
PART I.

REPORT UPON THE CONDITION AND PROGRESS OF THE U. S. NATIONAL
MUSEUM DURING THE HALF YEAR ENDING JUNE 30, 1885.

BY

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REPORT UPON THE CONDITION AND PROGRESS OF THE U. S. NATIONAL MUSEUM DURING THE HALF YEAR ENDING JUNE 30, 1885.

A.—GENERAL CONSIDERATIONS.

1. INTRODUCTORY REMARKS.

The report now presented embraces the period between January 1 and June 30, 1885. This change is made in accordance with the vote of the Regents of the Smithsonian Institution to the effect that reports upon the condition of the Smithsonian Institution and its dependency, the National Museum, shall in the future have reference to the fiscal year, from July 1 to July 1, instead of, as in the past, covering the calendar year.

There has been a constant increase in the number of the accessions to the Museum ; during these six months there were nearly twice as many contributions as in the entire year of 1884.

Owing to the fact that the greater portion of these six months was consumed in the preparation of exhibits for New Orleans, no manuscript was offered for publication in the form of Museum Bulletins, but it will be seen that 236 papers bearing upon the collections in the various departments of the Museum, were published during the first half of 1885, which is far in excess of one-half the number of similar papers published during the year 1884.

There has been no important change in the character of the work of the Museum as described in previous reports. It is pleasing to note that nearly every curator states that considerable progress has been made in the development both of the study and the exhibition series. The space allotted to each department is more definitely fixed, and many additional cases have been constructed and put into use.

A statement relating to the exhibit made by the Institution at the New Orleans Exposition is submitted, but since, at the close of the period covered by this report, the exposition was still in progress, the final and exhaustive article bearing upon this subject will be reserved for the next report.

It was the intention of myself and my associates in the Museum, to present in this report a review of the past history of the Museum as a

whole, and of its several departments. This feature is, however, necessarily omitted on account of the absence of several of the curators at New Orleans during these six months. I trust, however, that it will be practicable to prepare such a summary in time for the next report of the Museum.

2. FOUNDATION AND SCOPE OF THE MUSEUM.

The National Museum was organized in 1846 by act of Congress, the nucleus of its collections being the "National Cabinet of Curiosities," which at that time were on exhibition in the Patent Office building. These collections were not, however, removed to the Smithsonian Institution building until eleven years afterwards, and their custody was accepted by the Regents of the Smithsonian Institution, on condition that the appropriation of a sufficient sum of money for their proper care be continued by Congress.

The National Museum is under the direction of the Smithsonian Institution, which is governed by an establishment consisting of the President of the United States and his Cabinet, the Commissioner of Patents, and the Board of Regents, which latter is composed of the Vice-President, 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 Secretary of the Smithsonian Institution, to whom is intrusted the actual management of its affairs, is *ex officio* the Director of the National Museum. The Museum staff at the present time is composed of an assistant director, and twenty-four curators and acting curators, fifteen of whom receive no salary from the Museum appropriation. There are also twelve administrative departments.

The collections of the Museum are 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 U. S. geological surveys under the direction of the U. S. geologists, Hayden, King, and Powell.

5. The collections of the U. S. 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 retain such gifts in their private possession.

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 in Europe and America, at the time of the Philadelphia Exhibition and subsequently.

In connection with the general work of administration there is in the Museum a library, a chemical laboratory, a photographic establishment, and various workshops for taxidermy, modeling, and for the preparation of skeletons for exhibition. In connection with the department of art and industry two preparators are constantly employed.

The publications of the Museum consist of (1) The Annual Report; (2) The Proceedings of the United States National Museum; (3) The Bulletin of the United States National Museum; (4) Series of circulars. These are all reprinted in the volumes of the Smithsonian Miscellaneous Collections.

3. THE FUNCTIONS AND AIMS OF THE MUSEUM.

The broad plan upon which the operations of the National Museum are now conducted, was anticipated as far back as 1853, when, in the report of the Smithsonian Institution for 1852, Professor Henry wrote: "There can be little doubt that in due time ample provision will be made for a library and museum at the capital of this Union worthy of a Government whose perpetuity depends upon the virtue and intelligence of the people." The difficulties attending the formation of such a museum were appreciated by Professor Henry, and in the report of the Institution for 1849, he dwelt with much emphasis on the caution required in assuming under the direction of the Institution the care of the national collections. At length, in 1857, it was ordered by law that all collections belonging to the United States should be delivered to the Regents of the Smithsonian Institution. From that time annual appropriations for the preservation of these collections have been made by Congress.

Professor Henry, in the report of the Institution for 1870,* carefully considered the character which should be given to the National Museum. "There is," he wrote, "scarcely any subject connected with science and education to which more attention is given at the present day than that of collections of objects of nature and art, known under

the general denomination of museums. This arises from their growing importance as aids to scientific investigation and instruction."

In the report for 1873* allusion is made to the enormous increase in the national collections, "requiring the utmost exertions of the limited force connected with the National Museum for its proper treatment." And although the appropriations for the Museum have of late years been more liberal, it is certain that, on account of the immense annual increase in the quantity of material received, quite as much care and caution is still needed in order to carry out fully the aim of the Museum, which consists not only in securing collections, but in arranging for exhibition a complete set of specimens, preparing a duplicate set for purposes of study, and distributing far and wide such duplicates as it may be found practicable to spare.

4. SYSTEMS OF CLASSIFICATION.

There has been no change in the plan of arrangement of the collections or in the system of classification since the writing of the report for 1884, and it is therefore deemed unnecessary to recapitulate what has there been said. For the benefit of those who may not be acquainted with the principles which are considered in the arrangement of the collections, the following general rules, printed in the last report, are here repeated :

