
PART I.

REPORT UPON THE CONDITION AND PROGRESS OF THE UNITED
STATES NATIONAL MUSEUM IN 1884.

BY

G. BROWN GOODE, ASSISTANT DIRECTOR.

REPORT UPON THE CONDITION AND PROGRESS OF THE UNITED STATES NATIONAL MUSEUM IN 1884.

A.—GENERAL CONSIDERATIONS.

1. INTRODUCTORY REMARKS.

During the year the officers of the Museum have continued the work of arranging the material under their charge in the exhibition halls, laboratories, and store-rooms at their disposal.

It should be remembered that the reorganization of the Museum was begun late in 1881, at the time when the new Museum building was first made ready for occupation, and that 1884 is but the third year of systematic effort. Much progress has been made in removing from the exhibition halls the great mass of unclassified material which had been gathering for many years in the various store-rooms of the Smithsonian building and elsewhere, and which, on account of lack of space, had for the most part been allowed to remain in the original packing cases.

The floors of the Museum have at last been almost cleared, and at present only three of the seventeen exhibition rooms are occupied for storage purposes, viz: The southwest court, which is still full of specimens belonging to the departments of metallurgy, mineralogy, and lithology; and the southeast court, which is used as a general receptacle for empty cases and unmounted material belonging to the departments of zoology and anthropology. Before the end of February this work will be completed.

The additions to the Museum have been far more numerous and valuable than in any previous year. The activity of every department has been greater, both in respect to progress made in the administration of the collections and in respect to the number of scientific papers published by the officers in connection with their professional studies upon the specimens under their charge.

By direction of Congress the Smithsonian Institution, in connection with the Executive Departments of the Government and the Department of Agriculture, has participated during the year in the industrial expositions at Cincinnati, Louisville, and New Orleans.

Having been designated by yourself, and appointed by the President, representative of the Smithsonian Institution (including the National Museum and Fish Commission) on the Government Executive Board,

charged with the representation of the interests of the General Government at these expositions, I have devoted the greater portion of my time during the latter half of the year to the work of preparation, an account of which will be given in fuller detail hereafter. Nearly every department of the Museum has necessarily been called upon to assist in this work, and a large proportion of the activity of the force has consequently been diverted to this channel. Although the progress of regular work has thereby suffered much interruption and delay, it is hoped that the service will eventually be benefited and final organization accelerated rather than impeded. At the present time the exposition at New Orleans is in progress, and the collections sent thither by the Museum cover a space fully equal to one-third of the entire exhibition space in the Museum building in Washington.

In accordance with established custom, the exhibition work has been carried on entirely under the direction of the regular Museum officers, assisted by such additional workers as it was found practicable to engage temporarily. Many of our officers accompanied the collections to superintend their installation in the exposition building. Several of the curators are at present absent in New Orleans and will be obliged to return to that city at the close of the exhibition, in May, to attend to the packing and return of the collections.

Following established usage, I have reviewed the work of the several scientific departments of the Museum, as well as that of the division of administration. The reports of the curators of the several departments are presented in full, their extent and importance being so great as to render this necessary. In my own report I have included an account of the operations of the department of arts and industry, for the present assigned to my care, in preference to preparing a special curator's report upon this department: the reports of certain of the curators of "sections" of this department are, however, furnished with the others.

In the present report, as in those which have preceded it, certain suggestions relating to the administration of the Museum are made for which I desire to be held individually responsible, and which the reader should not assume to be definitely determined elements of the policy of the Museum, since they may, any or all of them, at some future time, either in their present forms or with modifications, be recommended for adoption, or pronounced undesirable.

This being the first of the separately printed series of Museum reports, some statements which have already been printed in previous reports are repeated, in an abridged form, for the purpose of presenting a general exhibit of the policy of the Museum.

It had been the desire of myself and my associates to present in this the first report of the new series a somewhat exhaustive statement of the present condition of the Museum, together with a review of its past history as a whole and of its several departments: the exigencies of Exposition work having made this impossible, we hope to prepare such a report for the coming year.

2. THE FOUNDATION AND SCOPE OF THE NATIONAL MUSEUM.

Foundation and legal status.—The National Museum was organized in 1846 by the act of Congress transferring to the Smithsonian Institution the custody of the "National Cabinet of Curiosities," at that time deposited in the Patent Office building.* These collections were, in 1857, placed in the Smithsonian building, the Regents of the Institution having accepted the trust on condition that the necessary appropriations for their maintenance should be continued by Congress.

The act above referred to provides 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," shall be delivered to the Regents of the Smithsonian Institution, and together with new specimens obtained by exchange, donation, or otherwise, shall be so arranged and classified as best to facilitate their examination and study.†

The National Museum is the authorized place of deposit for all objects of natural history, mineralogy, geology, archæology, ethnology, &c., belonging to the United States or collected by the Coast and Interior Survey, the Geological Survey, or by any other parties for the Government of the United States, when no longer needed for investigations in progress.‡

Organization and government.—The establishment of the Smithsonian Institution, to which, in addition to the carrying out of the other requirements of the bequest of Smithson, is intrusted the control of the National Museum, is composed of the President of the United States and his Cabinet, the Commissioner of Patents, and a Board of Regents, which has for its members the Vice-President and Chief Justice of the United States, three members of the Senate, three members of the House of Representatives, and six other persons, not members of Congress, two of whom are residents of the city of Washington.§

The management of the National Museum is intrusted to the Secretary of the Smithsonian Institution, who is, *ex officio*, its director. He is aided by a staff of assistants, who are chosen by him, and for whose action he is responsible to the Regents. The constitution of the staff is constantly changing with the varying needs of the Museum.

This staff is at the present time composed of an assistant director, six curators and five assistant curators, twelve honorary curators, serving without pay, a number of aids, acting in various capacities, a reg-

* AN ACT to establish the "Smithsonian Institution" for the increase and diffusion of useful knowledge among men. (Approved August 10, 1846; Revised Statutes, title lxxiii, sections 5579-5594.)

† Revised Statutes, section 5586.

‡ Statutes Forty-fifth Congress, third session, chap. 182, p. 394.

§ Revised Statutes, 5580.

istrar, chief taxidermist and chief modeler, besides a considerable force of preparators, mechanics, watchman, clerks, laborers, &c.

The collections are stored and exhibited in the building erected for the use of the Smithsonian Institution between 1847 and 1857, and in the new building, just finished, known as the "National Museum."

Composition of the collections.—The Museum is made up, in large part, of the following materials:

1. The natural-history and anthropological collections accumulated since 1850 by the efforts of the officers and correspondents of the Smithsonian Institution.

2. The collections of the Wilkes Exploring Expedition, the Perry Expedition to Japan, and other naval expeditions.

3. The collections of the scientific officers of the Pacific Railroad Survey, the Mexican Boundary Survey, and of the surveys carried on by the Engineer Corps of the Army.

4. The collections of the United States Geological Surveys under the direction of the United States Geologists Hayden, King, and Powell.

5. The collections of the United States Fish Commission.

6. The gifts by foreign Governments to the Museum or to the President and other public officers of the United States, who are forbidden by law to receive them personally.

7. The collections made by the United States to illustrate the animal and mineral resources, the fisheries, and the ethnology of the native races of the country, on the occasion of the International Exhibition at Philadelphia in 1876, and the fishery collections displayed by the United States in the International Fisheries Exhibition at Berlin in 1880 and at London in 1883.

8. The collections given by the Governments of the several foreign nations, thirty in number, which participated in the exhibition at Philadelphia.

9. The industrial collections given by numerous manufacturing and commercial houses of Europe and America, at the time of the Philadelphia Exhibition and subsequently.

10. The material received, in exchange for duplicate specimens, from the museums of Europe, Asia, and Australasia, and from numerous institutions and collectors in North and South America.

Adjuncts to administration.—All necessary adjuncts to the work of the Museum, a working library, a chemical laboratory, a photographic establishment, a workshop for taxidermy, modeling, and the preparation of skeletons, and several smaller workshops are carried on as a part of the general work of administration.

Publications of the Museum.—The scientific results of the labors of the officers of the Museum, and of investigations upon the collections belonging to it, are to be found for the most part in the following works:

Bulletin of the United States National Museum ;

Proceedings of the United States National Museum ;

Reports of the Smithsonian Institution;
Smithsonian Miscellaneous Collections;
Smithsonian Contributions to Knowledge;
Reports of the Bureau of Ethnology of the Smithsonian Institution;
Reports of the United States Commissioner of Fisheries;
Bulletin of the United States Fish Commission;

also occasionally in other scientific reports of other scientific departments of the Government, especially those of the United States Geological Survey, many of whose officers are also honorary officials of the Museum.

A catalogue of the scientific papers emanating each year from the Museum or based upon Museum interests has been published each year since 1881 in the Smithsonian Report.

3. THE FUNCTION AND AIMS OF THE MUSEUM.

Objects and methods of work.—The collections in the National Museum are intended to exhibit the natural and industrial resources, primarily of the United States, and secondarily of those of the remainder of the world, for purposes of comparison.

The activity of the Museum is exerted in three directions:

(a) The permanent preservation of objects already in its possession.

(b) The acquisition of new material.

(c) The utilization of material already in its possession, by its exhibition in the most instructive manner, and by the prosecution of and publication of scientific researches for which it forms the basis; by the distribution of properly-labeled duplicates of materials to colleges and other educational institutions.

The preservation of material is accomplished by means of the vigilance of the curators and the skill of the preparators.

New material is acquired (a), from the various Government surveys and expeditions, in accordance with law; (b) by gift from individuals, from other institutions, and from foreign governments; (c) by exchange for its duplicate specimens or publications; (d) by the efforts of officers of the Museum, who make collections in connection with their regular duties, or are detailed for special service of this nature; (e) by purchase when appropriations are made by Congress for that purpose.

The treasures in the custody of the Museum are utilized to the world by exhibiting them to the public, and by encouraging investigations on the part of the officers of the Museum and other suitable persons, and facilitating the publication of the results; also by the distribution to other museums and educational institutions of duplicate specimens, which have formed the basis of scientific investigation, these being identified and labeled by the best authorities.

The Museum by these means fulfills a threefold function:

1. It is a museum of record, in which are preserved the material foundations of a very great number of scientific memoirs—the types of

numerous past investigations. This is especially the case with those materials which have served as a foundation for the numerous governmental reports upon the resources of the United States. Types of investigations made outside of the Museum are also incorporated.

2. It is a museum of research, by reason of the policy which aims to make its contents serve as fully as possible as a stimulus to and a foundation for the studies of scientific investigators. Research is a necessary part of the work, in order that the collections may be properly identified and arranged. Its officers are selected for their capacity as investigators, as well as for their ability as custodians, and its treasures are open to the use of any trustworthy student.

3. It is an educational museum of the broadest type, by reason of its policy of illustrating by specimens every group of natural objects and, so far as it may prove practicable, such other collections as may be found useful for the instruction of the public which are explained by displaying descriptive labels adapted to the popular mind, and by its policy of distributing its publications and its named series of duplicates.

4. THE DEVELOPMENT OF THE MUSEUM IDEA.

Periods in the history of the Museum.—The history of the National Museum may be divided into three periods: First, that from the foundation of the Smithsonian Institution to 1857, during which time specimens were collected purely and solely to serve as materials for research, no special efforts being made to exhibit them to the public or to utilize them except as a foundation for scientific description and theory. Second, the period from 1857, when the Institution assumed the custody of the "National Cabinet of Curiosities," to 1876. During this period the Museum became a place of deposit for scientific material which had already been studied, this material, so far as convenient, being exhibited to the public, and, so far as practicable, made to serve an educational purpose. Third, the present period, beginning in the year 1876, in which interval the Museum has entered more fully into the additional task of gathering collections and exhibiting them on account of their value from an educational standpoint.

In the first period, the main object of the Museum was scientific research; in the second, the establishment became a museum of record as well as of research; while in the third period is growing up the idea of public education. As soon as a judiciously selected series of objects from the material already within the walls of the Museum can be displayed properly to the Museum visitors, the National Museum of the United States will have commenced to fulfill all the demands which are likely ever to be made upon it.

The three ideas of scientific research, record, and education, co-operative and mutually helpful as they are, are essential to the development of any comprehensive and philosophically organized museum. Materials are gathered together that they may serve as a basis for scientific

thought. Objects which have served as a foundation for scientific study, or which, from their historical significance, are treasured up and preserved from destruction that they may serve purposes of record—permanent land-marks of the progress of the world in thought, in culture, or in industrial achievement—they are not only records of what has been done in the past, but they constitute the most valuable of all materials for future study. The museum of record, then, is not only an accessory to the museum of research, but an adjunct which accomplishes similar and fully equal results in the same direction.

The contents of the museum of research and the museum of record, if no other objects be sought save those already mentioned, might without impropriety be stored away in vaults and cabinets, inaccessible to any except the specialist. To give them their highest value, however, they should be arranged in such a manner that hundreds of thousands of people should profit by their examination instead of a very limited number, and that they should afford a means of culture and instruction to every person, young or old, who may have opportunity to visit the place in which they are preserved.

It is much to be regretted that many specialists, intent chiefly upon the study of certain scientific problems in which they individually are absorbed, are disposed to neglect the claims of the educated public to the enjoyment and instruction which museums afford. They do not hesitate to say that scientific museums should be administered for the benefit solely of persons engaged in research. At a recent meeting of professional naturalists, an eminent investigator in natural science publicly expressed his opposition to exhibiting certain scientific collections to "the gaping clowns who form the majority of the visitors to our museums." Such a spirit defeats its own purposes, and such a remark deserves no answer. The experience of Europe with its magnificent educational museums and the history of the several expositions in the United States should be quite sufficient to satisfy any one who has studied the matter that the museum is an educational power even more influential than the public library.

The venerable director of the South Kensington Museum, speaking from an experience of thirty-five years, not only in his own establishment, but in the work of building up the score of sister museums, now under its wing, located in the various provincial towns of Great Britain, remarked to the writer: "We educate our working people in the public schools, give them a love for refined and beautiful objects, and stimulate in them a desire for information. They leave school, go into the pursuits of town life, and have no means provided for the gratification of the tastes which they have been forced to acquire. It is as much the duty of the government to provide them with museums and libraries for their higher education as it is to establish schools for their primary instruction."

The educational museum is of comparatively recent origin, and may be said to be one of the outgrowths of the modern industrial exposition. The World's Fair of London in 1851, the first of a long series of international exhibitions, was utilized by the Government of Great Britain as a starting-point for a number of national educational museums, the most perfect which have as yet been organized, and many subsequent World's Fairs have been taken advantage of in a similar manner, so that nearly every civilized country now has a system of public museums.

One of the results of the Philadelphia Exhibition of 1876 was that it made plain to the people of the United States the educational importance of great museums. It suggested the thought that if so much that is inspiring and instructive can be imparted by the exhibition of natural and manufactured objects gathered together, chiefly with commercial ends in view on the part of the exhibitors, necessarily somewhat unsystematically arranged and with little effort toward labeling in an instructive manner, an immense field is open for educating the public by gathering together a selected series of similar objects, which may be so classified and explained by means of labels and guide-books that they shall impart a consistent and systematic idea of the resources of the world and of human achievement.

The United States has as yet no system of educational museums, although there are several museums of limited scope, which have successfully carried out the educational idea in the arrangement of their materials; for instance, the American Museum of Natural History in New York, the Museum of Comparative Zoology in Cambridge, the Museum of the Peabody Academy of Sciences in Salem, the Philadelphia Academy of Natural Sciences, the Boston Museum of Art, the Metropolitan Museum of Art in New York, the Pennsylvania Museum of Industrial Art, the Peabody Museum of Archæology in Cambridge, the Peabody Museum of Yale College, and the Boston Society of Natural History.

The same remark applies with equal force to the museums of Europe. There are, however, institutions, like the Museum of Practical Geology, the museum of the Royal College of Surgeons, the museums at Bethnal Green and South Kensington, in London, the Museum of Industrial Art at Berlin, the Ethnological Museum at Leipzig, the National Museum of Germany at Nuremberg, the Bavarian National Museum at Munich, and others, which have admirably carried out a single idea, or a limited number of ideas, and which are marvelously rich in material and arranged in a manner full of suggestiveness.

The museum now under the charge of the Smithsonian Institution has, through the action of influences beyond the control of its management, in fact by the terms of the act of Congress which authorizes its

existence, been made the depository of collections in every department—geological, botanical, zoological, and anthropological—and its work has of necessity been organized upon a very comprehensive plan.

5. PRINCIPLES OF ARRANGEMENT OF COLLECTIONS DESIGNED FOR PUBLIC EXHIBITION.

The majority of visitors to any museum go thither for amusement, or actuated by praiseworthy curiosity. Many have no desire to gain instruction, and even if actuated by such a purpose, would fail to accomplish their object by a visit to an ordinary museum. This is due in part to the fact that where so much duplicate material is exhibited the really instructive objects are lost to view; that the objects in but few museums are labeled in a really instructive manner; but is principally because the objects exhibited are not of the kind best adapted to the needs of the museum-visiting public. The visitors carry away only general impressions of rooms full of glass cases containing animals, minerals, and “curiosities,” gathered by travelers among uncivilized races. Professor Huxley has defined a museum as “a consultative library of objects,” and this definition, true enough in itself as a description of the best ideal museums, is unfortunately too true a description of all. Most collections are as useless and little instructive to great masses of our people, who know not how to use them, as are our libraries of consultation. The museum of research, since it is intended chiefly for investigators, should be the consultative library. The educational museum should resemble a great encyclopedia rather than a library full of learned volumes. Every library of importance, however, contains the encyclopedias for the general reader and the monographs for the scholar. The larger public museums may in like manner be adapted to the needs of both student and general visitor.

To overcome the difficulties in the way of this adaptation many steps must be taken which are not usual in museums. By far the most important of these is in the direction of thorough labeling.

An efficient educational museum, from one point of view, may be described as a collection of instructive labels, each illustrated by a well-selected specimen.

There are many obstacles to the effort to build up a museum upon this basis. Museums which exhibit only such objects as are in themselves beautiful or marvelous cannot fail to be attractive, no matter how poorly the objects are arranged and labeled.

When, however, the objects depend for their interest upon the explanations on the labels, and upon the manner in which they are placed, relatively to each other, a responsibility a hundred-fold greater is entailed upon the curators. The materials of such a museum may be compared to piles of brick, stone, lumber, and architectural ornaments, which by themselves possess little apparent interest, but which may by thought and labor be combined into an imposing and useful edifice.

