entire space assigned to the Government for exhibition purposes, and the attention which the collection received from visitors to the exhibition and from the press was very gratifying, the space being the center of attraction for scientists from various parts of the country and for students from different Southern colleges.

At the close of the exposition several of the curators returned to New Orleans to look after the exhibits belonging to their departments, and a number of professional packers, under the direction of Mr. H. Horan, were sent from Washington to assist in the packing and returning of materials, many of the exhibits from their nature being very fragile and requiring skillful handling. An additional force of laborers was employed, and the work was pushed with all possible speed, so that by the 10th of July the work of packing had been completed and the exhibits were on their way to Washington, Mr. Earll and party leaving on the 14th. By the end of the month the last car-load of materials had reached Washington. Very little loss was sustained from breakage, the exhibits upon arrival being, as a rule, in excellent condition.