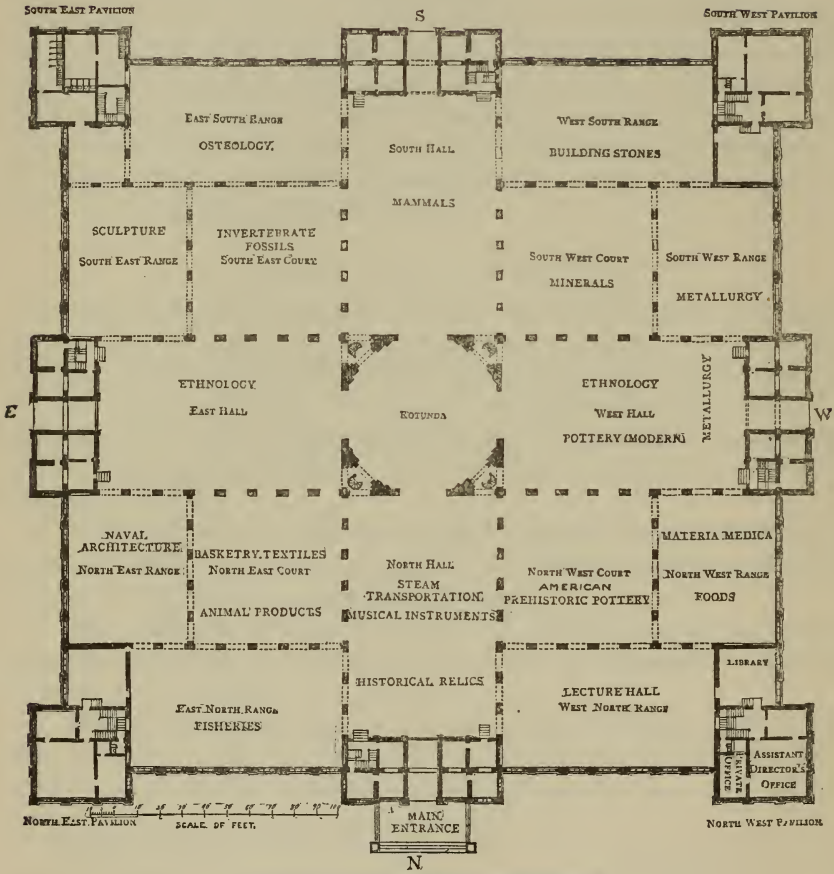
1. No object will be placed on exhibition which is not of evident educational value, and likely to interest and instruct a considerable percentage of the persons visiting the Museum.

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 the 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.



PLAN OF THE NATIONAL MUSEUM, WASHINGTON, D. C.

6. The specimens will be illustrated and supplemented by pictures, diagrams, books, and maps, in such manner that the Museum may form an encyclopædia, 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 it may seem necessary to present in addition.

By reference to the accompanying plan, it will be seen that the four main divisions of the Museum building are the north, south, east, and west "halls." The four square halls included between the main halls in the angles joining the Rotunda are called "courts." The "ranges" are eight in number. Those on the north side are the "North range—" "East North" and "West North." Those on the east side are the East range—"North East" and "South East." Those upon the south side are the South ranges—"East South" and "West South." Those on the west side are the West ranges—"South West" and "North West."

In the pavilions and towers are the offices and laboratories connected with the various departments.

The accompanying plan shows the exhibition space allotted to each department, although many of the departments are still without any exhibition room whatever. An additional Museum building can alone remedy this condition of affairs. The apportionment of space is at present a provisional one and will doubtless be considerably modified hereafter.

B.—THE MUSEUM STAFF.

The staff of the Museum includes two classes—scientific and administrative, the former reporting to the Director of the Museum, and consisting of curators, acting curators, assistant curators, assistants and aids, the latter reporting to the Assistant Director, and consisting of a superintendent of buildings with his force, which is detailed elsewhere, and a number of clerks and copyists.

5. THE SCIENTIFIC STAFF.

There have been no changes made in the scientific staff since the writing of the last report, except that the section of American prehistoric pottery has been included in the Department of Ethnology, instead of the Department of Antiquities, as heretofore. The Section of Steam Transportation was added to the Department of Arts and Industries in June, under the honorary curatorship of Mr. J. E. Watkins, of the Pennsylvania Railroad Company. Active operations have not been commenced in this section, and a detailed account of its condition will be

deferred until the next report. 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 adjunct curatorships as follows:

(a) *Materia Medica.* H. G. Beyer, M. D., U. S. N., honorary curator; 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.* J. W. Collins, U. S. Fish Commission, honorary curator.

(f) *Foods.* Romyn Hitchcock, acting curator.

(g) *Historical Relics.* A. Howard Clark in charge.

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

(h) *Steam Transportation.* J. E. Watkins, honorary curator.

Department II (A).—Ethnology. Otis T. Mason, curator; one preparator and two clerks.

Department II (B).—American Prehistoric Pottery. W. H. Holmes, Bureau of Ethnology, honorary curator; one preparator.

Department III.—Antiquities. Charles Rau, curator, E. P. Upham, assistant.

DIVISION OF ZOOLOGY.

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

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

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

Department VI.—Reptiles and Batrachians. H. C. Yarrow, M. D., U. S. A., honorary curator.

Department VII.—Fishes. Tarleton H. Bean, curator; two assistants detailed from the U. S. Fish Commission.

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

Department IX.—Mollusks. W. H. Dall, curator, R. E. C. Stearns, adjunct curator; one clerk.

Department X.—Insects. C. V. Riley, honorary curator.

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

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

Department XII (B).—Invertebrate Fossils, Meso-Cenozoic. C. A. White, U. S. Geological Survey, honorary curator, J. B. Marcou, U. S. Geological Survey, honorary assistant; one clerk.

DIVISION OF BOTANY.

Department XIII.—Fossil and Recent Plants. Lester F. Ward, U. S. Geological Survey, honorary curator; one clerk, one preparator.

DIVISION OF GEOLOGY.

Department XIV.—Mineralogy. F. W. Clarke, U. S. 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.

Some additions and changes in this classification are contemplated.*

These twenty-seven departments and sections are administered by twenty-four curators and acting curators, of which number at present only nine receive salaries from the Museum appropriation. Of the remaining fifteen, five are connected with the Geological Survey; one the Bureau of Ethnology; two with the Fish Commission; two with the Army; one with the Navy, and one with the Agricultural Department.

6. THE ADMINISTRATIVE STAFF.

The only change made in the classification of this branch of the Museum work is the addition of a department of labels under the charge of Mr. A. Howard Clark.

The administrative departments are at present organized as follows:

Department A (Direction).—This department is under the immediate charge of the Assistant Director, and embraces the general supervision of the routine work of the other departments, in addition to the performance of his special duties as the executive officer of the Museum, such as the care of the installation of specimens, the construction of cases, the purchase of supplies, the assignment of work and apartments, leaves of absence, correspondence, &c.

Mr. R. I. Geare, executive clerk, has rendered most efficient service in this department, both in the management of the correspondence of the Museum and in the work of preparing the Museum report.