Principles of administration.—Certain cardinal principles may be announced which should be considered in the arrangement of every public museum: (I) every article exhibited should illustrate an idea, and no two objects should be shown which illustrate the same idea in a similar manner; (II) the idea which any object is intended to illustrate should be explained upon its label in such a manner that any intelligent visitor, without previous special knowledge of the subject, may be able to learn (a) why the object is shown, and (b) what lesson it is intended to teach; (III) the objects should be so carefully classified that their relations to each other may be recognized by the visitor, so that taken together, they shall suggest general conclusions; in the formation of these conclusions he should be aided by certain general or collective labels which relate to and describe groups of objects in a manner similar to that in which the individual labels describe separate articles; (IV) the labels, individual and collective, should be supplemented by guide-books and manuals for special departments, which shall contain, arranged systematically, all the information given upon the labels, and which shall be illustrated by engravings of the more important objects.*

Industrial museums, as a rule, exhibit only those articles which are designed and constructed in the most sumptuous manner—the armor of

* The following general rules have been formulated:

1. No object will be placed on exhibition which is not of evident educational value, and likely to interest and instruct a considerable percentage of the persons visiting the Museum.

2. The exhibition of duplicate material is to be avoided, except in instances where similar objects can be shown to advantage in different divisions of the Museum.

3. Each object will be placed in a case of the form best suited for its effective display, and the light, color of the background, &c., will be so adjusted as to show it to best possible advantage, and with the least possible fatigue to the eyes of the visitor.

4. Each object, or group of objects, will be accompanied by a large plainly printed label, which will give a concise description of what is shown, an account of its origin and uses, a synopsis of its history, and the name of the person or organization contributing it to the Museum. The character of the Museum is such that any labels which might suggest advertising for business purposes must be excluded. It will be the policy of the Museum, however, to give prominence on each label to the name of the person or business house from whom it has been received, provided that the object is a gift to the Museum.

5. The objects will be grouped together in systematic order, and each case will be provided with a general descriptive label. In the case of collective exhibits, the general label may also give the name of the contributor.

6. The specimens will be illustrated and supplemented by pictures, diagrams, books, and maps, in such manner that the Museum may form an encyclopedia, the illustrations for which are in the exhibition cases, the text in the labels.

7. Guide-book manuals of the different departments will be published, which will embody in concise and systematic form the information given by the specimen labels, together with such illustrative material as may seem necessary to present in addition.

kings and knights, the furniture of palaces, the most artistic of metal work, stone work, and wood work. The ethnological museums, on the other hand, admit only the implements and costumes of savage and partially civilized races. Between the two there is a great chasm to be filled. It is as important to preserve in museums the more humble and simple objects which illustrate the domestic economy and customs of the masses of the people of civilized nations, as to search for similar objects in distant lands, or to treasure up only the objects which, on account of their cost, are seen and used only by the most wealthy and luxurious classes in the civilized community.

Collections of this character are, perhaps, as well entitled to be called "anthropological collections" as those usually included under this name, which are intentionally more limited in their scope.

To supply the place of objects too large to be placed in a museum, too evanescent to have been preserved, or which, on account of their rarity or neglect in preserving them at the time when they could have been obtained, are necessarily lacking in the collections, it is essential that museums should assume the administration of great quantities of material such as is usually consigned to the library or to the picture-gallery. Otherwise, deficiencies in groups of objects, which should illustrate by their collective meaning a general idea, will much impair their value. Pictures and diagrams should be freely used as temporary or permanent substitutes for specimens which may be lacking, and also to supplement and explain the descriptive labels. In many sections it may be impossible to exhibit anything but pictures. It is needless to point out the difference in the influence of a series of plates, like those, for instance, in Audsley and Bowes "*Keramic Art in Japan*," the publications of the Arundel Society, the autotypes of Braun, or the illustrations of many ethnographic works, if displayed in a public museum, where they are seen daily by thousands of visitors, or hidden except from the initiated few in a library, where they are only practically accessible to students with abundance of time and training in the use of books.

Much of the material usually shown in art galleries and art museums, such as is ordinarily used to illustrate the history of art, or is preserved on account of its artistic suggestions, may be displayed in a much more instructive manner in a museum without in the least lessening its value to the artist or designer. Portraits, pictures of buildings, of costumes, of geological features in scenery, of ceremonies, and of social customs may be arranged and administered as anthropological specimens. In addition, much may be accomplished by having standard works, relating to the special departments of the museum, placed in convenient places in the exhibition halls, and, if necessary, fastened to desks in such a manner that they could not be removed, while easily accessible to any person who might wish to become informed upon special topics relating to objects being examined.

6. SYSTEMS OF CLASSIFICATION.

The chief requisite to success in the development of any museum is a thoroughly available plan of organization and a philosophical system of classification.

The arrangement of the natural-history collections—zoological, botanical, and geological—which will doubtless always constitute a very large proportion of the treasures of the National Museum, and which will undoubtedly in the future, as at the present, occupy the attention of at least three-fourths, if not more, of the Museum staff, is a simple matter, since naturalists are pretty generally in accord as to the affinities of different groups to one another, and since the grouping of the objects in the Museum cases may be made to accord very closely with the schemes laid down by systematists. When, however, it is necessary to take up the arrangement of collections which illustrate the history of human culture, the lack of a convenient and instructive system becomes very apparent.

Much thought has been devoted to these subjects by the officers of the Museum, especially during the past four years. Many of the principal museums of Europe have been studied, their catalogues and publications minutely compared, and correspondence carried on with their officers. It is hoped that the plans which have been developed as the result of these labors may include the best features of similar plans hitherto proposed, but it is undoubtedly true that no plans can be laid down, except in a tentative way, since the experience of each year reveals possibilities and impossibilities not previously thought of by the student of museum methods.

In my first report, published in 1881, I printed a scheme of classification for the anthropological collections which, in certain quarters, did not meet with favor. It was a purely tentative effort, published for the purpose of inviting criticism, and not in any way supported by official sanction. Some of the criticisms which it called forth were evidently just and will have due weight in planning for future work. The scheme referred to has been objected to by museum administrators because it breaks up their favorite and time-honored method of geographical arrangement. It is the result of the experience of the officers of this Museum that it is absolutely impossible to handle our immense collections if we adhere to the methods of older and smaller establishments. It is well known that some ethnological collections should be arranged geographically, some teleologically, some with reference to materials of which the objects are made.

In this Museum in different departments of the work we shall doubtless find it convenient to employ all these systems.

Our collections are at present being arranged in accordance with a teleological rather than geographical plan of classification, objects of a similar nature being placed side by side, musical instruments together,

weapons together, &c., and arranged in such a manner as to show the progress of each idea from the most primitive type. In discarding the ethnographic method of arrangement, however, special care has been taken not to sacrifice the possibility of bringing together the objects belonging to any particular locality or race, if this shall at any time be required for purposes of study.

In our method of installation, objects are mounted in glass-covered trays or deep frames, 24 by 30 inches in dimension, which are arranged for study or exhibition in cases of various forms. The articles belonging to two different tribes are never mounted together in the same tray; and if at any time it should be found desirable to bring together the collections from any given race, for instance, from the Eskimos, the Siamese, or the Japanese, this might be accomplished in a few hours; in fact, when once the present system of mounting has been completed, the rearrangement of the Museum upon the ordinary ethnographic plan would be the work of only a few hours, and may be effected by a small force of mechanics and laborers under the direction of a single curator.

It is no part of the plan, nor has it ever been, to separate articles which belong together. The parts of any collection or group of objects which may justly be considered a unit of administration are always kept together; for instance, if a costume is complete it is not intended to dissect it and distribute its parts. The separate elements of a costume are only placed by themselves when they have no related objects associated with them. In the same way a costume of a family, whether composed of two or ten individual suits, might with propriety be regarded as a unit. Collections illustrating the history of a special tribe in a monographic way may also with propriety be kept together. Such a collection would, however, not be assigned to the department of art and industry, where the preferred method of arrangement is evolutionary or progressive, but would rather be made over to the department of ethnology.

The studies of the collections already made by Professor Mason, the new curator of Ethnology, reveal the fact that there is really no conflict between a systematic scheme classification and a geographical one, because, in those series of objects which have already been arranged, the one scheme has always proved to be explanatory of the other. They are mutually beneficial; indeed, it is impossible to understand the one without studying the other.

B.—THE MUSEUM STAFF.

The staff of the Museum as now organized consists of two classes of workers—the scientific officers, and the administrative officers; the former reporting to the Director of the Museum, the latter to the Assistant Director, who also has general supervision of the administrative work of the curators.

7. THE SCIENTIFIC STAFF.

In the scientific staff of the Museum there are at present nineteen curatorships, some of which are subdivided below, so that the number of heads of departments and sub-departments is twenty-five, and the total number of men in the scientific staff thirty-six, of whom twenty-four are in the pay of the Museum, and the others honorary, five being detailed for this duty by the Director of the United States Geological Survey, one by the Director of the Bureau of Ethnology, others by the United States Commissioner of Fisheries, and by the Secretary of the Navy, while two are volunteers. It may be stated here that the details just referred to are in every instance made in the interests of co-operation with those Government bureaus engaged in work closely connected with that of the Museum. The paleontologists of the Geological Survey find it 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 machinery, that they are permitted by their chief to assume the responsibilities of curatorships and perform a general work of supervision; and the mineralogists and the curator of aboriginal pottery are similarly situated. In nearly every instance, however, the Museum supplies the honorary curators with assistants, who relieve them of much of the routine work.

The curatorships are now organized as follows:

DIVISION OF ANTHROPOLOGY.

Department I.—Arts and industries, the Assistant Director acting as curator (A. Howard Clark, assistant, two preparators), with subcuratorships as follows:

(a) *Materia Medica.* Dr. H. G. Beyer, U. S. N., honorary curator, with one clerk.

(b) *Textile Industries.* Romyn Hitchcock, acting curator.

(c) *Fisheries.* R. Edward Earll, curator.

(d) *Animal Products.* R. Edward Earll, acting curator.

(e) *Naval Architecture.* Capt. J. W. Collins, United States Fish Commission, honorary curator.

(f) *Foods.* W. O. Atwater, acting curator.

(g) *Historical Relics.*

In this department, it may be stated, is administered very much of the material, such as is usually arranged by museums in their ethnological series, and the Curator of Ethnology is consequently acting as adjunct curator in the Department of Arts and Industries.

Department II.—Ethnology. Dr. Otis T. Mason, curator, with one preparator and two clerks.

Department III (A).—Antiquities. Dr. Charles Ran, curator, E. P. Upham, assistant.

Department III (B).—American Prehistoric Pottery. W. H. Holmes, Bureau of Ethnology, honorary curator, Dr. Edward Foreman, assistant, one preparator.

DIVISION OF ZOOLOGY.

Department IV.—Mammals. Frederick W. True, curator, one clerk, two preparators.

Department V (A).—Birds. Robert Ridgway, curator, Leonhard Stejneger, assistant, one clerk and one preparator.

Department V (B).—Birds' Eggs. Capt. Charles Bendire, U. S. A., honorary curator (volunteer), and one clerk.

Department VI.—Reptiles and Batrachians. Dr. H. C. Yarrow, honorary curator (volunteer).

Department VII. Fishes. Dr. T. H. Bean, curator, two assistants detailed from the United States Fish Commission.

Department VIII.—Comparative Anatomy. Frederick W. True, curator, F. A. Lucas, assistant, and one preparator.

Department IX.—Mollusks. W. H. Dall, curator, R. E. C. Stearns, adjunct curator, both of U. S. Geological Survey, one clerk.

Department X.—Insects. Prof. C. V. Riley, honorary curator (volunteer).

Department XI.—Marine Invertebrates. Richard Rathbun, U. S. Fish Commission, curator, one assistant, and one clerk detailed from the United States Fish Commission.

Department XII (A).—Invertebrate Fossils, Paleozoic. C. D. Walcott, United States Geological Survey, honorary curator.

Department XII (B).—Invertebrate Fossils, Mesozoic and Cenozoic. Dr. C. A. White, United States Geological Survey, honorary curator, J. B. Marcou, United States Geological Survey, honorary assistant, one clerk.

DIVISION OF BOTANY.

Department XIII.—Fossil and Recent Plants.—Lester F. Ward, United States Geological Survey, honorary curator, one clerk, one preparator.

DIVISION OF GEOLOGY.

Department XIV.—Mineralogy. Dr. F. W. Clarke, United States Geological Survey, honorary curator, W. S. Yeates, assistant.

Department XV.—Lithology and Physical Geology. George P. Merrill, acting curator, one preparator.

Department XVI.—Metallurgy and Economic Geology. Fred. P. Dewey, curator.

A comparison of the above classification with that presented in the reports for 1883 will show changes in the following particulars, namely, that the scope of the Department of Arts and Industries has been augmented during the year by the addition of two sections: (1) Naval Architecture, of which Capt. J. W. Collins is the honorary curator, and (2) Animal

Products, in charge of R. Edward Earll, as acting curator. Mr. Earll has also been acting as curator of the section of Fisheries. For greater convenience the section of Foods and Textiles has been reorganized in two divisions: (1) Textile Industries, Mr. Romyn Hitchcock as acting curator, and (2) Foods, under the direction of Prof. W. O. Atwater.

To the Division of Anthropology has been added the Department of American Aboriginal Pottery, under the honorary supervision of Mr. W. H. Holmes, of the Bureau of Ethnology. The Department of Ethnology has been organized under the curatorship of Prof. Otis T. Mason, taking the place of the Department of Races of Men in the classification as given in the report for last year.

The Division of Zoology has been increased by the addition of (1) the Department of Birds' Eggs, Capt. Charles Bendire, U. S. A., serving, as honorary curator; and (2) the Department of Comparative Anatomy under Mr. F. W. True, assisted by Mr. F. A. Lucas. The three Departments of Crustaceans, Worms, and Radiates and Protozoans, as classified in 1883, have been merged in one, the Department of Marine Invertebrates, under Mr. Richard Rathbun. Department XVI, Physical Geology, under the old classification, is now an adjunct of the Department (XV) of Lithology under the direction of Mr. George P. Merrill; and the Department of Mineralogy, which was in 1883 connected with that of Lithology, is now classified separately.

S. THE ADMINISTRATIVE STAFF.

The classification of the departments in the Division of Administration remains essentially the same as detailed in the report for last year, and is as follows:

Department A.—Direction. This department is under the immediate charge of the Assistant Director, who, as executive officer to the Director, has general supervision of the routine work in all the departments, the care of the installation of specimens, the construction of cases, &c., the purchase of supplies, &c., the assignment of work and of apartments, leaves of absence, curators' reports, and routine correspondence. The organization of the offices of the Director and Assistant Director has not been materially changed during the year, except that, on account of the increase in efficiency of the other departments of the Division of Administration, a considerable amount of routine work, with its accompanying responsibilities, has been transferred from the Assistant Director to the heads of these departments. During the absence of the Assistant Director for five weeks during the summer, on business connected with the preparation of the Smithsonian exhibit at the World's Exposition in New Orleans, Mr. F. W. True was designated to act in his place. Mr. R. I. Geare, executive clerk, has rendered most efficient service in the Assistant Director's office.

Department B.—Registry and storage. This department is in charge of Mr. S. C. Brown, whose duties pertain to the reception, unpacking, and assignment of accessions and other packages, the packing and shipment of boxes, &c., the storage of accessions subject to the call of curators, and the custody of department catalogue books.

Department C.—Archives. Mr. S. C. Brown also has charge of all papers relating to accessions and the distribution of Museum material.

Department D.—Library. Mr. F. W. True, librarian.

Department E.—Publication. Dr. Tarleton H. Bean performs the duties of editor of "Proceedings" and "Bulletins."

Department F.—Labels. Mr. A. Howard Clark in charge. His duties consist in the arrangement of material for labels, in receiving the printed labels from the printer, and in arranging a duplicate set of labels for reference.

Department G.—Duplicates and exchanges. Mr. S. C. Brown in charge. The work of this department includes the distribution of duplicate collections for exchange and the custody of the files relating to applications and proposals for exchange.

Department H.—Property and supplies. Mr. C. W. Schuermann in charge. All cases, furniture, and supplies of all kinds are under his care, and are distributed by order of the Assistant Director.

Department I.—Accounts. All disbursements are made by the Disbursing Clerk of the Department of the Interior. Estimates for supplies and the general care of contracts and orders are included in the work of this department.

Department K.—Buildings and labor. Mr. Henry Horan, superintendent, in charge. In this department are included the care of police and inspection, mechanics and labor, construction and repairs, cleaning and public comfort, heating and lighting.

Department L.—Electric service. In this department are embraced the telephone service, time service, burglar-alarm service, and watch-clock service.

Department M.—Preparation. This department is divided into several sections, each of which is in charge of a preparator, and is thoroughly discussed in another portion of this report.

Exposition staff.—In addition to the regular administrative staff of the Museum, an administrative staff for exhibition work has been maintained since July, 1882, under the general charge of the Assistant Director. Mr. R. Edward Earl is the executive officer, and Mr. W. V. Cox financial clerk of the staff, which is increased from time to time as occasion requires by the employment of extra clerks and preparators, and to which also, when necessary, are detailed various officers of the Museum scientific staff. In addition to the exhibition work of the year elsewhere referred to, this staff is still engaged in the preparation of a report upon the International Fisheries Exhibition at London, in 1883.

C.—THE CONDITION OF THE COLLECTIONS.

The custodianship of the specimens of the several departments has been conscientiously fulfilled by the curators with the assistance of the various preparators. I am confident that the material in the possession of the Museum has never been in better condition than it is at the present time.

9. A PROVISIONAL CENSUS OF THE COLLECTIONS.

*Estimated number of specimens now in the several departments of the National Museum.**

	No. of specimens.	
Department of Arts and Industries:		
(a) Materia medica	4,442	
(b) Textile industries	2,000	
(c) Fisheries.....	5,000	
(d) Animal products	1,000	
(e) Naval architecture.....	600	
(f) Foods.....	1,580	
Department of Ethnology.....	200,000	
Department of Antiquities	45,252	
Department of Prehistoric Pottery	12,000	
Department of Mammals { Skins and alcoholic specimens.....	5,694	9,908
{ Skulls and skeletons.....	4,214	
Department of Birds.....	50,350	
Department of Birds' Eggs	40,072	
Department of Reptiles and Batrachians.....	23,495	
Department of Fishes.....	68,000	
Department of Comparative Anatomy (department not organized)	3,000	
Department of Mollusks	400,000	
Department of Insects	150,000	
Department of Marine Invertebrates	200,000	
Department of Invertebrate Fossils (Paleozoic).....	73,000	
Department of Invertebrate Fossils (Mesozoic and Cenozoic)	100,000	
Department of Plants, fossil and recent	7,291	
Department of Mineralogy.....	16,610	
Department of Lithology and Physical Geology.....	18,000	
Department of Metallurgy and Economic Geology	40,000	
Total	1,471,000	

10. ASSIGNMENT OF SPACE.

There has been made no material change in the assignment of exhibition space, as described on page 2 of my report for 1883. The northwest court will probably be opened during 1885 with the collections of North American pottery. The exhibition space for the collections of the metallurgical department will shortly be increased by the opening of the southwest court.