*The departments of Exploration and Field Work, Chemistry, Experimental Physiology, and Vivaria are still unorganized, although Mr. John A. Ryder, embryologist of the U. S. Fish Commission, is frequently referred to in the case of accessions whose special features are related to embryology and physiology. These accessions are alluded to in index B to Part IV, under Department XVII.

Department B (Registry and Storage).—This department is under the supervision of Mr. S. C. Brown, whose duties pertain to the reception, unpacking and distribution of accessions and other packages, the shipment of boxes, the storage of accessions not immediately required, and the custody of department catalogue books.

Department C (Archives).—Mr. S. C. Brown has charge of papers relating to accessions to the Museum, applications for specimens, and the distribution of Museum material.

Department D (Library).—Mr. F. W. True, librarian, Mr. H. W. Spofford, assistant.

Department E (Publications).—The various publications of the Museum have been, as hitherto, under the editorial supervision of Dr. Tarleton H. Bean.

The publication of the special report upon the Fisheries of the United States, in quarto, which, in addition to its descriptive, historical, and statistical contents, will in reality constitute a monograph of the American portion of the fisheries collection in the Museum, has been in process of publication under the supervision of the Assistant Director and Mr. A. H. Clark, who are rendering this service to the Fish Commission as volunteers.

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 for reference.

Department G (Duplicates and Exchanges).—Mr. S. C. Brown in charge.

Department H (Property and Supplies).—Mr. C. W. Schuermann in charge.

Department I (Accounts).—Mr. W. V. Cox in charge. All disbursements are made under the direction of the chief clerk of the Smithsonian Institution. 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 of buildings, in charge. This department is thus subdivided: (1) police and inspection, (2) mechanics and labor, (3) construction and repairs, (4) cleaning and public comfort, (5) heating and lighting.

Department L (Electric Service).—In this department are embraced the care of the instruments used in connection with the telephone service, time service, burglar-alarm service, and watch-clock service.

Department M (Preparation).—The subdivisions in this department have undergone no material change since last year. Statements showing the amount and nature of the work performed in the various sections will be found in the statement of the work of the Museum preparators.

C.—THE CONDITION OF THE COLLECTIONS.

7. INCREASE IN THE COLLECTIONS.

In the report for 1884 the number of specimens in the several departments of the Museum was estimated at a little less than one and a half millions. This provisional census of the collections has not been revised for the present report, but it is safe to assume that, from all sources, including the increase from the New Orleans Exposition, the total has been increased by at least ten thousand.

8. ASSIGNMENT OF SPACE.

Early in the year, the north-east court was cleared of packing-boxes, &c., for the exhibition of specimens belonging to the Department of Ethnology. The north side of the west hall was assigned to the exhibit of modern pottery and terra-cotta. It having been found that the modelers were not furnished with working space adequate to their needs, rooms were constructed and fitted up for their use in April. For the speedy prosecution of the work of preparing the collection of building-stones for the American Museum of Natural History, a temporary wooden building was put up west of the poisoning-shed for the use of the stone-cutters. In June the northwest gallery of the Smithsonian building was fitted with casing and shelving for the collections of marine invertebrates, which were transferred thither from the west hall.

The laboratory and offices of the curator of Metallurgy were early in the year moved from the first floor of the south-west pavilion to the second floor, and the offices of the curator of Mammals have been transferred from the south tower to the first floor of the south-west pavilion. A portion of the west hall has been devoted to the textile exhibit. One-half of the south-west court has been assigned to the Mineral Department, and cases for the reception of the specimens arranged.

Owing to the crowded condition of the exhibition halls in the Museum building, it is impossible to assign exhibition space for the collections of birds, birds' eggs, reptiles, fishes, mollusks, or marine invertebrates. The collections of birds and fishes are at present inadequately provided for in the Smithsonian building. There is no suitable space for the exhibits, which are being collected by the curator of Steam Transportation, and the collections of animal products and foods are very insufficiently housed. It is to be earnestly hoped that Congress will give serious consideration to the pressing necessity for more room, and make provision for the erection of another Museum building.

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

9. ACCESSIONS TO THE MUSEUM.

Accessions to the Museum are acquired by gift, by exchanges with home or foreign institutions, by the deposit of the collections of various surveys and Government departments, from special expeditions, or as a result of the explorations carried on, in whole or in part, by the Smithsonian Institution, U. S. Fish Commission, and National Museum.

The total number of packages recorded by the registrar as received during the period covered by this report was 10,591. Of this number, 3,884 contained specimens for the National Museum, forming 658 accessions (Nos. 15551-16208), an accession frequently including the contents of many boxes or packages. The remainder were intended for the Smithsonian Institution and the U. S. Fish Commission, or for officers connected therewith. The increase in the number of incoming packages may be illustrated by the statement that during the entire year 1884 the number received was 5,507, only a little more than half the number (10,591) received during the first six months of 1885. The above figures also show a proportional increase in the number of accessions, there being 658 received during the first half of 1885 against 1,084 for the entire year 1884. An annotated list of the accessions will be found in Part IV of this report. Some of the most important are discussed at greater length in the curators' reports, in Part II.

There is a great increase in the number of ores, minerals, &c., sent for analysis. The curators are always willing to furnish careful identifications of specimens sent, but cannot, of course, undertake detailed analyses unless the Museum should be ordered by Congress to make special provisions for work of this character.

Upon receipt of an accession the registrar writes upon an accession card the name and address of the sender, together with the nature of the specimen or specimens forming the accession. This card is submitted to the management for assignment to one of the scientific departments. When assigned, the accession is transferred to the laboratory of the department, together with the card and all papers bearing upon it. If an accession contains objects of more than one kind, the collections are sent to the assorting-room, where they are separated before leaving the hands of the registrar. As soon as the curator has examined the accession he indorses a brief statement as to its character and value upon the card, returning this, with the papers, to the registrar. These are transmitted to the office of the executive clerk, whose duty it is to attend to the necessary correspondence. Finally the papers are returned to the registrar to be filed.

10. PROGRESS IN CLASSIFICATION AND ARRANGEMENT.

(a) Laboratory work and catalogue entries.

On pages 27 and 28 of the Report of the Museum for 1884 is a detailed list of the storage-cases and other furniture in use in the several laboratories at the end of that year. There have been no material changes or additions during the past six months. The laboratory cases are entirely distinct from those used for the display of the specimens in the exhibition series, and are of course not seen by the public; but it is safe to say that the accommodations provided in this respect are in most cases ample for the requirements. Every available means is being adopted toward supplying any deficiencies.

The following table shows the number of entries* made in the catalogues of the various departments and sections during the first half of 1885:

No. of department.	Name of department.	Last entry in 1884.	Last entry in June, 1885.	Total number of entries.
I	Arts and Industries:			
	Materia Medica.....	53,669	53,716	47
	Textile Industries.....	6,857	7,440	583
	Foods.....	480	547	67
	Historical Relics.....	75,201	75,342	141
II a	Ethnology.....	74,215	76,328	2,113
II b	American Prehistoric Pottery.....	107,505	114,000	6,495
III	Antiquities.....	97,685	98,110	425
IV	Mammals.....	14,714	15,075	361
V a	Birds.....	101,233	104,913	3,680
V b	Birds' Nests and Eggs.....	22,148	22,350	202
VI	Reptiles.....	14,066	14,148	82
VII	Fishes.....	36,934	37,231	297
VIII	Comparative Osteology.....	21,622	21,972	350
IX	Mollusks.....			5,457
X	Insects.....	121	138	17
XI	Marine Invertebrates:			
	Crustaceans.....	{ 7,220	{ 7,261	{ 31
		{ 8,913	{ 10,127	{ 1,214
	Worms.....	{ 880	{ 960	{ 80
		{ 1,032	{ 1,114	{ 82
	Tunicates and Bryozoa.....	{ 298	{ 515	{ 217
	Radiates.....	{ 8,698	{ 9,725	{ 1,027
		{ 10,000	{ 11,070	{ 1,070
	Sponges and Protozoans.....	{ 1,760	{ 2,000	{ 240
		{ 4,000	{ 4,640	{ 640
	Total.....			4,531
XII a	Invertebrate Fossils (Paleozoic).....	14,274	14,849	575
XII b	Invertebrate Fossils (Meso-Cenozoic).....	13,389	13,482	93
XIII a	Fossil Plants.....	2,018	2,055	37
XIII b	Recent Plants.....		23	23
XIV	Minerals.....	45,217	45,843	626
XV	Lithology and Physical Geology.....	36,986	37,471	485
		59,281	59,290	9
XVI	Metallurgy and Economic Geology.....	44,253	44,254	1
		55,843	55,942	99
	Grand total.....			26,796

(b) Development of the exhibition and study series.

The comparatively-empty appearance of some of the exhibition halls during the past six months is accounted for by the fact that collections aggregating about 140,000 pounds in weight were taken from the halls

*An entry in many instances includes hundreds of specimens.

and sent to the New Orleans Exposition, in addition to about 37,000 pounds previously sent to Cincinnati and Louisville. It is no less certain, however, that by the close of the year the exhibition series will be much more attractive than it has ever been. Especial attention will be paid to the development (i) of the section of historical relics in the Department of Arts and Industries; (ii) of the basketry exhibit in connection with the Department of Ethnology; (iii) of the osteological exhibit, closely affiliated with the Department of Mammals; and (iv) of the display of textiles. Before the end of the year the celebrated collection of Mexican casts belonging to Señor Eufemio Abadiano will be open to the public, in the south east range. This collection has been temporarily deposited in the National Museum. A list of the casts is given in Part IV, under Acc. 16185.

(c) Construction of cases.

In the report for 1884* a full account was given of the number and styles of cases made and delivered in the Museum during the year. The main features of the plan of installation were discussed, and it was intended to present in this report a complete description, with illustrations, of the various methods of installation which have been adopted. I regret to say that the special work in connection with the preparation of the exhibit for the New Orleans Exposition has rendered it necessary to defer the completion of this matter until the next report (July 1, 1885 - July 1, 1886). No cases were received during the first six months of 1885, nor were any new styles of construction adopted, although several plans have been under consideration.

(d) Labels and printing.

During the six months ending June 30, 1885, very material progress was made in the preparation and printing of descriptive labels for the exhibition series and for the reserve and duplicate collections. Early in the year copy for about 3,000 forms of labels was sent to the Public Printer through the Interior Department. Most of them were for the Materia Médica and Metallurgical Departments of the Museum. There are still great numbers of unlabeled objects in most of the departments; for many of them, however, labels have been written and are ready for printing.

The Museum printing-press has been in use constantly during the year, in charge of one of the clerks, who has been engaged in printing miscellaneous circulars and blanks required for immediate use, which could not be sent out without delay and consequent detriment to the service, as well as certain special and temporary labels.

* Pages 25-28.

II. PROGRESS OF GENERAL AND INCIDENTAL WORK.

(a) Library.

The following sketch of current operations has been furnished by Mr. F. W. True, librarian.

At no time in its history has the demand for books been so general or so great. The accessions also show a decided increase over those of last year. These were derived by (1) gift, (2) exchange, (3) purchase, the ratio being in the order given.

Table showing number of accessions from January to June, 1885.

Months.	Museum.	Smithsonian.	Total.
January.....	46	163	209
February }.....	240	133	373
March }.....			
April }.....	65	86	151
May }.....			
June.....	103	156	259
Total.....	454	538	992

The accessions of public documents, except those pertaining to natural science, and of regular periodicals, are not included in this table. Forty-one of the works were obtained by purchase. In June, sixty-eight volumes belonging to the U. S. Fish Commission were received on deposit, through Professor Baird.

The principal contributors were the following :

Contributors.	Volumes.	Pamphlets.	Charts, &c.
Prof. S. F. Baird.....	38	82	3
Dr. Georg Baur.....	5
British Museum.....	3	2
U. S. Geological Survey.....	11	4	1
Second Geological Survey, Pennsylvania.....	4	11
Interior Department.....	1	3	16
Geological and Natural History Survey, Canada.....	2	1	Maps, &c.

The periodical list of the library comprises many of the standard scientific, and technical journals of the world. The periodical register shows that 1,604 numbers and parts of serials were received.

Table showing number of books issued and returned during each month.

Months.	Drawn.	Returned.
January.....	411	142
February }.....	513	523
March }.....		
April }.....	413	261
May }.....		
June.....	169	196
Total.....	1,506	1,122

The number of persons entitled to the privileges of the library is eighty.