In the Smithsonian building the four main halls are occupied as they were in 1883, and as follows: Main hall, Ornithology; upper main

*These estimates do not take into account the actual number of specimens, but refer to "lots" of specimens, which may include one or several hundred, but which are included in a single entry of the Museum register.

hall, Pre-historic Archaeology; west range, Ichthyology; west hall, Invertebrates.

The south galleries of the Smithsonian main hall have been cleared, the exhibition cases, which were old and unserviceable, having been taken down and used for other purposes, and the gallery spaces assigned for laboratory use. The southwest gallery is now occupied by the ornithological department for a work-room, and for storage of the great collection of unmounted bird-skins; the southeast gallery is similarly occupied by the conchological department.

The large room adjoining the northeast pavilion in the Museum building is now used as a depository for the oological collection, and as a laboratory for the section of birds' eggs.

The office of the Director of the Geological Survey having been removed elsewhere, the northeast pavilion is now occupied by the chemical and physical laboratory of the Survey. The southwest pavilion is being fitted up for the accommodation of the mammal, metallurgical, and mineralogical laboratories; the west balcony is used as a laboratory for ethnology; the north balcony for the department of textiles, and the south balcony for plants, recent and fossil.

The photographer of the Geological Survey having vacated the rooms for several years occupied by him in the brick annex, second story, the workshop of the taxidermist attached to the department of birds has been transferred thither.

The Armory building, with its wooden annex, occupied jointly by the Museum and the Fish Commission, is still crowded with unassorted material belonging to the Museum collections.

In order to provide suitable accommodations for the preparators, in connection with the preparation of the exhibit for the three expositions of Cincinnati, Louisville, and New Orleans, and also to give much-needed space for packing the collections to be sent, it was deemed advisable to construct a wooden building east of the Museum building. On July 15 the work of breaking and leveling the ground was commenced. The annex is 150 feet long, 50 feet wide, and 50 feet high. The eastern end was assigned to the modeling department of the United States Geological Survey. The southwestern portion was occupied by the taxidermic force of the National Museum, and in the northwest part the packing and general exposition work was carried on. The cost of this annex was about \$3,500, expended as follows:

Survey of location for building.....	\$10 00
Construction.....	3,055 41
Plumbing.....	257 76
Steam-fitting.....	131 11
Drainage	60 00
Total	3,514 28

Two wooden sheds, one to be used as a poisoning-house for skins, &c., and the other, for the preparation of the collection of building-stones

for the New Orleans Exposition, were erected in July between the Museum and the Annex building.

The need of an additional Museum building is each year more seriously appreciated. Very many objects of great interest and requiring a large space for their accommodation have been promised by exhibitors at New Orleans, and it is a serious problem to know where these can even be stored, aside from the possibility of properly displaying them.

Extensive collections of alcoholic specimens are known to greatly endanger the safety of museum buildings and their contents, and most of the establishments in Europe have lately taken the precaution to construct separate buildings peculiarly adapted for the purpose. It is sincerely hoped that the application which was made at the last session of Congress for an appropriation to put up a similar building in the grounds of the Institution will be acted upon favorably.

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

11. ACCESSIONS TO THE MUSEUM.

The total number of packages recorded by the registrar during the year was 5,507. In addition to this number, 209 wagon-loads of boxes, packages, &c., were received and distributed to the several departments. Of the entire number, 3,509 packages, boxes, &c., were addressed to the National Museum and its officers, the remainder being intended for the Smithsonian Institution and the United States Fish Commission.

The registrar of the Museum acts also in the capacity of transportation clerk for the Smithsonian Institution, and much material passes through his hands with which this report has no concern. The total number of individuals and institutions sending collections to the Museum, as shown in the list published in the appendix to this report, is 1,084.

It should be stated that very many of the objects sent in by the correspondents of the Museum are of very little value, and are transmitted simply for the purpose of obtaining a report upon their names and character. It has been the policy of the Smithsonian Institution to receive all objects offered which have any relation to its work, since the majority of such contributions, after they have been identified and studied, are valuable for exchange or distribution to museums and institutions of learning, and often prove to be of unexpected importance. Many of the specimens sent in for examination and report are entirely useless. It is hardly proper, therefore, to consider each one of the 3,500 packages received as constituting an important contribution to the collections. Many of them, however, contain specimens of great value.

The Museum has, during the past year as in previous years, received accessions from the following sources:

- (a) By gift from correspondents.
- (b) By exchange with institutions at home and abroad.
- (c) By the deposit of the collections of the various surveys and Government departments which here find their legal repository.
- (d) From the work in connection with the several expeditions.
- (e) As a result of the explorations carried on under the patronage or with the co-operation of the Smithsonian Institution and Museum.

Mr. John Durand has rendered efficient service in negotiating exchanges with European museums.

Every important accession is fully described in the reports of the several scientific departments.

12. PROGRESS IN CLASSIFICATION AND ARRANGEMENT.

(a) *Laboratory work and catalogue entries.*

By "laboratory work" is meant the work of the curators upon the collections in their special apartments, which are not open to the public. Here the collections are received, unpacked, classified, identified, and catalogued; here also it is determined whether specimens should be placed in the exhibition series; or, if not thus assigned, whether or not they are sufficiently important as material for investigation in the study series, or should be called "duplicates" and distributed to other institutions.

The efficiency of the Museum work depends, in a large degree, upon the facilities which are afforded to curators for careful and thorough work in the laboratories. It is here that the specimens are indelibly marked with the catalogue number, upon which all future authentications depend. Here also must be prepared the labels, upon which the value of the exhibition series to a great extent depends; and here are prosecuted the scientific investigations, which, through the publications of the Museum, establish the reputation of its scientific staff for thorough and accurate work. The laboratory accommodations are being improved, but still there is much to be desired in respect to space, number of clerical assistants, and facilities for the use of books and instruments and other appliances.

In a museum, as in a temporary exposition, the efficiency of each department depends also upon the energy and constant presence of a thoroughly competent head, and consequently upon the opportunities afforded him for good work in his laboratory.

The present organization of the Museum is of such recent date that nearly all the curators are still embarrassed by the accumulations of past years, and the greater portion of their time is necessarily devoted to unpacking and overhauling the unclassified material which they found already on hand when they assumed the duties of their present offices. These heritages from the past will soon be under control, and

it may be expected that our next year's report will show a great increase in the amount of work directly concerned with the preparation of the exhibition series, of final labels, of catalogues and hand-books, and the prosecution and publication of original researches.

The activity of 1884 may best be gauged by the following table, which shows the total number of entries made in the Museum registers of the several curatorships:

No. of dept.	Name of department.	No. of entries during 1884.	No. of dept.	Name of department.	No. of entries during 1884.
I	Arts and Industries (general) . . .	4, 429	XI	Marine Invertebrates:	
	Materia Medica	398		Crustacea	2, 924
	Textile Industries	1, 683		Worms	151
	Foods	420		Tunicates and Bryozoa	89
	Historical Relics	200		Radiates	1, 858
II	Ethnology	1, 184		Protozoa and Sponges	645
IIIa	Antiquities	4, 367		Invertebrate Fossils (Paleozoic)	564
IIIb	American Prehistoric Pottery	603		Invertebrate Fossils (Mesozoic Cenozoic)	1, 159
IV	Mammals	711		Fossil Plants	97
Va	Birds	8, 142	XIIa	Fossil Plants	97
Vb	Birds' Eggs	3, 222	XIIb	Mineralogy	2, 307
VI	Reptiles	584		Lithology	2, 541
VII	Fishes	3, 015	XIII	Metallurgy	11, 021
VIII	Comparative Anatomy	547	XIV		
IX	Mollusks	5, 231	XV	Total	58, 195
X	Insects	53	XVI		

(b) *Development of the exhibition and study series.*

The "reserve series" in the Museum includes all the specimens which are retained for purposes of study, the exhibition series consisting of objects which are suitable to be exposed to public view in glass cases, selected from the reserve series of which it forms a part. The study series is formed by the residue, which are kept compactly stored either in cases in the laboratories or in the closed tables which serve as pedestals for the smaller show-cases in the exhibition halls.

The study series for any special group may generally be largely reduced in extent after an exhaustive monograph has been published upon that group, it being the long-established policy of the Museum to reserve only a sufficient number of specimens to permit the author of such monograph to entirely rewrite it, should the manuscript of his essay be destroyed.

Much progress has been made during the year in many departments in the work of separating the duplicate from the reserve series, and in many of the others in the work of preliminary classification, which is the necessary preparation for this task. The development of the exhibition series is necessarily slow, since it is not considered desirable to place on exhibition specimens which are not fully explained by printed labels. It is, to be sure, often necessary to expose to view large objects which have not been labeled. The extent and nature of the work of the Museum is not appreciated by persons who are not familiar with the character of the laboratory work and who have not access to the reserve stores. In the various departments of ethnology and indus-

trial art, for instance, the wealth of the Museum is exceedingly great, but until cases have been built and labels printed it is impossible properly to display it.

Although very much has been done for the development of the exhibition and study series, it is certain that during the years 1885 and 1886 the Museum will improve in attractiveness to the visitor and general student, and in convenience to the investigator and special student, to a degree which has not in past years been in any way approximated.

The exhibition series has been greatly extended during the year by the work which has been done for the several expositions, numerous specimens having been mounted and labeled, which after their return may be placed at once on exhibition. Many objects have been acquired especially for use in this exposition work, which are equally desirable for the regular exhibition work of the Museum.

During this year, special improvements have been noted in the exhibition halls devoted to mineralogy, lithology and physical geology, metallurgy and economic geology, textile industries, fisheries, and naval architecture.

(c) *Construction of cases.*

It is hardly necessary to remark that no part of the work of the Museum at present occupies so much of my attention as the construction of cases, since the supply at present on hand is far from adequate to our needs. The "furniture and fixtures appropriation" which Congress has made annually since 1880 permits each year the building of a large number of cases. At the same time the capacity of the Museum building, with its laboratories and work-rooms, is exceedingly great, and up to the present time certainly not more than one-half of the requisite amount of case room has been obtained. In my previous report was given a statement of the number of cases in the Museum at the beginning of the year 1883. Appended is a list of the cases added during the year 1884:*

* Case C:

(1.3) Door-screen cases, 8.6 by 1.3 by 7.....	10
(2.2) Door-screen cases, 8.6 by 2.2 by 7.....	10
(9 in.) Door-screen cases, 8.6 by 9 in. by 7.....	1

Case D:

(1.3) Sliding-screen cases, 8.6 by 1.3 by 7.....	10
(2.2) Sliding-screen cases, 8.6 by 1.3 by 7.....	10
(2.6) Sliding-screen cases, 8.6 by 1.3 by 7.....	4

Case F:

Fold-screen cases (half pillar).....	10
Fold-screen frames.....	300
Slope-top cases.....	55
Slope-top cases.....	6

Case H:

Table upright cases.....	10
Table upright cases.....	6

Case I:

Unit-table cases.....	40
Unit-table cases.....	12

The names by which these cases are designated will of course be unintelligible to those who are not familiar with the nomenclature adopted in the Museum. Our system of case construction, which has been briefly discussed in previous reports, is entirely different from that in use in any similar establishment, and is admitted to be unusually economical and effective. We are constantly called upon by the officers of other museums for descriptions and working drawings. I have in preparation, and hope to present in the report for 1885, a full description, with illustrations, of the various methods of installation which have been adopted.

The main features of the plan are as follows: The cases are, as a rule, of mahogany, finished in the natural color, and have been constructed in accordance with artistic plans furnished by Mr. William Bruce Gray. Their chief recommendations are the following: (1) the building consisting practically of a single large hall; the cases are so constructed that they may be placed between any two adjacent pilasters, and thus form partitions dividing this hall into seventeen halls of lesser extent; (2) the cases are all of one length, 8 feet 8 inches,* which is the architectural unit of the Museum building, or are of such lengths that, combined together, they always conform to this unit, so that they are interchangeable; (3) the construction is such that, with very slight expenditure of labor, any one of them full of specimens can be transported from one part of the building to another, thus allowing great freedom in the matter of rearranging the Museum; (4) all the smaller specimens are mounted in groups upon small tablets or in glass-covered boxes of uniform size, which can be handled with great facility, and which afford great security to the specimens, and diminish immensely the labor of properly caring for them; (5) the objects are displayed against backgrounds which at the same time afford the greatest ease to the eye of the visitor and the greatest relief and effectiveness to the object dis-

Unit-table cases (terraced section).....	14
Table-top cases (movable).....	20
Case J. Unit drawers.....	1,386
Case K. Unit boxes.....	210
Case L. Wall upright cases, 10 by 10 by 9.....	1
Case M. Salvin bird cases.....	4
Case O. Basement drawer storage cases.....	21
Case P. Sectional library cases.....	6
Case S:	
Quarter unit-table cases.....	20
Kensington cases.....	20
Costume cases.....	1
Card catalogue cases.....	7
Manuscript cases.....	2
Manuscript drawers.....	421
Anatomical cases.....	1
Franklin press case.....	1

*As a matter of fact, the cases are made a little scant in length, to provide for convenient handling; they actually measure about 8 feet 6 inches.

played; (6) the objects being shown singly against a suitable background, and at the same time brought as close as possible to the glass front of the case, the sense of confusion, so often experienced in museums, is entirely avoided; (7) the labels are printed in large, heavy-face type and upon paper of soft tints, which are much less wearisome to the eye than the ordinary labels in black and white.

Important additions of storage cases and furniture have been made to the laboratories of several of the curators, and all the laboratories are now better supplied than ever before. The storage cases in some of these departments are built in four sections in height, occupying only the same floor space as the one-section cases and accommodating four times the quantity of specimens. Each curator is supplied with a light ladder, affording easy access to the upper sections.

The laboratories in which the greatest improvements have been made during the year are those of birds, fishes, mollusks, insects, invertebrate fossils, fossil plants, lithology and physical geology, minerals, and metallurgy and economic geology. The following statement shows the number and kind of storage cases and other furniture at present in use in the various laboratories

Ethnology:

Unit tables	14
Sectional library cases	1
Standard pigeon-hole stack	1
Quarter tables.....	12
Card catalogue cases	2

Mammals:

Sectional library cases	1
Standard shelf-stacks	3
Standard pigeon-hole stacks.....	4
Quarter tables	6

Birds:

Salvin bird cases.....	16
Sectional library cases	4
Standard pigeon-hole stacks.....	1
Quarter tables.....	29

Fishes:

Sectional library cases	8
Card catalogue cases	1

Mollusks:

Basement-drawer storages (1 containing 2 tiers; 1 containing 3 tiers).....	5
--	---

Insects:

Sectional library cases	11
Quarter tables	2

Marine invertebrates:

Sectional library cases	3
Standard pigeon-hole stacks.....	2
Quarter tables	4
Card catalogue cases.....	1

Fossil invertebrates (Paleozoic section):

Basement drawer storages (1 containing 3 tiers; 1 containing 4 tiers).....	2
Sectional library cases	2
Quarter tables	13

Fossil invertebrates (Mesozoic and Cenozoic section):

Basement drawer storages (1 containing 1 tier; 2 containing 3 tiers; 1 containing 5 tiers)	4
Sectional library cases	4
Standard shelf-stacks	2
Quarter tables	1

Fossil plants:

Unit tables	4
Basement drawer storages (1 containing 2 tiers; 1 containing 4 tiers; 2 containing 3 tiers)	4
Sectional library cases	1
Quarter tables	11

Lithology and physical geology:

Unit tables	1
Basement drawer storages (containing 4 tiers)	1
Sectional library cases	1
Standard shelf-stacks	4
Standard pigeon-hole stacks	6
Quarter tables	4

Minerals:

Basement drawer storages (1 containing 4 tiers; 2 containing 8 tiers; 1 containing 9 tiers)	4
Standard pigeon-hole stacks	1

Metallurgy and economic geology:

Basement drawer storages (containing 4 tiers)	1
Sectional library cases	1
Standard pigeon-hole stacks	5
Quarter tables	1
Card catalogue cases	1

Materia medica:

Basement drawer storage (containing 2 tiers)	2
Sectional library cases	1
Standard shelf-stacks	14
Card catalogue cases	1

The number of unit-drawers in use now exceeds 10,000.

(d) Preparation of labels.

During the year 1884 about 4,500 descriptive labels for the exhibition series were printed, besides several thousand forms of labels for the reserve and duplicate collections in the various departments. This has been accomplished through the courtesy and co-operation of the Secretary of the Interior. Much progress has been made toward labeling the exhibition series, particularly in the departments of Building Stones and Materia Medica, the labeling of collections in those departments being now practically completed. Many of the labels printed were for the objects sent to the expositions.

No changes were made in the general form of the labels. Slight modifications were in some cases necessary, in order to adapt the labels to special collections.

Large general labels, as also labels for some special collections, are printed upon a small press kept for the purpose in my office, while the

bulk of the descriptive labels are, as a rule, printed by the Interior Department. During the year 1884, however, the Museum office printed about 2,000 labels, or nearly one-half of all that were printed. These were chiefly labels for the collections sent to the expositions.

Of each descriptive label there are twenty copies printed, ten on cardboard (gray or herbarium) and ten on white paper; the former to be shown with the objects and for the reserve file, and the latter for making catalogues of the collections and for general distribution to donors and to other museums. The labels printed for the Fisheries collections which were sent to the London Exhibition in 1883 have been reprinted in Bulletin 27 of the Museum, and form a complete index to the numerous objects of fishing implements and vessel models composing the collections.

The care of the labels requires the entire time of one man. As soon as received from the printer, a sample of each label is put in the scrap-book series, as many as are needed for immediate use are sent to the curator in charge of the collections, and the remainder of the labels are filed in unit drawers, where they are arranged numerically by departments. An index is kept, by means of which a label, designated by its number, can be referred to at once in the scrap-book and files.

13. PROGRESS OF GENERAL AND INCIDENTAL WORK.

(a) *Library.*

During the past year the usefulness of the library has been gradually increasing, although no very important additions have been received. The additions for the year numbered about 700 books and pamphlets, including many works of permanent value and practical utility. Few purchases have been made, the principal sources of growth being through exchange, gift, and deposit. The various departments of the Government, especially those engaged in scientific research, have made many valuable contributions. The trustees of the British Museum have presented a large series of the catalogues and regular publications of that institution. Progress has been made during the year in the effort to classify systematically the books in the library, but the work has been greatly retarded owing to the insufficient force. The classification referred to is absolutely necessary for the proper administration of the library, and it is hoped that it may soon be practicable to provide adequate means for this purpose.