The card-catalogue by authors has been materially augmented during this period. The following will show the number of books and pamphlets catalogued during each month:

Months.	Books.	Pamphlets.	Total.
January.....	90	137	227
February }.....	133	226	399
March }			
April }.....	58	129	187
May }			
June.....	36	298	334
Total.....	317	790	1,147

Probably the most important feature in the operations of the library during this period has been the transfer of the Smithsonian accounts with the Library of Congress to the Museum library. This change necessitates a different system of record from that previously used in withdrawing books from the Congressional Library, and the call-cards adopted were used indiscriminately for both libraries. It has been found necessary to carefully examine the entire account with the Library of Congress since 1877, a large number of books having been detained by borrowers for many years; and the work of comparing the records of the sectional libraries will occupy several months.

About one hundred books of a more or less popular nature, such as works of travel, narratives of scientific expeditions, &c., have been set apart for the use of messengers, clerks, and others debarred by the regulations from drawing books from the library proper. These books are in constant demand, and if popular works of travel and biography could occasionally be added to the library, its utility would be greatly increased.

The sectional libraries are in good condition. They are sixteen in number, and contain the larger part of the most important monographic and specific works belonging to the library. The system of their administration, described in a previous report, has proved very satisfactory.

In March Mr. H. W. Spofford was appointed assistant librarian.

Recommendations.

Since the usefulness of the library is each year increasing, and since it is especially deficient in the latest editions of reference books, which are continually called for, it is suggested that this branch of the library should first receive attention. It is evident that if the growing importance of the library is to be maintained, a small fund should soon be provided for the purchase of works absolutely essential.

The librarian calls attention to the crowded state of the library. On the first floor, where the beneficiaries of the library consult the books.

and periodicals, space is very much restricted, owing to the fact that there are a number of large desks, tables, and stands, which are of course necessary adjuncts to a library, but are greatly in the way in so small a room. The shelves of the first floor and of the gallery are now quite full. The periodical department, on the upper floor, is particularly in need of more commodious quarters. The larger periodicals and newspapers are packed away in inconvenient places, and some are quite inaccessible. The overcrowded condition of this department is increased by the cases and material of the Department of Labels stored in the gallery of the library room.

It is suggested that the present upper story of the library room could be extended toward the north-west and west-north ranges. This change could be made at comparatively small cost, and would not mar the architectural effect of the interior of the Museum. Something might be gained by building galleries on the west wall of the west-north range and the north side of the north-west range, at the level of the floor of the second story of the library.

(b) *Distribution of duplicates and exchanges.*

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

	Boxes and packages.
Mammal skins and skeletons	12
Birds' skins, nests, and eggs.....	27
Minerals (more than 1,200 specimens).....	19
Reptiles	2
Marine invertebrates (in sets)	16
Marine invertebrates, miscellaneous packages.....	13
Fossils	2
Pottery.....	6
Indian relics.....	34
Fishes	2
Plants.....	5
Casts (plaster).....	2
Rocks	4
Shells	6
Corals	1
Insects	1
Total	152

The total number of packages sent out was 1,474, 152 of which (including more than 15,000 specimens of all kinds) were, as shown in the preceding table, in the form of gift or exchange with institutions or individuals.

During the six months there have been recorded twenty-five applications for specimens, many of which have been attended to.

Numerous requests have been received for photographs and working drawings of Museum cases. So frequent are these requests becoming that with the beginning of the new fiscal year a detailed record of such matters will be kept for publication.

In the report of the curator of the Department of Marine Invertebrates may be found a list of the recipients of sets of marine invertebrates expressly prepared for distribution.

A loan of several cases was made to Capt. R. H. Pratt, of the Indian Training School at Carlisle, Pa., for the exhibition of his collection at New Orleans. After their return from the exposition, these cases were finally permanently transferred to Captain Pratt, in exchange for specimens of Indian costumes.

(c) *Publications.*

The seventh volume of the "Proceedings" was finished in February, and of the eighth volume, the printing of which was begun in March, 221 pages were printed prior to the 1st of July. A list of signatures published during the first half of the year is given in Part III of this report. At the present time two Bulletins are in the hands of the printer—No. 29, "Results of Ornithological Explorations in the Commander Islands and in Kamtschatka," by Leonhard Stejneger, and No. 30, "Bibliography of publications relating to the collection of fossil invertebrates in the U. S. National Museum," including complete lists of the writings of Fielding B. Meek, Charles A. White, and Charles D. Walcott, by John Belknap Marcou.*

In Part III of this report will be found a detailed list of the publications of the Museum during the half-year, and also a bibliography of the papers by officers of the Museum and by others whose writings are based upon specimens in the collections. The authors of these papers number 60, 28 of whom are connected with the Museum, 13 being honorary officers. These papers number 273, and are thus distributed under the following subjects:

* This forms Part III of "Bibliographies of American Naturalists." Part I is entitled "The Published Writings of Spencer Fullerton Baird, 1843-1882," by G. Brown Goode, constituting Bulletin 20, U. S. National Museum; and Part II, "The Published Writings of Isaac Lea, LL. D.," by Newton Pratt Seudder, constituting Bulletin 23, U. S. National Museum.

Subjects.	Papers published by Museum officers.	Papers by other inves- tigators.	Total.
Arts and industries:			
Foods.....	1	0	1
Textiles.....	3	0	3
Materia medica.....	2	0	2
Ethnology.....	12	0	12
Antiquities.....	1	0	1
Mammals.....	9	1	10
Birds.....	34	11	45
Reptiles and batrachians.....	2	0	2
Fishes.....	18	46	64
Mollusks (including crustaceans).....	4	6	10
Insects.....	57	0	57
Invertebrates.....	7	0	7
Plants.....	3	1	4
Mineralogy.....	3	1	4
Lithology and physical geology.....	6	0	6
Geography and exploration.....	3	2	5
Chemistry.....	2	0	2
Fisheries and fishing grounds.....	3	1	4
Metallurgy.....	1	1	2
Physiology and histology.....	3	22	25
Taxidermy.....	1	0	1
Administration.....	3	1	4
Biography.....	1	0	1
General.....	1	0	1
Total.....	180	93	273

A comparison of this table with that included in the report for 1884* shows a decided increase in the line of original research during the first half of 1885, the total number of papers published during 1884 being 335.

In the report for 1884, Part III, are published six papers † based upon Museum collections. The following is a list of their titles, accompanied by a brief synopsis:

I. THROWING-STICKS IN THE NATIONAL MUSEUM. By Otis T. Mason.—This deals with the throwing-sticks used in the hyperborean regions of North America. In this paper the author applies zoological methods to a specific human art, studying the case of each specimen, structure, function, and geographical distribution.

II. BASKET-WORK OF THE NORTH AMERICAN ABORIGINES. By Otis T. Mason.—In order to test the value of human art as evidences of race, the author has made an exhaustive collection of the basketry of the world; has analyzed the methods of fabrication, materials used, forms, and decorations. The result of this study is very satisfactory, showing that by comparison the products of that art can be exactly traced to the authors when no definite information exists.

III. A STUDY OF THE ESKIMO BOWS IN THE U. S. NATIONAL MUSEUM. By John Murdoch.—This paper points out the fact that the bows stiffened by cords of sinew on

* Page 31.

† Since at the time of sending to press the present report, the report for 1884 had not been published, it is deemed not inappropriate to refer to these in this place as forming part of the current work of the Museum. In continuation of this plan of devoting one part of each Museum report to original papers bearing upon Museum collections, an extensive and illustrated paper by Mr. Thomas Donaldson, entitled "The George Catlin Indian Gallery in the U. S. National Museum (Smithsonian Institution), with Memoir and Statistics," is published in Part V of the report now presented.

the back, which are used by all Eskimos, have this backing made of one continuous cord, often of great length, and frequently put on in a very complicated pattern.

All Eskimo bows from that part of America west of the valley of the Mackenzie River may be referred to one of three types, which are modifications of one primitive type to be found in its least modified form in the islands north of Hudson's Bay. These three types have each a definite geographical distribution, and probably owe their peculiarities to the relative facility of obtaining wood suitable for making bows in the different regions where they are found. They are: I. The Arctic type, found from the Mackenzie region to Bering Strait. II. The southern type, from Bering Strait to the island of Kadiak; and III. The western type, found on the Siberian coast and the island of Saint Lawrence.

The Arctic type is peculiar in having the cords of the backing twisted into tense cables by a process hitherto undescribed.

IV. ON A SPOTTED DOLPHIN APPARENTLY IDENTICAL WITH THE *Prodelphinus doris* OF GRAY. By Frederick W. True.—This paper contains a description of the external appearance and skeleton of a dolphin received fresh from Pensacola, Fla., and believed to be identical with *Prodelphinus doris* (Gray). The species is found to be very abundant in the Gulf of Mexico and off the coast of the South Atlantic States. Although there are skulls in very many museums, external characters of the species have until now remained unknown.

V. THE FLORIDA MUSKRAT, *Neofiber alleni*, True. By Frederick W. True.—This paper contains a detailed description of the superficies and skeleton of a new muskrat having a round tail, a single specimen of which was received from Georgiana, Fla. It appears to replace *Fiber zibethicus* in this region.

VI. ON THE WEST INDIAN SEAL, *Monachus tropicalis*, Gray. By Frederick W. True and F. A. Lucas.—In this article the skull of *Monachus tropicalis* Gray is described in detail and compared with *M. albiventer* and other species of *Phocidæ*. The specimen on which the description is based was obtained by Prof. Felipe Poey in Cuba. The skull is the only one, so far as known, in any museum, and the cranial characters of the species have not been hitherto described. The species seems to be closely allied to *M. albiventer* of the Mediterranean.

(d) Visitors.

During the half year the number of visitors to the Museum building has been 107,365, and to the Smithsonian Institution, 60,428. Total, 167,793.

The monthly register, as kept by the doorkeepers, is here recorded:

Month.	National Museum.	Smithsonian.
January	12,482	6,213
February	13,577	6,614
March	41,372	28,723
April	16,043	6,851
May	12,789	6,087
June.....	11,102	5,940
Total	107,365	60,428
Daily average	692	390

The large number of visitors in March was due to the inauguration season. Between March 2 and March 6, 48,148 people visited the two buildings, and in order to give all more ample opportunity the buildings were kept open until 5 p. m. On March 3, 20,500 people visited the Smithsonian and Museum buildings.

In the report for 1881 it was estimated that the number of visitors to the Museum building during 1880 was at least 150,000. This number in 1882 was increased to 167,455 and in 1883 to 202,112. In 1884 the number was 195,322, and, as given in the table above, 107,365 people visited the Museum during the first six months of 1885.

(e) *Students and lectures.*

As in previous years the Museum has afforded facilities to several students who have in some instances rendered a partial equivalent by volunteer work upon the collections.

In the Department of Ethnology Dr. Frauz Boas, of Germany, spent some time in January studying the collections of Hall and others from Baffin's Land. In February Dr. Simmons, formerly of Japan, compared the carvings of the Northwest Coast Indians with the forms familiar to him in Japanese art. Dr. Nash also spent several days in receiving special instructions with relation to collections intended to be made in Northwest Alaska.

In the Department of Minerals volunteer service was rendered by Harry P. Ingram, who commenced work in February.

Mr. Albert Koeble was detailed from the Department of Agriculture to assist the curator of the Department of Entomology in arranging and classifying the collections.

Mr. J. Warner Edwards rendered valuable service at New Orleans in connection with the arrangement of collections for the Museum.

In the photographic laboratory instructions were given by Mr. T. W. Smillie to Lieut. Winterhalter, U. S. N.; Dr. Nash, U. S. N.; Mr. H. L. Turner, U. S. Geological Survey, and also to Mr. George P. Merrill and Mr. James Templeman Brown, of the National Museum.

As in previous years the use of the lecture hall has been granted for a series of lectures delivered on Saturday afternoons under the joint auspices of the Biological and Anthropological Societies of Washington. These were largely attended. Many of the lectures had direct reference to the work of the Museum, and were illustrated by specimens.

The programmes of the two courses are here given:

PROGRAMME OF THE FIRST PART.

- February 7.*—Prof. John Fiske: Results in England of the surrender of Cornwallis.
February 14.—Dr. George M. Sternberg, U. S. A.: Germs and germicides.
February 28.—Hon Eugene Schuyler: The machinery of our foreign service.
March 7.—Mr. William T. Hornaday: Natural history and people of Borneo.
March 14.—Mr. Charles D. Walcott: Searching for the first forms of life.
March 21.—Prof. E. M. Gallaudet: The language of signs and the combined method of instructing deaf-mutes.

PROGRAMME OF THE SECOND PART.

- March 28.*—Dr. James C. Welling: Oldest history in the light of newest science.
April 4.—Mr. Frederick W. True: *Ornithorhynchus*, a mammal that lays eggs.