The library system may be briefly described, as follows: In the central library are retained all books treating of more than one subject, such as periodicals, proceedings of societies, serial reports, dictionaries, and encyclopedias, together with such monographs as are not desired in the sectional libraries, which are in the several Museum laboratories under the charge of their respective curators. To the sectional libraries are assigned only those works which relate directly to the work of the sec-

tion. Books in the sectional libraries are considered to be personally loaned to the curators in charge.

All books and other matters are first entered at the central library, and the necessary acknowledgment made, after which monographic works, upon application, are sent to the sectional libraries, their assignment being designated upon the card catalogue.

It is very evident that the efficiency of the curators, not only in the proper handling of the collections, but also in the preparation of the scientific reports, which constitute so prominent a feature in the work of the Museum, depends upon the completeness of the Museum Library. A certain sum should be set aside for the purchase of books, since many of those which are most needful cannot be obtained by exchange. The entire appropriation has hitherto been needed for the payment of salaries and the construction of cases, and for all books which have been bought the Museum is indebted to the Smithsonian endowment fund.

(b) *Distribution of duplicates and exchanges.*

The following table represents the number of boxes and packages of specimens distributed to museums and colleges, and in exchange with correspondents during the year, viz :

	Boxes and packages.
Mammal skins and skeletons	13
Birds' skins, nests, and eggs.....	86
Minerals	21
Reptiles	10
Marine invertebrates (in sets).....	48
Marine invertebrates (miscellaneous packages).....	34
Fossils.....	11
Pottery	7
Indian relics	17
Fishes	10
Crania	1
Plants	16
Casts (plaster).....	9
Rocks	2
Shells	4
Foods, etc	1
Materia medica.....	3
Total.....	293

The number of specimens contained in these boxes and packages amounts to 21,084. This table shows an increase in the work of this department, there having been distributed this year nearly 5,000 specimens more than in 1883.

During the year, 103 applications from museums, schools, and individuals in the United States for general natural history specimens have been filed, and a large number of these have been filled.

The number of packages of all kinds shipped to the New Orleans, Louisville, and Cincinnati Expositions amounted to 819.

In the report of the Department of Marine Invertebrates will be found a detailed list of the institutions to which the Fish Commission sets of duplicates of marine invertebrates were distributed during the year. References to the various exchanges made are also reported on by the several curators. A tabulated exhibit of what the Museum has done in the way of distributing its duplicates from the commencement of its history is very desirable, and will probably be prepared in time for the next report.

(c) *Publications.*

A complete list of the publications of the National Museum for 1884 is given in Appendix B, Part IV. During the year the last five signatures of Vol. VI and the first thirty-one signatures of Vol. VII appeared. Proceedings United States National Museum for 1883, Vol. VI, consisting of 558 pages and 14 plates, were published.

Bulletin No. 25, including seven parts, and forming Vol. I of Contributions to the Natural History of the Bermudas, and Bulletin No. 27, consisting of twelve parts and constituting a report upon the exhibit of the United States at the London Fisheries Exhibition, 1883, were printed.

Eight Museum circulars were printed as separates. These, including Nos. 24-31, will appear in Vol. VIII, Proceedings United States National Museum.

In Appendix B, Part IV, will be found a bibliographical list of the papers published during 1884 by officers of the Museum. These papers number 229 and are distributed among the several departments as follows:

	Papers by officers of the National Museum.	Papers by other investigators.	Total.
Arts and industries (including 26 papers on fisheries and fish culture)	30	1	31
Ethnology	20	3	23
Antiquities	8	1	9
Mammals	7	4	11
Birds	42	17	59
Birds' eggs	1		1
Reptiles and Batrachians	2	2	4
Fishes	26	32	61
Mollusks	9	1	10
Insects	23	2	27
Marine Invertebrates	5	5	10
Invertebrate fossils	9	1	10
Plants:			
Fossils	3		3
Recent	3	2	5
Mineralogy	2		2
Lithology and physical geology	11	1	12
Geography and exploration	19	3	22
Chemistry	7		7
Physiology and histology	6	1	7
Taxidermy	4		4
Bibliography	1		1
Administration	15		15
General	1		1
Total	259	76	335

In Part IV is a list of 76 papers based upon Museum material, written by investigators other than officers of the Museum.

(d) Visitors.

During the year the number of visitors to the Museum building has been 195,322, and to the Smithsonian building 91,130. The total number of visitors may, therefore, confidently be placed at considerably more than 200,000.

It may be noted that the interest of visitors in the collections appears to be increasing in full proportion to the progress which has been made in affixing descriptive labels.

The doorkeepers still continue the use of the automatic registers, which are proving much more satisfactory than the turnstile system usually employed in museums and exhibitions. The result of their record is given below in tabulated form.

Number of visitors to the Museum building for 1884.

Month.	Number of visitors.	Number registered.
January	15, 114	2, 207
February	21, 215	3, 321
March	20, 832	2, 938
April	21, 527	3, 092
May	25, 484	3, 716
June	11, 947	1, 486
July	13, 671	1, 516
August	17, 698	1, 838
September	13, 263	1, 645
October	12, 456	1, 520
November	10, 515	1, 223
December	11, 600	1, 380
Total	195, 322	25, 882

Number of visitors to Smithsonian building, 1884.

Month.	Number of visitors.	Number registered.
January	7, 007	1, 029
February	8, 781	1, 353
March	7, 743	1, 193
April	8, 012	1, 243
May	10, 319	2, 098
June	6, 379	1, 024
July	6, 392	997
August	10, 883	1, 442
September	6, 945	1, 072
October	7, 116	796
November	5, 310	702
December	6, 243	930
Total	91, 130	13, 879

Number of visitors to United States National Museum and Smithsonian Institution for 1882, 1883, and 1884.

Year.	Museum building.	Smithsonian building.
1881	*150, 000	-----
1882	†167, 455	152, 744
1883	202, 188	104, 823
1884	195, 322	91, 130

* Estimated on basis of register.

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

c) Students and lectures.

Reference has been made in previous reports to the arrangement by which, at the request of the Navy Department, the Institution received for three successive years six ensigns, and assigned them to duty in various sections of the National Museum for the purpose of enabling them to become acquainted with certain branches of science, such as chemistry, mineralogy, geology, ethnology, general natural history, &c., in order that in their subsequent cruises they might be more useful. Three details of the kind have been made, none, however, in 1884, the Department having found it inexpedient to continue the arrangement. Most of the gentlemen already detailed have also been reclaimed and assigned to duty. Two of these ensigns, Messrs. Miner and Garrett, are now on the Fish Commission steamer "Albatross." Ensign Hayden was detached in October and ordered to duty, first at the Cambridge Observatory, and subsequently to the United States Geological Survey.

The experiment in connection with these junior officers of the Navy has been very satisfactory as far as it has gone, and there can be no doubt that the increased range of information thus acquired by the eighteen gentlemen so detailed will be utilized to a considerable extent in the future.

The Museum is frequently favored by visits of men of science from other countries for the purpose of special inquiry into its methods, and an unusual number of such callers was welcomed during the past year in connection with a meeting of the British Association in Montreal. Several distinguished naturalists took the occasion to study the collections of the National Museum, which they found to contain many important types otherwise inaccessible to them.

Permission has been granted during the year to a considerable number of students of art to make copies of specimens in the Museum, and an increase in the number of schools visiting the Museum in company with their teachers has been noticeable.

As in previous years, the use of the lecture room in the Museum on Saturday afternoon during the winter and spring has been granted to a joint committee of the Biological and Anthropological Societies of Washington for the purpose of conducting a course of scientific lectures. These lectures are usually in some way connected with the work of the Museum, and are illustrated by specimens from the collections. They correspond in character closely to the afternoon lectures given at the gardens of the Zoological Society of London.

The programme of the year is here appended :

FIRST COURSE.

January 5, Mr. Grove K. Gilbert: Cliffs and terraces.

January 12, Prof. Otis T. Mason: Child-life among savage and uncivilized peoples.

January 19, Prof. Edward S. Morse: Social life among the Japanese.
 January 26, Maj. J. W. Powell: Win-tun Mythology.

SECOND COURSE.

February 2, Prof. F. W. Clarke: Lightning and lightning-rods.

February 9, Capt. C. E. Dutton, United States Army: The Hawaiian Islands and people.

February 18, Prof. John Murdoch: Eskimo life at Point Barrow.

February 23, Prof. Harvey W. Wiley: The sugar industry of the North.

THIRD COURSE.

March 1, Prof. Harvey W. Wiley: The sugar industry of the North.

March 8, Prof. Simon Newcomb: Psychic force.

March 15, Mr. John A. Ryder: Protoplasm in the light of recent investigations.

March 22, Dr. Frank Baker: The new phrenology.

March 29, Dr. D. Webster Prentiss: The bird-life of the District of Columbia.

FOURTH COURSE.

April 5, Prof. T. C. Chamberlin: The great ice invasion of North America.

April 12, Dr. W. W. Godding: What shall we do with the inebriates?

April 19, Prof. J. S. Newberry: The industrial arts as factors in modern history.

April 26, Maj. J. W. Powell: The cañons of the Colorado.

The lecture room was occupied on March 19 for the delivery of the ninth lecture of the Toner series by Dr. Charles K. Mills, of Philadelphia.

(f) *Meetings of societies.*

The lecture hall of the National Museum has been used during the year for sixty-eight meetings of different kinds, as is shown below.

National Academy of Sciences, April 15-17: Ten meetings were held. On the evening of the 17th a public meeting was held, at which the eulogies of deceased members were pronounced, 176 persons being in attendance.

American Surgical Association, April 30-May 3: Eight meetings were held.

American Fish Cultural Association, May 13-15: Seven meetings were held. Invitations were extended by the Commissioner of Fisheries to the fish commissioners of nineteen States, and a large attendance was the result. Many papers were presented, but the chief point of attraction was the opening to the public of the fisheries section of the Museum, as arranged after the return of a part of the collection from the International Fisheries Exhibition in London. The Brush-Swan Company

kindly furnished the lights to illuminate the entire building, especially the fisheries section, and a large number of visitors were present on the occasion. On the evening of May 13 a public meeting took place, Hon. Elbridge G. Lapham in the chair. The formal address was delivered by Hon. Theodore Lyman, of Massachusetts, who was followed by Hon. S. S. Cox, of New York, in a second address.

American Dental Association, July 22-23: Four meetings were held.

Society of American Taxidermists, July 30: One meeting was held.

Society of Naturalists of the Eastern United States, December 29-30: Four meetings were held.

The Biological Society of Washington: Fortnightly meetings were held between June 25 and May 31, and between November 1 and December 27. In all there were fifteen meetings.

The Entomological Society of Washington held three meetings in the office of the assistant director, on May 8, June 3, and November 3, respectively.

On January 11, permission was granted to members of the Argent Club, an association of amateur photographers, to hold their monthly meetings in the photographic laboratory of the Museum.

14. CURRENT ADMINISTRATIVE WORK.

(a) Buildings and labor, police and public comfort.

At the commencement of the year the administrative staff for police and inspection consisted of Henry Horan, superintendent of buildings, 2 assistant superintendents, 12 watchmen, and 5 doorkeepers; for construction, care of buildings, and repairs, 8 carpenters, 3 painters, and 1 mason; for labor and cleaning, 20 laborers, 2 attendants, and 4 cleaners. For heating and lighting there were employed 1 engineer and 4 firemen. The same system of Museum messenger-service as was adopted in 1883 is still in practice, and greatly facilitates the despatch of business between the offices of the divisions of administration and the officers and employés of the Museum. Two Museum messengers are now employed, it having been found impracticable for one to complete the round of the buildings within the necessary limit of time—one hour.

The following abstract of the report of Mr. Horan, the superintendent of buildings, is here presented, to give an idea of the manner in which the mechanics and laborers have been employed. The main features of the work mentioned by him and discussed elsewhere in this report form the standpoint of the general administration:

In the early part of January the exhibits of metals, ores, &c., transferred to the Smithsonian Institution at the end of the Centennial Exhibition in 1876 were brought into the Museum and assigned to their respective departments.

A great many heavy specimens were brought into the New Museum from the Smithsonian building during the early part of the year, including the Egyptian statuary, a pair of Haviland vases which were exhibited at the Centennial Exhibition, &c. Much time was also occupied during the first part of the year in shipping to their owners exhibits which had been sent to London in conjunction with the exhibit of

the National Museum. For instance, seventeen boxes were returned to the Signal Office, fifteen boxes to the Light-House Board, &c.

Toward the end of January it was found necessary to add to the force two carpenters, two painters, four laborers, and one fireman. In February and April further additions were rendered necessary.

During the latter month two additional carpenters, one painter, one stone-cutter, and ten laborers were employed. On account of lack of convenient quarters, it was found necessary in April to clear out a portion of the southeast court for the use of painters. The extra force was discharged on May 21.

On the 14th of May the entire force of laborers was very busily engaged in making preparations for the opening of the fisheries section, which took place in the evening of that date. It had been necessary for several days previous to keep the men at work until midnight, and it was only by most strenuous efforts that the fisheries hall was ready for the visitors a minute or two before the appointed time.

On the 10th of July the work of preparation for the Louisville and Cincinnati Expositions was commenced. Three extra carpenters were employed. On this day the construction of a workshop was begun in the grounds east of the Museum building for the use of the stone-cutters, and a few days later the ground was broken for the erection of an annex building, it having been found that the preparations for these expositions demanded more space than could possibly be found in the Museum building. This annex was finished on August 4, and the taxidermist's laboratory was immediately removed to it from the Museum building. A portion of the annex was allotted to the Bureau of Ethnology. On the 5th of August all the ethnological specimens in the northeast court were taken to the new building.

On August 6 the work of packing the Louisville exhibits was commenced in the northeast court, and on August 12 two car-loads, containing 112 packages, were shipped to the exposition. On the following day the superintendent left Washington for Louisville for the purpose of assisting in the reception and arrangement of the exhibits.

On August 26 two car-loads of exhibits, numbering 76 packages, were shipped to the Cincinnati Exposition, and the superintendent was also requested to go there and render similar assistance. During this month the force of laborers and mechanics was kept unusually busy, and at the end of the month the extra hands were all discharged.

On the first of September a small frame building was erected east of the stone-cutters' house for the purpose of poisoning skins, &c.

In the middle of October the National Museum received from the Botanical Gardens some very fine tropical plants, which have been placed around the fountain in the rotunda. Smaller plants were also arranged on the four balconies overlooking the rotunda. These plants have added very much to the appearance of the Museum.

On November 24 the work of shipping the exhibits intended for the New Orleans Exposition was commenced. On the 30th the superintendent left for New Orleans, in order to help in the arrangement of specimens.

The preparation of the exhibit for New Orleans necessitated a large addition to the force of mechanics and laborers, and during July 31 names were added to this roll, distributed as follows: 4 carpenters, 1 painter, 4 masons, 10 laborers, and 12 aids, assigned to various departments for special duty. In August this force was increased by 4 painters, 1 brass finisher, 1 laborer, and several aids.

During the absence of the superintendent at Cincinnati, Louisville, and New Orleans, Mr. C. P. Crandell acted in his place. On account of sickness Mr. Crandell was forced to temporarily resign his duties, and Mr. C. A. Steuart was then placed in charge.

(b) *Electric service.*

There have been no important additions to this service during the year, and a statement of the electrical apparatus now in use in the

National Museum will be found under this heading in the report for 1883.

The Superintendent of the United States Naval Observatory has included the Smithsonian building and that of the National Museum in the series of public establishments which receive telegraphic time at noon on each successive day, and a clock, fitted up under the direction of the Observatory, with an arrangement by which the Observatory itself corrects any aberration in time, has been supplied. The money expense has been borne by the Institution, but no charge has been made for the time service.

Through the courtesy of Colonel Rockwell, Superintendent of Public Buildings and Grounds, connection has been made with the underground telephone laid by his authority through the public grounds by the Waring Company. A special advantage in this was the opportunity of making a more satisfactory connection between the National Museum building and the United States carp ponds, a service that previously had been much interrupted. Connection was also made through the same trench with the Fire Alarm Telegraph Company, and the necessary permission to open North B street was promptly granted by the District Commissioners.

(c) Property and supplies.

The property clerk has, as hitherto, been in charge of and held responsible for all articles of furniture, and, in general, all Museum supplies, and has been required to inspect the same and report upon them to the Assistant Director. It is also his duty to keep in hand a stock of such articles as are in most general use, issuing the same to any person who presents a requisition duly endorsed. He is also required, when necessary, to buy special articles, whose purchase has been duly approved.

It is the duty of the property clerk to see that in the purchase of goods two points are especially attended to, viz: quality and price. If the cost of an article will probably exceed \$10, the property clerk is required to obtain estimates from several reliable dealers.

(d) Accounts.

Owing to the continued ill-health of Mr. George S. Hobbs, who had been in charge of this department, it was found necessary to relieve him of official duties, and on July 13 Mr. H. W. Spofford was engaged to fill his place temporarily, and also to assist Mr. William V. Cox, who was acting as financial clerk on the special exposition staff.

The administration of the Museum accounts has been carried on, as heretofore, under the direction of the chief clerk of the Smithsonian Institution, and all payments have been made through his office. A statement of the receipts and expenditures of the Museum will be found, as usual, in the report of the executive committee of the Board of Regents of the Smithsonian Institution.

(e) Chemical analysis of the air in the lecture room.

On several occasions it has been remarked that the air in the lecture room became exceedingly oppressive during the progress of meetings, lectures, &c. In order to verify these statements, Dr. J. H. Kidder, of the United States Fish Commission, was requested by Professor Baird to analyze the air during the progress of some of the Saturday afternoon lectures. Dr. Kidder's notes are here given in full:

ESTIMATION OF CARBON DIOXIDE IN THE LECTURE HALL OF THE
NATIONAL MUSEUM.

MARCH 1, 1884.

The hall is at the northwest angle of the building and measures $91\frac{1}{3}$ by $49\frac{2}{3}$ feet by $28\frac{3}{4}$ feet mean height.

	Cubic feet.
Total cubical contents.....	130,279.7
Less space occupied by 500 persons (in cubic feet).....	1,500
Less space occupied by screens and seats (in cubic feet).....	1,000
	<u>2,500.0</u>
	127,779.7

The lecture began at 3.30 and continued for three-quarters of an hour; most of the audience were present for a full hour. Its number, as estimated by the superintendent, was about 500. The hall had been scrubbed and ventilated as well as possible (but very imperfectly) during the day, and the screens freshly painted.