April 11.—Medical Director A. L. Gihon, U. S. N.: Sanitary ignorance among high and low.

April 18.—Mr. J. S. Diller: A trip to Mount Shasta, California.

April 25.—Dr. D. E. Salmon: Our invisible enemies, the plagues of animal life.

May 2.—Prof. T. C. Mendenhall: Weighing the earth.

The members of the joint committee in charge of the arrangement of the lectures were: Lester F. Ward, William Birney, Robert Fletcher, Grove K. Gilbert, Theodore N. Gill, Jerome H. Kidder, Otis T. Mason, John W. Powell, Frederick W. True.

(f) *Meetings of societies.*

By permission of the Director of the Museum several societies have held their meetings in the Museum lecture hall. During the first six months of the year the following societies have availed themselves of this privilege: The National Academy of Sciences, the American Fisheries Society, the Society of Naturalists of Eastern North America, the Biological Society of Washington, and the Entomological Society of Washington.

A list of the papers submitted is given below.

NATIONAL ACADEMY OF SCIENCES.

April 21-24.

Dr. J. S. BILLINGS and Dr. W. MATTHEWS, U. S. A.—Methods of measuring the cubic capacity of crania.

S. H. SCUDDER.—Winged insects from a paleontological point of view.

A. S. PACKARD.—The *Synsarida*, a hitherto undescribed group of extinct malacostracous Crustacea; the *Gamponychida*, an undescribed family of fossil schizopod Crustacea; the *Anthracakida*, a family of Carboniferous macrurous decapod Crustacea, allied to the *Eryonida*.

ALEXANDER AGASSIZ.—The coral reefs of the Sandwich Islands; the origin of the fauna and flora of the Sandwich Islands.

T. STERRY HUNT.—The classification of natural silicates.

ELIAS LOOMIS.—The cause of the progressive movement of areas of low pressure.

C. B. COMSTOCK.—The ratio of the meter to the yard.

C. H. F. PETERS.—An account of certain stars observed by Flamsteed, supposed to have disappeared.

J. E. HILGARD and A. LINDENKOHL.—The submarine geology of the approaches to New York.

THEODORE GILL.—The orders of fishes.

J. W. POWELL.—The organization of the tribe.

G. W. HILL.—On certain lunar inequalities due to the action of Jupiter, and discovered by Mf. E. Neison.

E. D. COPE.—The pretertiary vertebrata of Brazil; the phylogeny of the placental Mammalia.

C. A. YOUNG.—Some recent observations upon the rotation and surface-markings of Jupiter.

H. A. ROWLAND.—On the value of the ohm.

F. A. GENTH and GERHARD VON RATH.—On the vanadium minerals—vanadinite, endlichite, and descloizite—and on iodyrite, from the Sierra Grande mine, Lake Valley, New Mexico.

A. N. SKINNER.—On the total solar eclipse of August 29, 1886.

THEODORE GILL and JOHN A. RYDER.—The evolution and homologies of the flukes of cetaceans and sirenians.

IRA REMSEN.—Chemical action in a magnetic field.

A. GRAHAM BELL.—The measurement of hearing-power.

A. GRAHAM BELL and F. DELLA TORRE.—On the possibility of obtaining echoes from ships and icebergs in a fog.

THE AMERICAN FISHERIES SOCIETY.

May 5-6.

Opening address, Hon. Theodore Lyman, president of the society.
Appointment of committees and other business.

R. E. C. STEARNS.—The giant clams of Puget Sound.

JAMES A. HENSHALL, M. D.—Hibernation of the black bass.

FRED. MATHER.—Smelt hatching.

FREDERICK W. TRUE.—The porpoise fishery of Cape Hatteras.

FRANK N. CLARK.—Results of artificial propagation and planting of whitefish in the Great Lakes.

A. NELSON CHENEY.—Does transplanting affect the food or game qualities of certain fishes?

J. S. VAN CLEEF.—How to restore our trout streams.

TARLETON H. BEAN.—Exhibition of complete series of salmon and trout of North America.

MARSHALL McDONALD.—Objective points in fish culture.

W. V. COX.—A glance at Billingsgate.

FRED. MATHER.—Work at Cold Spring Harbor.

EUGENE G. BLACKFORD—Oyster-beds of New York.

JOHN A. RYDER.—On some of the protective contrivances developed by and in connection with the ova of various species of fishes.

O. T. MASON.—The use of the throwing-stick by Eskimo in fishing.

THEODORE GILL.—The chief characteristics of North American fish fauna.

MARSHALL McDONALD.—Suggestions as to the development of oyster culture in the Chesapeake area.

CHARLES G. ATKINS.—Biennial spawning of salmon.

The roll of membership now includes about 150 names, 24 new members having been elected during this meeting.

BIOLOGICAL SOCIETY OF WASHINGTON.

The Biological Society of Washington, as heretofore, has held its fortnightly meetings in the lecture hall of the National Museum.

January 24.

The fifth anniversary meeting of the society.

The retiring president, Prof. Charles A. White, delivered an address upon "The Application of Biology to Geological History."

COMMUNICATIONS.

February 7.

DR. THEODORE GILL.—The relative values of different types in palaeontology.

DR. H. G. BEYER, U. S. N.—Report on intracellular digestion and its relations to pathology.

Dr. J. A. RYDER.—On the probable origin and homologies of the flukes of cetaceans and sirenians.

Mr. J. L. WORTMAN.—A method for exhibiting the relationships of the bones of the skull.

Mr. FREDERICK W. TRUE.—The recent stranding of right whales on Long Island.

February 21.

Dr. THEODORE GILL.—The relative values of different types in paleontology.

Dr. H. G. BEYER, U. S. N.—Genital apparatus of *Lingula*.

Mr. J. L. WORTMAN.—A method for exhibiting the relationships of the bones of the skull.

Mr. FREDERICK W. TRUE.—The recent capture of right whales off Long Island.

March 7.

Dr. C. A. WHITE.—On the use of gutta-percha in making casts of fossils.

Dr. H. G. BEYER, U. S. N.—Report on intracellular digestion and its relations to pathology.

Mr. G. BROWN GOODE.—Remarks on the velocity of animal motion.

March 21.

Mr. WILLIAM H. DALL.—On the marsupium of *Milneria*.

Prof. J. W. CHICKERING, JR.—Exhibition of some botanical drawings and paintings.