Out-door air was damp and cold, slightly below the freezing point. Air of lecture hall, at 9 feet from the floor, about the middle of the hall, was as follows:

	Dry bulb.	Wet bulb.	Relative humidity (100 = saturation).
One hour before lecture	61°	56°	72°
At close of lecture.....	65	58	83

Floor scarcely dry at beginning of lecture.

Carbon dioxide.—Eighty-six feet of rubber hose, one-quarter inch inside diameter, were washed for two hours by a continuous stream of tap water and strung upon the gas fixtures from a point 8 feet from the floor, near the center of the hall, to the uppermost room of the northwest tower. Air was pumped by aspiration through this tube from the hall, and after the residual air in the tube had been displaced, was collected in close bottles and examined, with the following results:

	Parts CO ₂ per 10,000
March 1, half an hour before lecture.....	8.67
March 1, half an hour after beginning of lecture	12.22
March 1, air of experiment room	13.04
February 29, out-door air (4 p. m.).....	3.97
March 3, out-door air through tube.....	5.54

The last estimation was intended to eliminate errors arising from impurities possibly derived from the long and narrow tube through which the air was collected. Since the out-door air in the afternoon has been found by numerous estimations not to vary materially from the normal average of 4 parts per 10,000, the correction due to the tube becomes 1.14, and the corrected results are as follows:

	CO ₂ per 10,000
Lecture hall half an hour before beginning of lecture.....	7.53
Lecture hall half an hour after beginning of lecture.....	11.08
Experiment room during lecture.....	13.04
Mean of outside air.....	4.00

If the hall had been an absolutely closed box, the increase in carbon dioxide due to the presence of 500 persons would have been about 300 cubic feet. The quantity observed (supposing the specimen to have been a fair sample of all the air in the hall) was 45 cubic feet, or about one-sixth of the possible increase.

Specimens were also taken for estimation of organic matter and other contents of the air, but are not to be depended upon as tests because of the length and narrow caliber of the collecting tube; since both solids suspended in the air and ammonia tend to adhere to surfaces, and particularly to moist surfaces.

So far as carbon dioxide can be accepted as an indication of contamination in air, these observations do not show an unwholesome condition of the air of the lecture room, but do indicate insufficient ventilation. For exact conclusions, specimens should be taken near the floor, near the ceiling, and about ten feet from the floor, at the beginning and end of the lecture, and compared with one another and with the outside air. Larger pipes, of metal, should be used for collection, unless specimens can be taken in the hall itself; and estimations of ammonia, both free and "albuminoid," should be made in addition to those of carbon dioxide.

FURTHER EXAMINATIONS OF AIR OF LECTURE ROOM.

MARCH 6.

An average of ten persons present. Outside air damp—melting of a heavy snowfall.

Time.	Dry bulb.	Wet bulb.	Relative humidity (100 = saturation).
12.20 p. m.....	58°	55°	81 in laboratory.
12.40 p. m.....	65	59	68 in lecture hall.
4 p. m.....	60	64	75 in lecture hall.
4.10 p. m.....	52	48	74 out of doors.

Carbon dioxide :

1 p. m., outside air, 4.6 CO₂ per 10,000 parts.

12.40 p. m., lecture hall, 10.04 CO₂ per 10,000 parts.

MARCH 8.

Out doors rainy. Lecture began at 3.30 p. m.; 700 persons present.

Time.	Dry bulb.	Wet bulb.	Relative humidity.
1.00 p. m.	62°	58°	77 in laboratory.
1.20 p. m.	45	44	92 out doors.
2.30 p. m.	69	64	75 lecture hall, before lecture.
5.00 p. m.	74	70	81 lecture hall, after lecture.

Carbon dioxide:

Mean of out-door air, 4. per 10,000.

3 p. m., lecture hall, 9.086 per 10,000, one-half hour before lecture.

4.15 p. m., lecture hall, 12.505 per 10,000, three-quarters of an hour after beginning lecture.

Persons present declared the air to be more oppressive than on March 1, but the figures show no material difference.* The highest essential impurity (as measured by carbon dioxide) appeared on March 6, when there was no lecture, and it is probable that if there had been a lecture on that day the highest figures for contamination by respiration would then have appeared.

Summarizing the several observations, they result as follows:

March 1. Temperature increased 4° F. during the lecture.

March 1. Relative humidity increased 11 per cent. during the lecture. (Floors had been wet before lecture.)

March 6. Temperature increased 4° during four hours in lecture hall.

March 6. Relative humidity increased 7 per cent. during four hours. (No lecture.)

March 8. Temperature increased 5° during lecture.

March 8. Relative humidity increased 6 per cent. during lecture.

March 1, CO₂ exceeded outside air 3.53 per 10,000 before lecture.

March 1, CO₂ exceeded outside air 7.08 per 10,000 middle of lecture.

March 6, CO₂ exceeded outside air 5.44 per 10,000 at 1 p. m. (No lecture.)

March 8, CO₂ exceeded outside air 5.086 per 10,000 before lecture.

March 8, CO₂ exceeded outside air 8.505 per 10,000 near end of lecture.

If this excess be all attributed to respiratory impurity, it has exceeded "the maximum amount of respiratory impurity permissible in a properly ventilated space" (Dr. Chaumont), viz, 2 parts per 10,000, by—

Parts per 10,000 before lecture March 1	1.53
Parts per 10,000 half through lecture March 1.....	5.08
Parts per 10,000 no lecture March 6.....	3.44
Parts per 10,000 before lecture March 8	3.086
Parts per 10,000 three-fourths through lecture March 8	6.505

The *increase* due to respiratory impurity on the two lecture days of experiment, while the lecture continued, was:

March 1. In half an hour, 3.55 parts per 10,000.

March 8. In three-fourths of an hour, 3.419 parts per 10,000.

* In the increase of CO₂ during the lecture.

The indication is that the ventilation is imperfect, not only during the lecture, but in the Museum generally, the permanent air showing at all times of examination too great an excess of CO₂ over that out of doors.

MARCH 10, 1884.

15. THE WORK OF THE MUSEUM PREPARATORS.

A number of additional preparators have been employed during the year, for special work upon the collections for the New Orleans Exposition, and an unusual quantity of objects for the exhibition series have been completed during the year in the workshops, as is shown in the review of the operations of the scientific departments.

(a) *Taxidermists.*

The main workshop, which is devoted chiefly to work upon the mammals, is under the direction of Mr. William T. Hornaday, chief taxidermist, and the general excellence of its work testifies to the efficiency of its staff. The preparation of the exhibit for the New Orleans Exposition added considerably to its work, and during the summer '83 specimens, representing 78 species, were mounted specially for the exposition.

During the year Mr. Hornaday and his assistants mounted 114 specimens, representing 91 species, and classified as follows:

Orders.	Specimens.	Species.
Primates.....	7	7
Chiroptera.....	17	16
Insectivora.....	1	1
Carnivora.....	33	28
Pinnipedia.....	1	1
Ungulata.....	5	5
Rodentia.....	38	27
Edentata.....	6	4
Marsupialia.....	6	2
Total.....	114	91

In addition to the work already specified, the skins of 57 mammals were removed and preserved. A collection of Australian fishes, consisting of 60 specimens, was repaired and repainted. Twelve fur-seals were repaired, and 24 large mammals were mounted on new pedestals. The large seal group, which had been sent to the Fisheries Exhibition in London in 1883, was reconstructed, and the collection of Ungulates renovated. Twenty-one specimens of birds, fishes, &c., were mounted, and two groups of small mammals made and set up.

By an omission in the records of last year the Museum failed to make acknowledgment to Mr. Hornaday for his gift of a mounted setter, valued at \$250, and to certain members of the Society of American Taxidermists for some 25 objects presented to the National Museum.

LIST OF THE MAMMALS MOUNTED IN THE UNITED STATES NATIONAL
MUSEUM DURING THE YEAR 1884.

PRIMATES.

- | | |
|-------------------------------------|--------------------------------------|
| 14261. <i>Cynopithecus niger</i> . | 12129. <i>Sapajou melanochir</i> . |
| 14247. <i>Cercopithecus ruber</i> . | 14230. <i>Cebus capucinus</i> ? |
| 14290. <i>Stenops tardigradus</i> . | 14338. <i>Chlorocebus engythis</i> . |
| 14309. <i>Ateles ater</i> . | |

CHEIROPTERA.

- | | |
|--|---|
| 6997. <i>Atalapha cinerea</i> . | 14411. <i>Artibeus perspicillatus</i> . |
| 7839. <i>Natalus stramineus</i> . | 6980. <i>Artibeus cinerea</i> . |
| 13376. <i>Anthrozous pallidus</i> . | 11206. <i>Artibeus planirostris</i> . |
| 7779. <i>Noctilio leporinus</i> var. <i>mastivus</i> . | 5418. <i>Sturnia lilium</i> . |
| 14262. <i>Molossus rufus</i> . | 13952. <i>Vesperugo noctivagans</i> . |
| 5201. <i>Vampyrus spectrum</i> . | 7011. <i>Artibeus</i> , sp. |

INSECTIVORA.

2211. *Scapanus Townsendi*.

CARNIVORA.

- | | |
|--|--|
| 14312. <i>Felis concolor</i> . | 12545. <i>Taxidea americana</i> . |
| 7812. <i>Felis onza</i> . | 13836. <i>Meles anakuma</i> . |
| 3573. <i>Canis lupus griseo-albus</i> . | 14155. <i>Lutra canadensis</i> . |
| 14570. <i>Canis latrans</i> . | 13842. <i>Lutroneutes Whitleyi</i> . |
| 14423. <i>Vulpes fulvus argentatus</i> . | 13822. <i>Ursus japonicus</i> . |
| 14634. <i>Urocyon virginianus</i> . | 13616. <i>Ursus americanus</i> ? juv. |
| 14393. <i>Urocyon virginianus littoralis</i> . | 13832. <i>Mustela melanopus</i> . |
| 13838. <i>Vulpes japonicus</i> . | 13966. <i>Procyon lotor</i> . |
| 13824. <i>Nyctereutes procyonides</i> . | <i>Procyon lotor</i> . |
| 14155. <i>Gulo luscus</i> . | 9068. <i>Nasua narica</i> . |
| 7202. <i>Putorius brasiliensis frenatus</i> . | 8622. <i>Nasua narica</i> . |
| 8008. <i>Putorius erminea</i> . | 7033. <i>Cereuleptes candivolvulus</i> . |
| 12671. <i>Putorius erminea</i> . | 14424. <i>Bassaris astuta</i> . |
| 14545. <i>Putorius vison</i> . | 11902. <i>Bassaris Sumichrasti</i> . |
| <i>Putorius vison</i> . (With trap.) | 14513. <i>Viverra zibetha</i> . |
| 13946. <i>Mephitis mephitis</i> . | 14366. <i>Galidia olivacea</i> . |
| 14427. <i>Mephitis putorius</i> . | |

PINNIPEDIA.

14021. *Phoca fœtida*.

UNGULATA.

- | | |
|------------------------------------|--|
| 14684. <i>Bison americanus</i> . | 14004. <i>Cervus macrootis</i> . (Head.) |
| 13991. <i>Ovis</i> , sp. | 13776. <i>Elasmognathus Bairdii</i> . juv. |
| 14116. <i>Cervus columbianus</i> . | |

RODENTIA.

- | | | |
|--|----------|--|
| 14328. <i>Sciuropterus volucella</i> . | } Group. | 13839. <i>Pteromys leucogenys</i> . |
| 14329. <i>Sciuropterus volucella</i> . | | 2349. <i>Sciurus niger</i> var. <i>niger</i> . |
| 14330. <i>Sciuropterus volucella</i> . | | 14429. <i>Sciurus fossor</i> . |
| 14341. <i>Sciuropterus volucella</i> . | | 12892. <i>Sciurus hypopyrrhus</i> . |
| 14270. <i>Sciuropterus volucella</i> . | | 12055. <i>Sciurus æstuans</i> . |
| 14271. <i>Sciuropterus volucella</i> . | | 9488. <i>Sciurus cinereus</i> . |

RODENTIA—Continued.

9432. <i>Sciurus aureogaster</i> .	14148. <i>Lepus timidus</i> .
95. <i>Sciurus</i> , sp.	14413. <i>Lepus californicus</i> .
2482. <i>Tamias striatus</i> .	14460. <i>Lepus americanus</i> Washingtoni.
2477. <i>Tamias asiaticus</i> Townsendi.	14348. <i>Lepus sylvaticus</i> sylvaticus.
9489. <i>Tamias Harrisii</i> .	14348. <i>Lepus sylvaticus</i> sylvaticus.
7371. <i>Tamias</i> , sp.	14348. <i>Lepus sylvaticus</i> sylvaticus.
2375. <i>Sciurus carolinensis</i> . (Albino.)	<i>Lagostomus trichodactylus</i> .
1445. <i>Spermophilus Douglasii</i> .	14461. <i>Dipodomys Philippii</i> .
1323. <i>Cynomys ludovicianus</i> .	13847. <i>Fiber zibethicus</i> .
1913. <i>Cynomys columbianus</i> .	14288. <i>Fiber zibethicus</i> .
13957. <i>Arctomys monax</i> .	14289. <i>Fiber zibethicus</i> .
12654. <i>Erithizon dorsatus epixanthus</i> .	14341. <i>Castor fiber</i> .
13621. <i>Erithizon dorsatus epixanthus</i> .	7017. <i>Spermophilus Franklini</i> .

EDENTATA.

13874. <i>Cholæpus Hoffmanni</i> .	12856. <i>Cholæpus Hoffmanni</i> .
8807. <i>Cholæpus Hoffmanni</i> .	11282. <i>Mymedon dorsalis</i> .
12101. <i>Bradypus castaneiceps</i> .	<i>Solenodon cubanus</i> . (Head.)

MARSUPIALIA.

14349. <i>Didelphys virginiana</i> .	14349. <i>Didelphys virginiana</i> .
14349. <i>Didelphys virginiana</i> .	14349. <i>Didelphys virginiana</i> .
14349. <i>Didelphys virginiana</i> .	11851. <i>Didelphys californica</i> .

SUMMARY.

Orders.	Specimens.	Species.
Primates.....	7	7
Cheiroptera.....	17	16
Insectivora.....	1	1
Carnivora.....	33	28
Pinnipedia.....	1	1
Ungulata.....	5	5
Rodentia.....	38	27
Edentata.....	6	4
Marsupialia.....	6	2
Total	114	91

Mounted expressly for the New Orleans Exposition, 83 specimens, 78 species.

LIST OF MAMMALS, IN THE FLESH, SECURED FOR THE UNITED STATES NATIONAL MUSEUM BY THE TAXIDERMIC DEPARTMENT DURING THE YEAR 1884.

PRIMATES.

14229. <i>Cynocephalus porcarius</i> .	14350. <i>Chlorocebus engythithea</i> .
14230. <i>Cebus</i> , sp.	14604. <i>Papio maimon</i> .
14235. <i>Cercocobus fuliginosus</i> .	14605. <i>Cynocephalus</i> , sp.
14247. <i>Cercopithecus ruber</i> .	14664. <i>Semnopithecus</i> , ? sp.
14256. <i>Cebus hypoleucus</i> .	14672. <i>Cynocephalus sphinx</i> .
14260. <i>Cercopithecus mona</i> .	14673. <i>Cynocephalus sphinx</i> .
14261. <i>Cynopithecus niger</i> .	14676. <i>Macacus cynomolgus</i> .
14263. <i>Cercopithecus mona</i> .	14688. <i>Macacus nemestrinus</i> .
14290. <i>Stenops tardigradus</i> .	14686. <i>Chlorocebus cynosurus</i> .
14309. <i>Ateles ater</i> .	14687. <i>Morimon maimon</i> .
14324. <i>Cynocephalus anubis</i> .	14704. <i>Cercopithecus</i> , sp.
14338. <i>Chlorocebus engythithea</i> .	14705. <i>Cynocephalus anubis</i> .
14339. <i>Prosimia mongoz</i> .	14234. <i>Cebus</i> , sp.

CHEIROPTERA.

14700. *Pteropus Edwardsii*. |

CARNIVORA.

14634. *Urocyon virginianus*. |13966. *Procyon lotor*. |14699. *Viverra malaccensis*. |14312. *Felis concolor*. |14337. *Felis leopardus*.14397. *Felis jubata*.14398. *Felis jubata*.

PINNIPEDIA.

14302. *Zalophus Gilliespei*. |

UNGULATA.

Oreas canna. |14326. *Tragelaphus scripta*. |44667. *Dicotyles torquatus*. |14706. *Phacochærus ethiopicus*.14702. *Cervus porcinus*.

RODENTIA.

14288. *Fiber zibethicus*. |14289. *Fiber zibethicus*. |14270. *Sciuropterus volucella*. (6 speci- |
mens.)14606. *Dipus hirtipes*. |14346-8. *Lepus sylvaticus*.14710. *Lepus americanus*.14711. *Lepus americanus*.14712. *Lepus americanus*.14713. *Lepus americanus*.

MARSUPIALIA.

14841. *Macropus gigas*. |

(Total. 56.)

MISCELLANEOUS.

2 *Grus leucogeranus*. |

1 Cassowary. |

1 Condor. |

3 Cockatoos. |

2 Parrots.

1 Japanese fowl (domestic).

1 Alligator 9 feet long.

MISCELLANEOUS TAXIDERMIC WORK.

Removed and preserved the skins of 57 mammals.

Repaired, repainted, and rearranged a collection of Australian fishes;
60 specimens.

Repaired 12 fur seals, and also pedestal.

Mounted 24 large mammals on new pedestals.

Reconstructed large seal group.

Renovated and repaired the collection of Ungulates, Felidæ, Ursidæ,
&c.

Renovated rug for President Arthur.

Mounted 1 large halibut.

Mounted 1 shark.

Mounted 8 birds.

Mounted 4 California salmon.

Mounted 4 smaller fishes.

Mounted 2 pairs elk antlers.

Mounted 1 elk-leg trophy.

Made 5 traps.

Made 2 groups of small mammals.

Packed New Orleans exhibit of mammals, and installed the same, the taxidermic exhibit and skeleton exhibit in the New Orleans Exposition.

Mr. Henry Marshall has been engaged upon his regular work—that of mounting birds—during the whole year. A large number were prepared for the New Orleans, Louisville, and Cincinnati Expositions. In his work he has had the valuable assistance of his son, Mr. George Marshall.

(b) Osteological preparator.

Mr. Lucas has devoted his time, under the direction of the curator of mammals, to the removal of the collection of mounted skeletons from the Smithsonian building and its arrangement in the east south range of the New Museum building. The two large whale skeletons have been suspended from the ceiling, and nearly one hundred skeletons, skulls, and other osteological specimens mounted and placed on exhibition. A large number of specimens have been cleaned and rendered available for study. The necessary work of caring for the numerous fresh specimens received has precluded the possibility of devoting very much time to the exhibition series.

During the summer, while preparations for the New Orleans Exposition were being most busily carried on, an additional assistant, J. W. Scollick, was assigned to this section.

In November, on account of the low condition of the New Orleans appropriations, it was found necessary to dispense with Mr. McCormick's services. Mr. Scollick was transferred to the Museum roll.

(c) Modelers.

Mr. Joseph Palmer has been engaged in his usual work of making casts. He has prepared for exhibition and set up in the Museum the plaster casts of George Washington, Benjamin Silliman, and also the bronzed plaster cast representing an Indian group. Several casts of fishes, Indian pipes, reptiles, &c., were prepared by him for the New Orleans, Louisville, and Cincinnati Expositions. Two large casts, one of the spiny shark and one of the sperm whale porpoise, have been made with the assistance of Mr. William Palmer, who also rendered valuable service in unpacking, setting up, and repacking the collections sent to the Louisville and Cincinnati Expositions.

Mr. J. W. Hendley has made progress in the preparation of casts of animal and vegetable foods. It is intended that these casts shall be exhibited in the Department of Foods, accompanied by a statement of the chemical composition of the objects which they represent.

(d) Photographer.

Mr. T. W. Smillie reports the addition to his files of 529 negatives during the year. The following instruments have been purchased: One large vertical copying camera; one small camera; one solar microscope, including one heliostat; one camera with various illuminators, diaphragms, &c.; and a series of objectives from $\frac{1}{2}$ inch to 4 inches. An electric light has also been added to the apparatus of this section, obviating the necessity of delays by reason of cloudy weather.

The apparatus in this section is extremely complete, and the photographic laboratory is now thoroughly equipped for all kinds of work. Several of the Government bureaus have recognized this fact, and have occasionally requested the permission of the Director to have certain scientific work performed here, some of which probably could not have been accomplished elsewhere. During 1884 Mr. Smillie has instructed a class of ten ensigns of the United States Navy. One of these accompanied the Greely Relief Expedition, and produced some very satisfactory results with a camera. Instruction has also been given without reserve to several scientific gentlemen who desired to acquire some knowledge of this art preparatory to their departure on various scientific expeditions.

As a special application of this art to Museum purposes may be mentioned certain work which has been performed for the Department of Building Stones. Negatives have been made of typical buildings, constructed of various kinds of stone. These have been enlarged on paper 30 by 40 inches, and colored according to the natural colors of the different kinds of stone. By means of polarized light photomicrographs were made from thin sections of stone. These were enlarged on glass and colored with transparent tints, thus presenting a picture of the section as seen with the microscope under polarized light. Specially noteworthy also were a number of photographic enlargements representing thirteen of the Government buildings in Washington. These are the largest single prints ever made, and have been found particularly effective at the New Orleans and Cincinnati Expositions, it being thought that in an exhibition of the work of the Government Departments, such as has been attempted this year by the United States Executive Board, it is particularly appropriate that the public buildings of Washington should be shown in an impressive manner.

The work accomplished in this section during 1884 is as follows:

Negatives taken	*463
Prints made	4,847
Medium size enlargements.....	66
Extra size enlargements (4 by 7 feet)	26
Enlargements on glass, colored.....	12
Enlargements on paper, colored.....	12
Cyanotypes	315

* In addition to this number 66 negatives were taken in the field.

In addition to this 2,200 plates have been numbered, and filed for future use.

(c) *Artist.*

Mr. A. Zeno Shindler has been engaged in painting casts of fishes, reptiles, &c., for the Museum and for the Louisville, Cincinnati, and New Orleans Expositions. He has also made numerous sketches in oil and water-color of certain specimens on exhibition in the Museum. Four full-sized Indian busts were also painted by him for exhibition at New Orleans in connection with the ethnological department of the Museum.

(f) *Preparators in the Division of Anthropology.*

Mr. E. H. Hawley has been for the greater part of the year engaged in mounting collections for the New Orleans, Louisville, and Cincinnati Expositions. During the early part of the year he also arranged for exhibition the collections received from the foreign exhibition, held in Boston during the latter part of 1883. In November and December eight valuable India cashmere shawls were mounted and placed on exhibition in the Museum. An interesting collection from the Dennison Manufacturing Company, consisting of the ingredients used in the preparation of sealing wax, together with the manufactured products, is being installed by Mr. Hawley; also, a magnificent collection of ostrich feathers presented by Mr. R. T. Bénè, and imported by Joseph Andrade and Company, and some fine specimens of walrus leathers received from F. W. Gesswein.

Mr. T. M. Sweeny devoted his time during the first half of the year to the mounting of ethnological objects for display in the National Museum. As soon as the Department of Ethnology was organized, in July, he was assigned as assistant to the curator, Prof. O. T. Mason.

16. WORK IN CONNECTION WITH THE EXPOSITIONS.

(a) *The Cincinnati, Louisville, and New Orleans Expositions.*

The participation of the Smithsonian Institution, as directed by Congress, in three exhibitions, has—although in many respects detrimental to the growth of the Museum—contributed largely to the prosperity of several of its departments. In the first place, in order that material might properly be selected for exhibition, it was found necessary in many departments of the Museum to employ additional assistants in making a thorough overhauling of the material and getting it systematically arranged. In the second place, it was found necessary to purchase a considerable amount of material to fill vacancies in the various series of specimens which were shown at the exhibitions.

It has been our policy to expend the appropriation for the New Orleans Exposition in such a manner that there also might result a per-

manent benefit to the Museum. This we have found to be entirely consistent with the interests of the exhibitions, since the material which is useful for these temporary displays is even more useful for the permanent exhibition series of the Museum. At the same time, in many of the departments an effort has been made, in selecting specimens for the expositions, to make use of duplicate material from the Museum, in order that, should we be called upon in future to participate in other expositions, the preparation of a collection can be effected with less expense of time and money than has been heretofore practicable.

In the report for 1885 I hope to include an extended account of the New Orleans Exposition, with special reference to the specimens acquired for the National Museum by gifts and exchanges.

The following statement will, however, serve to indicate the extent of the preparations made by the Smithsonian Institution for participation in the expositions at Louisville, Cincinnati, and New Orleans:

The following preliminary report upon the exposition work of the year has been prepared by Mr. R. Edward Earll, the head of the special exposition staff:

On July 7 Congress passed a bill authorizing the representation of the various executive departments of the Government, including the Smithsonian Institution and Department of Agriculture, at the World's Industrial and Cotton Centennial Exposition to be opened in New Orleans December 1, and to continue for six months. The bill further provided for an exhibit by each of the departments at the Southern Exposition to be held at Louisville, Ky., and at the Industrial Exposition at Cincinnati, Ohio. The bill authorized the appointment by the President of representatives for each of the departments, these to constitute a United States Executive Board, to whom all questions relating to the Government participation in the various expositions were to be referred. Each representative was to be charged with the preparation of an exhibit for his department, and the funds placed to its credit by Congress were to be disbursed under his direction. Mr. G. Brown Goode, Assistant Director of the U. S. National Museum, who had represented the U. S. Fish Commission at Berlin in 1880, and at London in 1883, was appointed to represent the Smithsonian Institution, including the U. S. National Museum and U. S. Fish Commission. Seventy-five thousand dollars were placed to the credit of the Institution for the preparation of exhibits for New Orleans, with twenty-four hundred dollars additional for Louisville and twenty-three hundred dollars for Cincinnati.

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, 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 portions of the building. The time being short, the work of preparing the exhibit was vigorously prosecuted, and on August 12 three car-loads, containing 95 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 were abundant in the State, and a graphic representation of such subjects as were supposed to be least familiar to the people of Kentucky. One of the prominent features of the exhibit was a large collection showing the processes 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-works, another 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 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; 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 a series of photographs 30 by 40 inches, neatly framed, classified, and mounted on screens. The natural-history collections included a representation 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 exhibits were carefully packed and a majority of them forwarded directly to New Orleans, a few being returned to Washington to be remounted, with 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 annually since 1873, a suitable and substantial brick building having been erected by the management. It is located in the heart of the city, and has annually a large attendance. For the season of 1884 the exposition opened on September 3, closing on the fourth of the following month.

As the space was mostly 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 to 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 80 cases of exhibits with a weight of 24,321 pounds was shipped on August 26, reaching the exposition at Cincinnati on September 1. A large force of men was at once set to work to unpack and arrange them, 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 appreciated by those who saw them. One of the striking features of the exhibit 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 art 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 with 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 taxidermy, including game and water birds, sparrows, and a few mammals, while a full series of Audubon colored plates of North American birds were framed and used for decoration. 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 largest series being solar enlargement having dimensions of 30 by 40 inches. In the fishery 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 of both American and foreign fabrics, from the cheapest to the most expensive. Two alcoves, which attracted considerable attention, were devoted to photolithographs of Japanese pottery, and a large collection of photographs showing the arts of the early Saxons.

As at Louisville, the collections were placed in charge of an attendant who looked after the interests of the department 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.

THE EXHIBIT AT NEW ORLEANS.

The preparations for the exhibit at New Orleans have been very extensive. Curators from the various departments of the Museum have been charged with the collection of material to illustrate their several departments at the exposition, and assistants have been employed in arranging and mounting the collections, which, as a rule, have been provided with printed or written descriptive labels.

The building for the display of the Government and State exhibits at New Orleans is 885 feet long and 565 feet wide. A strip 185 feet wide, extending entirely across the center of the building has been assigned to the Government departments, the Smithsonian Institution occupying an area of over twenty thousand square feet at the left of the principal entrance of the building.

The exhibit includes an archæological collection of considerable size; a large and valuable ethnological collection, confined chiefly to the Indians and Eskimo of North America; a collection of models showing the development of American ship-building; a collection of American and foreign textiles, and a large and valuable collection of autotypes representing the principal artists of the world. Adjoining the last is a collection of all of the important food-fishes of the country in plaster, a collection illustrative of the recent methods of fish culture and the more important forms of fish-ladders, together with tabulated statements of the nutritive values of fish and other aquatic animals. Next comes an extensive collection of animal products, showing the various methods of utilizing the hair, fur, feathers, scales, leather, flesh, bones, intestines, and excrements of various animals. Adjoining this, and serving as a connection between it and the natural history specimens, is a collection illustrating the various devices used in the capture of animals. The natural history collection includes specimens of the principal mammals, birds, and shells, the latter being arranged according to their geographical location, the molluscan life of the Atlantic coast, the Miss-

issippi basin, and the Pacific being shown separately. Seven cases are devoted to an extensive collection of minerals, while a large space is assigned to metallurgy and economic geology, including a collection illustrating the apparatus and methods of coal mining, and samples of the various grades of commercial coal.

The entire collection, occupying seventeen cars, was sent to New Orleans, where it is now being installed in as systematic a manner as possible, the educational idea being prominent in the arrangement.

During the progress of the several expositions many of the curators were in attendance for a short time, in order to give their personal attention to the installment of their exhibits. The Assistant Director left here on December 6, to be present at the opening of the New Orleans Exposition, and was thus enabled to superintend in person the installation of the Smithsonian exhibit so far as it was possible to complete this by the opening day. Mr. Henry Horan, superintendent of the National Museum, was detailed to attend to the three expositions at various times between August 13 and November 30, in order to assist in the arrangement of the cases. He also attended to the shipment from Cincinnati to New Orleans of the cases intended for display at the latter place.

INTERNATIONAL FISHERIES EXHIBITION OF LONDON.

The International Fisheries Exhibition of 1883 closed on October 31, and Mr. Earll, with his assistants, who were left in charge after my return, reached Washington soon after the beginning of the year, the last shipment of collections from London having already been received. The reception, unpacking, and installation of the collections which were prepared to be sent to London, together with the new material obtained from the collections of other countries at this exhibition, occupied a great deal of time in the early part of the year. As has already been mentioned, this work was completed in a preliminary manner in May, during which month the fisheries gallery was opened to the public. At the same time the gallery devoted to naval architecture—a department which also received great impetus in connection with the London Exhibition—was also thrown open. The fisheries collection will undoubtedly for some years stand as the first completed and most thoroughly arranged collection in the department of arts and industries. During the year a full catalogue of the collection, as shown in London, has been printed, which, although far from corresponding to the standard proposed for the Museum hand-books, will serve as a starting point for this series. This catalogue may be considered as a report upon the participation by the United States in the London Fisheries Exhibition. The report upon the general exhibition is now, as the law requires, in course of preparation, and will be presented to the Secretary of State during the coming year.

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

As in my last report, I here present a brief review of what has been accomplished in each department of the several scientific divisions. The curators' reports are given in full in Part II of this report. These are especially intended to embrace (1) a review of the important additions during the year; (2) a statement of the character of routine work employed in arranging and classifying the collections, and in preparing the exhibition and study series.

17. DIVISION OF ANTHROPOLOGY.

(a) Department of Arts and Industries.

The curator of this department is the custodian of all materials possessing anthropological significance, which are not elsewhere assigned. Its belongings are consequently somewhat heterogeneous and difficult to report upon, and its relations with the Department of Ethnology are so intimate that it is impossible to make a definite division between them. Certain collections belonging to this department are under the charge of other curators, the collection of building-stones being assigned to the department of lithology and physical geology, while all that relates to mining and metal-working is cared for by the curator of metallurgy and economic geology. Several sub-curatorships have grown up in this department, and certain other collections, especially those of architecture, musical instruments, and modern ceramics, together with the somewhat anomalous collection of historical objects, are at present assigned to this curatorship.

When, in 1857, the Smithsonian Institution assumed the custody of the collection of the United States Exploring Expedition, together with the miscellaneous material which had gathered around this nucleus, a great quantity of material was transferred to the Smithsonian building which has not to this day been classified and placed upon exhibition. The rapid growth, especially during the past decade, of the collections illustrating the ethnology of North American Indians, and especially of prehistoric objects from this continent, has absorbed the attention of all who were interested in this department of the Museum. The majority of the foreign ethnological objects are still, on account of lack of room, packed up or crowded together in a too limited amount of case-room. At the close of the Centennial Exhibition the Museum received from foreign Governments great quantities of material exhibited at Philadelphia, which, while possessing an undoubted ethnological interest, could not in many instances be displayed in the manner usually adopted in ethnological museums.

The material received from Philadelphia in 1876 was for several years stored in the Armory building. On completion of the present Museum

building, and before the collections could be transferred to it, it became necessary to decide by what method the stored material (other than zoological, botanical, geological, or mineralogical) could be most effectively classified for purposes of study and exhibition.

After a careful consideration of the methods of the large museums of Europe, the officers of the Museum agreed that the ordinary classification by races or tribes would in this case be less satisfactory than a classification based upon function.

The Report of the Smithsonian Institution for 1881, pages 117-122, and also Circular No. 13, of the National Museum, presented a provisional outline of the plan of classification for the Museum. This classification, while its purpose was to embrace every kind of object which could possibly be exhibited in the Museum, was especially full in those parts which related to the arts and industries, forty-nine out of the sixty-four primary classes relating to this group of museum material. The general idea of the classification, as there explained, is that the collections should constitute a museum of anthropology, the word "anthropology" being applied in its most comprehensive sense. It should exhibit the physical characteristics, the history, the manners past and present of all races civilized and savage, and should also illustrate human culture and industry in all their phases; the earth, its physical structure, and its products are to be exhibited with special reference to their adaptation for use by man.

Some experiments have already been made with reference to the feasibility of this plan of arranging the exhibition series, but I am not yet prepared to recommend its final acceptance; indeed the experience of three years has brought about many changes in the plan, and a revision is now being made by Professor Mason and myself.

The adoption of any plan of this general character would necessitate the grouping together, in continuous series, of objects which had never before been placed side by side in any museum. If the evolution of any given industry or class of objects is to be shown, the series should begin with the simplest types and close with the most perfect and elaborate objects of the same class which human effort has produced.

In the textile industry, for instance, at one extreme is shown the simple whorl of stone or terra cotta, used by savage or semi-civilized man, together with the archaic representative of the same, surviving among rural members of the most highly civilized races; these being supplemented by the threads and the simple woven fabrics produced by them; on the other hand, the steam spinning apparatus and the power and Jacquard looms.

Much attention has been devoted during the year to experiments for determining the manner in which the idea of this classification can best be carried into effect. It is not possible within the limits of this report to describe what has been done. In fact a full account of them at present would be premature. The practicability of the scheme can best be

judged upon by an examination of the one or two groups, such as the *materia medica* collection, the collection of musical instruments, and the portion of the costume collection, which are already partly installed.

The Department of Arts and Industries is not yet established upon the same footing as the others in the Museum, nor is it yet quite certain what form it will assume in the future. I shall therefore not undertake to present a formal report upon its operations, but shall submit in the appendix the reports of the curators of *materia medica*, textile industries, foods and naval architecture, and refer back to my report of 1883 for a statement of the character of the work which was in progress at the end of that year, and which has been continued during the present year, so far as the interruptions connected with exposition work have permitted.

The installation of the section of fisheries,* under the immediate direction of Mr. R. E. Earll, was actively carried on from January to May, and on the evening of May 14, at 7.30 p. m., the fisheries section of the National Museum was formally opened to the public. This occasion was one of special interest, from the fact that the collections in this section were the same that had been exhibited at the International Fisheries Exhibition at London in 1883, together with certain collections which had been acquired in London by gift and exchange. The building was illuminated by electric lights, fitted up for the occasion by the Brush-Swan Electric Light Company. The Director of the Museum held an informal reception in the north main hall. The number of visitors on this occasion was 2,033.

This section presents no special report, except in the form of the catalogue of the American section at the London Fisheries Exhibition, which is in fact an elaborate report upon everything in the section, and which is referred to elsewhere. At the New Orleans Exposition the Department of Fisheries was represented by about sixty of the large pictures prepared for the London Exhibition, and by about 200 casts of American food-fishes, which also had direct relation to the animal products collection just referred to. It was not deemed expedient to dismantle the general fishery collections so recently installed, for such a temporary interest as that of these exhibitions. The United States Fish Commission made preparations for a considerable display of fish-culture, and a representative collection of fish-cultural apparatus was sent from the Museum.

Mr. Hitchcock, the curator of the textile collection, has been principally occupied in exposition work, in connection with which he undertook the preparation of a collection of textile fibers and fabrics. Portions of this collection were exhibited both at Louisville and Cincinnati.

Captain Collins, on behalf of the Department of Naval Architecture, prepared a series of working models illustrating the development of

* Report U. S. N. M., 1883, pp. 16, 17.

the ship-building industry in the United States, and especially the evolution of the American schooner, the American pilot-boat, and the American cotton-ship. A number of full-rigged models were also sent in this connection, being exhibited on the way at Louisville and Cincinnati. The model of a whale-boat, fully equipped with all appliances for the capture of whales, was also sent. This model attracted much attention at the London and Berlin Fisheries Exhibitions.

The animal products collection, which was so prominent a feature in the exhibition of this Institution at Philadelphia, has been reorganized and greatly extended, so that it now represents very thoroughly the applications of animals to the uses of mankind in all parts of the world. This collection alone, if arranged in table-cases, would occupy a floor-space equivalent to that in one of the large halls of the new Museum building. The Museum has received many important gifts for this collection on condition that they be exhibited in New Orleans before being finally placed in the Museum.

A selection of about 250 of the celebrated autotypes published by Adolph Braun & Co., of Dornach, have been acquired for use at the exhibitions. This collection illustrates the history of painting from the time of Cimabue and Giotto, including copies of from one to six of the best representative works of each celebrated master so far as it was practicable to obtain them. This collection can be packed in a very small space, and is particularly well suited for sending away to exhibitions. It may in future be somewhat extended to good advantage.

(b) Department of Ethnology.

Prof. Otis T. Mason, for many years connected with the Columbian University, of this city, was appointed curator of this department upon the 1st of July. The Museum may well be congratulated upon the addition of this skillful ethnologist to its staff. Professor Mason, as is well known, was one of the first in America to embrace in his studies the entire subject of the natural history of man, or what is known now as the science of anthropology. His publications upon this subject, beginning with his paper upon the Leipsic Museum, published in the Smithsonian Annual Report for 1873; his articles upon ethnology in Harper's Record of Science and Industry from 1873 to 1877; the Smithsonian Record of Progress from 1878 to 1884; the directions for collectors for the Centennial Exposition, issued by the Indian Bureau in 1875; his lectures in the Saturday course, delivered in the Museum; also his papers presented to the American Association, and his contributions to the American Naturalist, extending over a period of twenty years, are all devoted to the comprehensive study of man.

He was the associate of the late Mr. Louis H. Morgan in organizing the anthropological section of the American Association in 1876, and was one of the founders of the Anthropological Society of Washington in 1879, writing its constitution.

A prominent characteristic of his work has been the introduction of regular scientific methods into anthropological inquiries, treating each savage art as the anatomist or embryologist treats his subject.

The energy of Professor Mason has already produced important results in that the ethnological collections, never before under control, have already been provisionally classified. In the present report are presented three papers emanating from this department—on the basketry, throwing-sticks, and bows in the National Museum—and it is much to be hoped that the method of investigation and publication foreshadowed in these papers will be prosecuted until the discussion of the whole round of savage art as exemplified in our collections shall have been completed.

During the year 3,658 specimens belonging to primitive races have been received. In addition to these this department has been intrusted with many objects registered in other catalogues and deposited here for the sake of completing evolutionary series of implements, processes, and art products. The most noteworthy accessions in 1884 were as follows:

Illustrations of Eskimo and Indian life, from Ungava Bay and vicinity, by Lucien Turner, who will prepare a monograph upon the specimens.

Illustrations of Eskimo life at Point Barrow, collected by Lieutenant Ray, U. S. A. Mr. John Murdoch will describe these.

Rich collections from the Eskimo of Western and Southern Alaska, by E. W. Nelson, W. J. Fisher, Charles L. McKay, and Baron Norden-skjöld.

Specimens of the arts of the tribes of Northwest America, collected by James G. Swan and Lient. T. Dix Bolles.

Many objects illustrative of the modern Indians of Yucatan, by Louis H. Aymé.

A very large and instructive collection of objects from the Peruvian huacas, by George W. Keifer, and Dr. William H. Jones, U. S. N.

A collection of weapons &c., from New Guinea, purchased from A. P. Goodwin.

An exchange series of weapons from Polynesia, contributed by Charles Heape.

During the year illustrative series of ethnological objects have been exhibited at Cincinnati, Louisville, and New Orleans, care being taken in each case to impress some ethnological truth, such as distribution of types, the effect of environment, the treatment of the same art by different tribes, or the progress of an art from its infancy to its highest manifestation. This special collection was displayed in 120 unit boxes, 17 double unit boxes, 37 costume boxes, and 2 slope tables. In addition, 1 model of an Eskimo house, 1 model of a Haida house, and 2 Indian busts were sent.

(c.) Department of American Prehistoric Pottery.

Mr. William H. Holmes, having been assigned by the director of the Bureau of Ethnology of the Smithsonian Institution to the work of preparing a report upon American aboriginal pottery, has been appointed honorary curator of this section of the Museum. He has been engaged during the year in classifying the entire collection and in preparing the exhibition series. The northwest court, which has been assigned to this section, will be opened to the public as soon as cases can be provided and the specimens installed. More than 10,000 specimens have been added to this department during the year. By far the most prominent among the contributors is the Bureau of Ethnology, which has added 6,000 pieces of pottery to this department. A magnificent accession of 3,000 vases from the tombs of Chiriqui was bought from Mr. J. C. McNeil, and a very valuable collection from Peru has been received through the agency of Dr. William H. Jones, U. S. N.

(d.) Department of Antiquities.

The Department of Prehistoric Antiquities, under the charge of Dr. Charles Rau, has kept pace with all the others in growth and general progress. The present somewhat unsettled condition of the upper main hall of the Smithsonian building, in which these collections are exhibited, is due to the fact that the arts and industries collections, formerly placed here, have not been entirely removed, owing to the lack of exhibition cases in the new building. The arrangement of the gallery of antiquities is, however, as far advanced as any in the Museum. To as great an extent as opportunity and case-room have permitted, Dr. Rau has carried out his double system of arrangement, placing in one extensive series, which is for the most part exhibited in flat cases, collections grouped according to material and form, enabling visitors to take in at a glance "the whole culture of prehistoric North America, in so far as can be represented by tangible tokens." In another series are placed special collections, including the articles found in given single localities, whether mounds, graves, or shell-deposit districts. It is in the arrangement of these special collections that the most noticeable changes have been made.

Here, as elsewhere, the preparations for the New Orleans Exposition have seriously interfered with the general work. An extensive educational series of stone implements, illustrating American archæology, has, however, been prepared, and casts have been made of every characteristic form of stone implement. The collection, when complete, will constitute, in fact, a set of illustrations in actuality of the text of Dr. Rau's paper entitled "The Archæological Collection of the United States National Museum,"* and the work, which has been done well, will be of

* Published by the Smithsonian Institution, 1876, as No. 287, Smithsonian Contributions to Knowledge.

service not only for future exhibitions, but in the preparation of typical collections to be distributed to educational institutions.

The number of accessions during the year amounted to 5,441, and the total number of specimens in the collection is 45,252, of which 8,522 are duplicates. The principal literary product of the department has been a work upon prehistoric fishing in Europe and North America, prepared by the curator.

18. DIVISION OF ZOOLOGY.

(a) *Department of Mammals.*

Notwithstanding the absence of the curator, Mr. Frederick W. True, in Europe during the first quarter of the year, and other diversions of his attention and time to routine work not connected with his regular duties, the progress of this department has been exceedingly satisfactory. The work upon the exhibition series has been hampered by the fact that money has not been available for the construction of the desired cases in the mammal hall. The collection is now, for the first time in many years, thoroughly classified and under control, and the total number of skins and alcoholic specimens is reported to be 5,604, of skulls and skeletons 4,212, making a total of 9,908.

The accessions of the year have, in number, variety, and importance, been fully equal to those of earlier periods. No less than 38 specimens, including such rare and peculiar forms as the eland, harnessed antelope, cheetah, two species of lemur, wart-hog, and baboons, have been received from the proprietors of zoological gardens and menageries, for which due acknowledgments are given in the Museum report. An unusual number of cetaceans and seals, many of great novelty and interest, have been received from various sources. The amount of taxidermic work accomplished has been unusually great, owing to a special allotment for the employment of extra help, made from the appropriation for the New Orleans Exhibition, 149 specimens in all having been added to the mounted series, including several large forms such as the buffalo, puma, jaguar, and beaver.

(b) *Department of Birds.*

This year is shown by the report of Mr. Ridgway to have been one of unusual activity in the Department of Birds. The collections have been entirely rearranged, and the exhibition series is receiving a complete overhauling. Over 1,200 skins have been mounted, and several hundred of them fastened on walnut stands. Copy for 1,000 labels has been prepared. The total number of specimens in the reserve series is 50,350, 6,800 of which are in the exhibition series. In this, as in several other departments, the main direction of effort during the year was towards the preparation of the special exhibit of North American game-birds for the New Orleans Exposition, comprising 171 specimens, repre-

senting 123 species. Considerable time was also spent in unpacking and installing the exhibits which had been sent to the International Fisheries Exhibition, London, in 1883.

Mr. Ridgway reports that the year has been unprecedented in the extent of the accessions. The number of birds added during the year is 8,142, 2,658 skins having been distributed. Of this number 94 specimens were collected during the cruise of the United States Fish Commission steamer Albatross among the West India Islands; 675 specimens, mainly from Japan, and presented by Capt. T. W. Blackiston; 473 specimens from the British Museum; 768 specimens from Alaska and 21 specimens from Arizona, collected by E. W. Nelson; 256 specimens, chiefly from India, received from Mr. R. Bowdler Sharpe, of the British Museum; 84 specimens presented by Dr. Leonhard Stejneger; 478 specimens from Northern California, and 55 specimens from the Farallone Islands, collected by Mr. Charles H. Townsend; and 1,705 specimens from Ungava, Labrador, collected by Mr. Lucien M. Turner. Many other large and valuable accessions were also made, as will be seen by referring to the list of accessions in the report of the curator. Nearly 3,000 specimens were sent out in exchange or loaned for examination.

Birds' eggs.

The collection of birds' eggs has been overhauled and rearranged by Capt. Charles E. Bendire, U. S. A., the honorary curator of this department, who has also presented to the Museum his magnificent collection of about 8,000 eggs. The grand total of specimens in this section is 40,072, of which 35,800 are North American. This collection now represents nearly all that is known of American oology, and contains 40,072 specimens, of which 4,272 are foreign.

A large collection of 468 specimens was received from Dr. James C. Merrill, U. S. A. Other important accessions were made by Mr. E. W. Nelson, Lieut. P. H. Ray, U. S. A., Dr. Leonhard Stejneger, Mr. Charles H. Townsend, Governor Feucher, of Godthaab, Greenland, and others.

Forty-five specimens were exchanged or loaned for examination.

(c) Department of Reptiles and Batrachians.

Extensive and valuable additions have been made to the collections of this department during the year. Dr. H. C. Yarrow has continued to serve as curator in the capacity of volunteer. It has not yet been found practicable to assign any space in the Museum for the exhibition of these collections, and owing to the already crowded condition of the new Museum building it is feared that no exhibition space can be assigned to this department until the Museum shall have been enabled to extend its walls. During the summer the curator visited Utah for the purpose of scientific study, and while there collected many interesting

specimens of reptiles, which were added to the Museum collections. The principal accessions to this department in 1884 were made by Capt. Charles Bendire, U. S. A., Mr. Charles H. Townsend, Mr. C. J. Hering, and by the scientific staff which accompanied the United States Fish Commission steamer Albatross on her cruise to the West Indies.

(d) *Department of Fishes.*

The work upon this extensive and unwieldy collection has made fine progress during the year. The curator, Dr. Bean, has nearly completed his card catalogue of the reserve series, and during the summer Prof. D. S. Jordan was employed, in the interest of the New Orleans Exhibition, in selecting out a special exhibition series to include all the fresh-water fishes of the United States, and to make a special collecting trip through the Mississippi Valley, with the view to supply such species as were lacking in the collection. This trip has been of great importance to the science of ichthyology, bringing to light very many important facts concerning the fishes of a region not previously explored ichthyologically, and throwing much light upon the whole subject of distribution. Out of the 560 fresh-water species known to inhabit North America, the Museum now has all but 49, 30 having been added by this trip, and some 25 new species having been brought to light.

Of the 93 accessions to this department during the year 34 are regarded as of great value. A large collection was received from Mr. L. M. Turner. The U. S. Fish Commission contributed fifteen bottles of deep-sea forms, including at least 20 new fishes from the deep-sea fauna. These were of great value. Prof. D. S. Jordan sent a collection of Venetian fishes containing 23 species; a large collection of fishes from Cuba and Florida, containing many new species; a collection of fresh-water fishes from Southern Missouri, Kansas, Arkansas, Indian Territory, Indiana, &c. The curator added to the collection of this department 63 species of marine and fresh-water fishes from Great South Bay, Long Island, and vicinity.

The total number of entries in the catalogue during the year was 3,015.

During the year 127 drawings of fishes were added to the portfolio, 117 of which were made by Mr. H. L. Todd, and 10 by Miss. M. M. Smith, whose ability for this work is very decided.

Forty-one papers based upon material belonging to the department were published by signatures in the Proceedings of the National Museum for 1884.

The number of specimens in the collections is estimated at about 68,000, of which 36,000 are in the reserve series, 21,000 on exhibition, and some 12,000 duplicates.

A laborious and slow operation has been the transfer of the specimens from the old tanks into new ones and into glass jars.

(e) Department of Comparative Anatomy.

A Department of Comparative Anatomy is being organized, under the charge of Mr. Frederick W. True, and the east-south range has been fitted up with a set of cases especially constructed after new designs for the reception of the preparations. Mr. Lucas, with his two assistants, has been engaged during the latter part of the year in mounting skeletons, and fully 150 fine preparations have been put on exhibition. The report of Mr. True upon the plan of organization will not be presented until next year, since much preparatory work remains to be done. A case illustrating the work in this department was sent to the New Orleans Exposition.

(f) Department of Mollusks.

Mr. W. H. Dall, who has for many years had charge of the collection of mollusks, having been appointed one of the paleontologists of the Geological Survey, and assigned to the Department of Quaternary Mollusks, has, by the request of the Director of the Survey, been assigned working-rooms in the Smithsonian building, and will continue to care for the department as heretofore, access to the collections of recent shells being necessary for comparison with the shells of the Quaternary beds, which are, for the most part, specifically identical. Prof. R. E. C. Stearns, late of the University of California, has been assigned to this department as adjunct curator, and since the 1st of July there has been great activity in rearranging the collections. It was decided to make an extensive display of the mollusks of the United States at the New Orleans Exposition, and the well-known Stearns collection of mollusks, for which negotiations had been in progress for some years, was purchased from the exhibition appropriation. Professor Stearns had in charge the preparation of the series for New Orleans, which occupied his time from July until the end of the year. This occupied twenty large cases, and exhibits the economic mollusks of both coasts and the adjacent seas, and the fresh-water mussels which form so remarkable a part of the fauna of the great Mississippi basin. Mr. R. Ellsworth Call has been employed for six months in connection with the New Orleans work, and by the efforts of these three conchologists, with the help of two clerks, much progress has been made toward getting under final control the immense mass of material in this department.

The identification of the specimens representing the American land shells has occupied the attention of the curator. He has also devoted himself to the study of the deep-sea forms obtained from the Gulf of Mexico and the Caribbean Sea by Prof. Alexander Agassiz.

It is Mr. Dall's opinion that, when the mass of material which yet remains to be examined has been classified, the national collections, as far as the fauna of North America and its adjacent seas is concerned, will not be surpassed by any other collection in the world.

The most important accessions to this department in 1884 were presented by Henry Hemphill, the United States Signal Office, Dr. Leonard Stejneger, Rev. E. Lehnert, Dr. William H. Jones, U. S. N., and R. Ellsworth Call.

(g) *Department of Insects.*

Prof. C. V. Riley has, as in previous years, voluntarily assumed the care of the entomological material which has come in, and his own valuable and constantly-increasing collection remains a deposit in the Museum. A collection of insects injurious to forest trees, mounted in Museum cases, in the style which it is proposed by Professor Riley to adopt in the arrangement of our exhibition series when the opportunity comes, was sent to the International Forestry Exhibition in Edinburgh and received a gold medal. Fifty-five accession lots were received during the year, the most valuable being the collection made by L. M. Turner, at Ungava Bay, H. B. T.

There were 55 accessions to this department during the year, of which the collections made by Mr. Lucien M. Turner is perhaps the most valuable.

The curator was called upon by the Department of Agriculture to prepare an exhibit for the New Orleans Exposition, and it was agreed that upon the return of this exhibit to Washington it should be incorporated with the Museum collections. It is hoped that the financial condition of the Museum will soon warrant the placing of this very important and long-neglected department upon a footing of equality with the others.

(h) *Department of Marine Invertebrates.**

In the Department of Marine Invertebrates, exclusive of the mollusca, under the charge of Mr. Rathbun, 240 cases or specimens, enumerated in 72 accessions, have been added during the year. Of these, the most important have been received from the United States Fish Commission, from Dr. Edward Palmer, a collector employed in the interest of the New Orleans Exhibition, and from various naval sources. The Fish Commission collections are mainly illustrative of the recent deep-sea explorations of the steamer Albatross, off the eastern coast of the United States, and in the Gulf of Mexico and Caribbean Sea, and contain many new additions to science, which have been worked up only in part. They fill several thousand jars and vials. The collection of Dr. Palmer was made for the purpose of representing, at the World's Fair in New Orleans, the varied animal resources of the coral reef and sponge regions of southern and western Florida. It consists for the most part of finely prepared specimens of commercial and other sponges, ornamental corals, and the larger species of crustaceans and mollusks used as food, and required 65 large shipping cases to transport it to Washington. Supplemental to this is an extensive collection made by Mr. Henry Hemphill on the western coast of Florida.

* Exclusive of the mollusca.

Among the more interesting of the naval contributions are several collections of crustaceans and echinoderms obtained by Dr. W. H. Jones, U. S. N., in different parts of the Pacific Ocean. A number of valuable collections, carefully identified, have also been received from competent European authorities, and will be of great service in the elaboration of new materials contained in the Museum.

The increase of accessions to this department has been so great during the year, especially by reason of the material furnished by the Fish Commission, that, even with the aid of three or four assistants, little more could be done than to take care of the new material.

(i) *Department of Invertebrate Fossils (Paleozoic Section).*

The collections of this department are arranged in 13 unit table cases, and in office trays equivalent in capacity to as many more. Mr. Walcott estimates the total number of specimens at 25,000, including the old Smithsonian collections, and the accessions from the recent Government surveys and other sources up to the present time. The most important accession of the year is that of Devonian and Carboniferous fossils from the United States Geological Survey, many of them types of new species, and forming the basis of Mr. Walcott's recent report upon "The Paleontology of the Eureka District, Nevada."

Mr. Walcott has devoted his time chiefly to the identification and labeling of the accessions, and has, as far as possible, advanced the work of arranging the old collections of the Smithsonian Institution. Inasmuch as the curator holds the position of paleozoic paleontologist of the United States Geological Survey, it is impossible that progress in the work upon the Museum collections can be as rapid as would be the case were it practicable for Mr. Walcott to devote his entire time to these. It must, however, be remembered that these result, from his work in connection with the Geological Survey, in many important additions to the Museum collections.

A comparison between the unassorted condition of the collections under Mr. Walcott's care in the winter of 1883 with their present state of classification and arrangement makes evident the fact that this department is among the most highly developed in the Museum.

(k) *Department of Invertebrate Fossils (Meso-Cenozoic Section).*

The accessions of the year in this department consist of 85 boxes from the Geological Survey, embracing collections made in California, Oregon, New Jersey, Florida, Alabama, and Mississippi, and 15 miscellaneous lots sent from private sources to the Museum. The catalogue numbers 1,158 entries. From Dr. White, the curator of this department, as from many others, there comes a request for more room; these requests we are striving to grant as rapidly as the appropriation for the construction of cases will allow, but it is doubtful if the necessities of the case can be fully met until a new building can be put up.

Dr. White is preparing a complete index of all the mesozoic and cenozoic invertebrate fossils of North America. A catalogue of all the type-specimens of the mesozoic and cenozoic species belonging to the Museum, is nearly completed.

19. DIVISION OF BOTANY.

(a) *Department of Plants, Fossil and Recent.*

The collection of fossil plants now contains 923 distinct species identified and installed. The report of Prof. Lester F. Ward contains elaborate statistics of the collection, from which it appears that 7,291 specimens have already been catalogued. The accessions of the year have been of but slight importance. The Joad collection of recent plants has not yet been unpacked, owing to lack of room, but will soon be arranged and in proper condition for study. During the year Mr. William R. Smith, superintendent of the Government botanic gardens, has placed in the rotunda of the new building a number of very beautiful palms, which add very much to the attractiveness of the apartment, and which, having been selected with reference to their economic importance to man, will, when labeled, furnish instruction as well as pleasure to the visitors.

Through the assistance of Mr. Frank H. Knowlton, the curator has been enabled to classify and catalogue a large mass of unsorted material which has accumulated in this department.

20. DIVISION OF GEOLOGY.

(a) *Department of Mineralogy.*

Considerable progress has been achieved in the development of this department. The curator has performed valuable work in instituting scientific investigation upon specimens, the results of which have been valuable to the Museum.

During the year the growth of the collections has been steady and encouraging, the work of installing the collections has been definitely begun, and a system of exchanges has been fairly inaugurated. The reserve series contains 5,881 specimens, and the duplicate series, 5,883.

The accessions have been large and numerous. The most important is that of Mr. Joseph Willcox, Media, Pa. This collection consists of about 1,400 specimens, and is in some respects one of the finest in America. The collection of Col. J. J. Abert, presented by his son, J. T. Abert, and consisting of 1,245 specimens, is also of great value and interest.

An allotment of \$2,500 from the New Orleans appropriation was devoted to building up the collection of gems and ornamental stones. The schedule adopted included all the gems proper, rock crystal, agates and jaspers, malachite, lapis-lazuli, &c., and every important gem or ornamental species was secured both in the rough and cut conditions.

About 1,000 specimens are on exhibition at New Orleans, of which nearly one-third are cut and polished stones. A part of this collection was exhibited at Cincinnati, where it was awarded a silver medal. In connection with the New Orleans work, two important collecting trips were made by Mr. Yeates to northern New York, and the Hot Springs of Arkansas. The total number of specimens in the collection is estimated at 15,288. The curator, while in the field in connection with the United States Geological Survey, did excellent work for the Museum. Many good things were also obtained through exchange.

(b) *Department of Lithology and Physical Geology.*

The accessions to this department, which is under the curatorship of Mr. George P. Merrill, have been very numerous. The total number of entries amounts to 2,541, including not less than 300 specimens administered upon during the year. Important contributions have been received from 107 sources, besides many others of minor value. The most prominent donations to the department were a series of rocks and tufas from Utah, Nevada, and California, collected by Mr. I. C. Russell and transferred by the Geological Survey, and a large collection of building-stones from Mr. John S. F. Batchen; Messrs. Wharton, Houghton, Bartlett, and Marshall, Messrs. Abbott and Stearns, Lieut. G. N. Stoney, Mr. J. S. Diller, Dr. T. M. Chatard, the Esperanza Marble Company, Mr. L. J. Griffin, Mr. A. C. Proctor, Bowker, Torrey & Company, Messrs. Dimond & Hall, and Prof. Thomas Robinson, also made valuable contributions. Mr. Merrill prepared a large and important series of specimens of the building and ornamental stones of the United States for the New Orleans Exposition, comprising 358 specimens, an educational series of rocks, containing 500 specimens, and a collection of rock-forming minerals. In this work he had the efficient assistance of Mr. L. H. Merrill, and the services of a number of stone-cutters for some months. In addition to this work, 1,557 descriptive labels were printed and 200 thin sections of rocks prepared.

The exhibition series of the lithological collections comprises about 800 specimens, and this number can easily be doubled as soon as cases are provided. Some of the beautiful colored photographic enlargements on glass, illustrating the structure of twelve selected types of rocks, were among the most striking products of the year's work in Mr. Merrill's laboratory and are of very great educational value. As a supplement to the building-stone collection, a set of photographic negatives of some of the more important stone buildings in the country has been made, and from them enlarged prints (30 by 40 inches) have been prepared and colored, showing the appearance of various kinds of building stones used in architectural work.

The most important collections in the Department of Physical Geology are: the collection of lavas from Ice Springs Butte, Utah; two specimens of glacial polished mica from Prof. F. W. Clarke, and one large

block of glacial polished marble, a gift of the Gouverneur Marble Company.

The total number of specimens in the reserve series is estimated at 15,000, of which some 3,000 are on exhibition. Of these 4,246 are building or ornamental stones, 1,658 of which are on exhibition. The number of specimens in the duplicate series is about 3,000.

(c) *Department of Metallurgy and Economic Geology.*

An immense amount of work has been performed in this department during the year. The curator, Mr. Fred. P. Dewey, divides the material administered upon and collected during the year into four classes: (1) those received as accessions in the usual way; (2) those received from the permanent exhibition in Philadelphia; (3) those received from the Boston Exhibition, and (4) the material specially collected for display at the New Orleans Exposition. The collections embraced under the last head were very numerous and valuable. A series of 87 specimens, representing the occurrence of placer gold at most of the prominent regions, was purchased, and is the most full and complete collection of its kind in the country. The early part of the year was devoted to administration upon great quantities of material which had been accumulating for many years, and was stored away in the southwest court. From this source alone 7,540 new specimens were added to the collections of the department. Not less than 9,500 specimens have been placed on exhibition, and the total number of specimens in the department is estimated at 40,000.

Since July, Mr. Dewey and his staff have been preparing the New Orleans collection, having an allotment of \$5,000 wherewith to illustrate the metallic resources of the country, and by the aid of a number of volunteer assistants in the field the collection has received accessions of very great value, which make it one of the most valuable metallurgical collections in the world.

The organization of the collections in economic geology has consumed a great deal of time. The curator reports that in the development of this branch of the department a serious obstacle is presented by the unwillingness on the part of mine owners to impart such information as is necessary in order that the specimens shall attain their highest value in an educational series.

Mr. Thomas Donaldson has continued the work of cataloguing and packing the collection of the American Institute of Mining Engineers, which, having been presented to the Museum, are still in Philadelphia under his charge.

21. MISCELLANEOUS DEPARTMENTS.

(a) *Exploration and field work.*

As in previous years the work of exploration and investigations in the field has been under the immediate auspices of the Smithsonian Institution, and under the special care and direction of the Secretary, who

has published a full account in his report to the Regents of the Institution, pages 13-28.

An abstract of this report, giving special references to the additions made to the collections through the efforts of explorers, is here presented.

Greenland.—Considering that the whole energy of the Greely Relief Expedition had to be devoted to the rescue of the Lady Franklin Bay party, the natural history collections are richer than might have been expected; the numerous photographs of the country, of the natives, and the ice, in its various shapes and formations, will be of lasting value.

The physical observations during the course of the expedition were made part of the regular routine of the vessels. The natural history work was prosecuted by naval ensigns who had been sent by the Navy Department to the Smithsonian Institution specially for the purpose of being trained for such duty. Among these were Messrs. C. A. Harlow, A. A. Ackerman, and C. S. McClain. These gentlemen had all been trained at the Institution in the methods of instantaneous photography, in taxidermy, and in the collecting of minerals and fossils; and although the time occupied by the expedition was very much less than had been anticipated, very interesting and desirable collections of rock specimens, minerals, fossils, numerous birds, and of fishes and marine invertebrates in alcohol, were made by the gentlemen mentioned.

The Greely Relief Expedition fully and entirely carried out its mission of restoring the survivors of the Greely party to their friends in the United States. By far the greater part, however, of the apparatus and collections made in the several years of absence was left behind at Fort Conger, and may never be recovered. A few specimens were brought home by Lieutenant Greely, but have not been received at the National Museum.

Labrador.—The reports of 1882 and 1883 give full details of the work prosecuted by Mr. L. M. Turner at Fort Chimo, Ungava Bay, in Northern Labrador. Mr. Turner's two years of detail expiring in 1884, he returned to Washington and is now engaged in preparing his report. His collections are described by him as consisting:

“Of birds, 1,800 specimens; eggs, 1,800 specimens; fishes, 1,000 specimens; mammals, 200 specimens; ethnological, 600 articles; plants, a great number; insects, over 200,000; geological specimens, a great variety; Eskimo linguistics, over 500 pages of manuscript, embracing thousands of words and over 800 sentences, which were obtained during the winter nights and at other times when outdoor work could not be done.”

Reference was made in a preceding report to the work accomplished by Dr. C. Hart Merriam in the investigation of the natural history of the seals of the coast of Labrador; the arrangements made by him in Newfoundland and Labrador have furnished additional material in the way of skins and skeletons of several species of seals, the results of which he has shared with the National Museum.

Arctic coast.—Captain Healy and officers of the revenue steamer *Corwin* have supplied collections of minerals, birds, fish, invertebrates, &c., from Hotham Inlet and other points along the coast.

Lieut. George M. Stoney, U. S. N., of the schooner *Ounalaska*, who had visited Arctic America and explored Hotham Inlet and the rivers entering into it, obtained an interesting series of rocks from the volcano in Behring's Sea. The collections made by him have not, however, yet come to hand.

Both Captain Healy and Lieutenant Stoney have furnished specimens of some minerals which were supposed to be jade, but which proved to be serpentine and green quartzite.

The Pacific Steam Whaling Company established during the year a depot at Cape Lisburne, with Mr. D. Woolfe in command, for the purpose of mining coal for the use of the whalers, and specimens of this coal and of the associated fossils have been furnished.

The North Pacific.—Reference was made in a previous report to the very important work accomplished by Dr. L. Stejneger in Kamtschatka and the adjacent group of the Commander Islands. Through the courtesy of Governor Grebnitski, in command of these islands, a number of additional collections were received.

Dr. Stejneger also received from Captain Hunter some skins and skeletons of the mountain sheep of Kamtschatka.

Alaska.—The Signal Service station at Nushagak, on Bristol Bay, has been re-established by Mr. J. W. Johnson, from whom a collection of birds was lately received, which was specially noteworthy as containing specimens of the Alaska willow wren and of the yellow wagtail, representing a locality many hundreds of miles further south than Saint Michael's, the place of previous record.

Mr. John J. McLean, of the Signal Service, stationed at Sitka, has secured many ethnological objects of great rarity.

Mr. W. J. Fischer, who is stationed by the Coast Survey at Kodiak, has used many opportunities both there and in the adjacent regions to continue his important work; this including much information in regard to the manners and characteristics of the native tribes.

From the Rev. J. Loomis Gould a collection of Indian carvings and other articles of ethnology was obtained, representing some quite new forms of aboriginal construction.

Oregon and California.—From Oregon the most noteworthy collections are those furnished by Capt. Charles Bendire, at Fort Klamath.

The returns from California consist of numerous collections of shells, minerals, fossils, and archæological objects from Mr. R. E. C. Stearns.

Other specimens are birds from Mr. L. Belding, and fossils from Mr. C. R. Orcutt.

Mr. Charles H. Townsend, of the United States Fish Commission, has supplied the most extensive collection of mammals ever received from California. The collection also embraces numerous skins, skele-

tons, and skulls of sea lions and seals from the Farralone Islands, and of sea elephants from South California.

Arizona and New Mexico.—These Territories have been well represented; the former by the mammals, birds, and other objects of interest furnished by Mr. E. W. Nelson; the latter by an enormous collection of modern Indian pottery and other articles, made under the auspices of the Bureau of Ethnology, and others obtained by Mr. James Stevenson under similar direction.

Some contributions to the fauna of New Mexico were supplied by Dr. R. W. Shufeldt, of the Army, from his station at Fort Wingate.

Eastern portion of the United States.—The exploration of the freshwater fish fauna of the Mississippi Valley made by Professors Jordan and Gilbert in behalf of the New Orleans International Exposition is specially worthy of mention. Several months were occupied in this service, and many hundreds of species obtained and prepared for exhibition. Dr. Palmer was detailed to collect the corals of the Florida Keys and the Tortugas. Henry Hemphill also made collections of the invertebrates of Florida.

The collections of the United States Fish Commission along the eastern coast of the United States have been noteworthy, especially those from the labors of the Fish Commission steamer Albatross in the deep waters off the coast.

General collections were made by the Albatross of the land fauna of the coast of the Gulf of Mexico as well as of the marine, resulting in the addition of a very great number of species to the National Museum, of which a noted proportion are of scientific interest. Among these may be mentioned eight new species of birds found on the islands of Curaçoa and Old Providence.

Professor Poey has continued his contributions of fishes from Cuba.

Dr. Nichols, of Dominica, has continued his donations of birds, mollusks, &c., while from Mr. Morris, director of the public gardens and plantations in Jamaica, many samples of valuable fibers have been secured.

Mexico and Central America.—Professor Alfred Dugés, of Guanajuato, Mexico, has continued his transmissions of objects of natural history, among them being some rare species of birds, &c. Mr. McLeod, of Jesus Maria, in Mexico, has also furnished some rare birds.

Mr. Romero, the Mexican minister, supplied a series of the playing cards and other gambling implements of the Mexican Indians.

The services of Louis Aymé, late consul at Merida, were secured to prosecute some investigations into the ethnology of Yucatan and Western Mexico, especially with a view of showing the relationships between the habits and manufactures of the Indians of those regions and those of the southern portion of the United States. Several large collections have already been received from him, and others of still greater moment are on the way.

Other collections, especially of birds, from Yucatan have been furnished by Mr. Gaumer.

Valuable illustrations of the animal and vegetable kingdoms of Guatemala and Salvador were secured from the Government commissioners of those countries to the foreign exhibition held in Boston in the autumn of 1883. These, with similar collections under similar auspices obtained from Venezuela and Brazil, were transferred to the National Museum early in 1884.

Costa Rica.—Mr. J. C. Zeledon has transmitted specimens of medicinal plants, of birds, of vertebrated animals, and of ethnology.

Mr. R. Iglesias, of Chiriqui, has contributed antiquities and modern pottery.

South America.—Interesting collections representing the natural products of the animal and vegetable kingdoms of Venezuela and Brazil were secured from the Governments of Venezuela and Brazil. Dr. William H. Jones, U. S. N., has contributed some extremely important collections of the antiquities and natural history of the coast of Peru and Chili, and to some extent of the Galapagos Islands.

Mr. Kiefer, of Lima, has also made similar contributions.

Professor Nation has sent types of rare and undescribed species of birds of Peru.

Dr. William Crawford, U. S. N., has contributed some fine shells from the west coast of Terra del Fuogo and the Straits of Magellan.

The magnificent collection of recent and fossil shells of Europe, belonging to Mr. J. Gwyn Jeffries, of London, has been acquired by the National Museum and in large part received. This is by far the most valuable private collection of European shells in existence, and especially important in possessing so many types of the deep-sea species dredged in the North Atlantic.

Among contributors to the European collections may be mentioned the Royal College of Surgeons, the South Kensington Museum, the British Museum, the Royal Botanical Gardens at Kew, in England; the Museums of Berlin and Dresden, in Germany; of Copenhagen, in Denmark; of Bergen, in Norway, &c.

Asia.—The collections from Asia have been of unusual significance and importance. Reference has been made to the accessions from Kamtschatka and the Commander Islands obtained through the efforts of Dr. Stejneger.

Mr. P. L. Jouy has continued his researches in Japan, and has supplied a large number of species of mammals and birds of that region, together with other species of animals. The collection of birds being taken in connection with a series presented by Mr. Thomas Blackiston, who spent many years in Japan, gives to the National Museum one of the most complete collections of Japanese birds in existence, and one great in value in view of their relationships to the birds of Western North America.

Rev. C. H. A. Dall has furnished samples of fibers and other native products of the Indies, and the greater part of the exhibit of the Foreign Exhibition in Boston made by Ceylon has been received; while a very valuable collection of musical instruments of East India were contributed by the Rajah of Tagore.

Africa.—This country is represented by a few objects of art and industry, while from New Guinea the collection of weapons, implements, &c., obtained from Mr. A. P. Goodwin, has added very greatly to our representation of that little known island.

The Sandwich Islands.—The greater part of the exhibit made by the Hawaiian Government at the Boston Foreign Exhibition was secured and transferred to the National Museum.

(b) *Chemistry.*

The chemical laboratory of the Smithsonian Institution, which was for a time transferred to the custody of the Museum, has now been as such abandoned. The chemical analyses which it is found necessary to have made in connection with the work of the Museum and the correspondence of the Smithsonian Institution are made under the direction of the chemist of the Geological Survey, Prof. F. W. Clarke, who occupies laboratories in the northeast pavilion of the Museum building, and who is authorized by the Director of the Geological Survey to carry on investigations of this character as a partial return for the accommodations afforded to the Survey in the Museum building.

(c) *Experimental physiology.*

Mr. John A. Ryder, embryologist of the United States Fish Commission, occupies a laboratory in the east wing of the Smithsonian building and is constantly engaged in physiological and embryological researches upon material supplied by the Museum and Fish Commission. He may, therefore, for the present be regarded as the honorary head of this department, and his numerous contributions to zoological literature are included in the bibliography of the work of the officers of the Museum.

(d) *Vivaria.*

A small collection of living animals is always kept up under the charge of the chief taxidermist. The collection of aquatic animals at the Government carp ponds, is still in a flourishing condition.