Dr. TARLETON H. BEAN.—Some features of collecting at Cozumel Island, Yucatan.

Dr. J. A. RYDER.—On the development of the mammary glands in the Cetacea.

Mr. LESTER F. WARD.—Phyllotaxy of *Paulownia imperialis*.

April 4.

Prof. C. A. WHITE.—On vegetable cells.

Mr. FRANK H. KNOWLTON.—Remarks on some Alaskan willows and birches.

Mr. FRANK BAKER.—Muscular equalization.

April 18.

Dr. D. E. SALMON and Dr. THEOBALD SMITH.—Koch's method of isolating and cultivating bacteria, as used in the laboratory of the Bureau of Animal Industry.

Mr. A. B. JOHNSON.—The ship-worm and the sheephead.

Mr. G. BROWN GOODE.—Remarks on the velocity of animal motion.

Mr. ROMYN HITCHCOCK.—Exhibition of a preparation of the "comma bacillus" of cholera.

May 2.

Dr. THOMAS TAYLOR.—The white rust of cabbages, *Cystopus candidus* (with illustrations).

Mr. H. W. HENSHAW.—Hybrid quail.

Mr. WILLIAM H. DALL.—Notes on a journey in Florida.

May 16.

Mr. FREDERICK W. TRUE.—Exhibition of a specimen of the Guereza monkey.

Dr. TARLETON H. BEAN.—Note on a new fish from Florida, allied to *Muraenoides*.

Mr. J. L. WORTMAN.—On the reduction of the molar teeth of the Carnivora.

Prof. OTIS T. MASON.—On post-mortem trepanning.

Mr. LESTER F. WARD.—Some Cretaceous fossil plants from the Laramie group.

May 30.

MR. LESTER F. WARD.—Recent flowering of the Ginkgo tree in Washington, with remarks on the phylogeny of the genus.

DR. H. G. BEYER, U. S. N.—The physiological effects of cocaine.

DR. C. V. RILEY.—Notes on the periodical cicada.

COL. MARSHALL McDONALD.—A theory to explain the phenomenal abundance of migratory fishes in certain seasons.

DR. THOMAS TAYLOR.—How to distinguish animal and vegetable fats.

SOCIETY OF NATURALISTS OF EASTERN NORTH AMERICA.

January 29.

CHARLES S. MINOT.—A new cabinet for microscopical specimens.

CHARLES S. MINOT.—A new feeding trough.

CHARLES S. MINOT.—An apparatus for calculating intervals of days rapidly.

S. H. GAGE.—The use of Müller's fluid for preserving the dark colors of animals.

S. H. GAGE.—The use of collodion for protecting the rubber rings of museum jars.

S. H. GAGE.—Glass bulb canulæ for the injection of silver nitrate, gold chloride, &c.

H. F. OSBORN.—A simple method of injecting the entire arterial and nervous systems in different colors.

H. P. BOWDITCH.—A new form of stop-cock for rubber tubing.

R. RAMSAY WRIGHT.—On methods of staining series of sections.

B. G. WILDER.—The use of slips in scientific correspondence.

C. S. MINOT.—On a new staining solution for histological use.

C. A. ASHBURNER.—Notes on barometric hypsometry.

H. C. LEWIS.—A summer school of geology.

C. A. ASHBURNER.—Methods in practical geology.

H. N. MARTIN.—The use of modeling clay to illustrate lectures.

H. F. OSBORN.—Methods of investigating the embryology of the opossum.

THEO. GILL.—On osteological collections.

January 30.

C. D. WALCOTT.—The collecting and working of invertebrate palæontologic material.

G. K. GILBERT.—Geological bibliography.

GEORGE P. MERRILL.—Exhibition of a colored, enlarged photo-micrograph of a thin section of a rock.

G. BROWN GOODE.—Description of the unit-system of cases used in the U. S. National Museum.

J. A. RYDER.—On Museum alcoholics.

B. G. WILDER and S. H. GAGE.—An investigator's table with double or triple revolving top and movable book-rests.

R. R. WRIGHT.—On the use of series of sections in laboratory teaching and a convenient method of obtaining them.

H. A. HOWELL.—On the use of terrapin blood for the demonstration of the phenomena of coagulation.

HARRISON ALLEN.—Exhibition of the palatograph.

C. V. RILEY.—On the mounting of alcoholic specimens in insect cabinets.

C. V. RILEY.—On a preserving fluid for soft galls and plant tissues.

JOHN MURDOCH.—New application of the towing net in the Arctic regions.

F. W. TRUE.—On the preservation of type specimens.

G. BROWN GOODE.—The use of photography for making large diagrams.

W. H. NILES.—Shall we define groups of organisms?

L. F. WARD.—On a method of rapid drawing for photo-engraving.

R. E. CALL.—Dentition of certain mollusks.

ENTOMOLOGICAL SOCIETY OF WASHINGTON.

January 8.

Prof. C. V. RILEY.—On a larva of *Scenopinus* (Diptera) found infesting the blanket of a Navajo Indian.

Dr. GEORGE MARX.—Discovery of the male of *Gasteracantha* (Arachnida).

March 12.

Annual address by the president, Prof. C. V. Riley.

Mr. B. P. MANN.—Advisability of exact transcription of titles in making references to publications.

Mr. E. A. SCHWARZ.—On a Scolytid beetle (*Pityophthorus consimilis*) infesting sumac.

April 2.

Mr. E. A. SCHWARZ.—Habits of *Rhagium lineatum*.

Mr. E. A. SCHWARZ.—On the character of the coleopterous fauna of the Alleghany Mountains.

Mr. L. O. HOWARD.—On the eggs of *Tingis* (Heteroptera).

Mr. L. O. HOWARD.—On a *Pteromalus* bred from the bags of *Thyridopteryx ephemeraeformis*, and on the difficulty in distinguishing between primary and secondary parasites.

Dr. GEORGE MARX.—On the Arachnidæ collected in Labrador by Mr. L. M. Turner.

Mr. E. A. SCHWARZ.—On the identity of the genera *Eutyphlus* Le Conte and *Nicotheus* Casey.

May 6.

Mr. E. A. SCHWARZ.—On the process of losing the mandibular appendages in *Otiorynchidae*.

Mr. E. A. SCHWARZ.—On the hibernation of certain *Cerambycidae* in the imago state.

June 4.

Mr. L. O. HOWARD and Prof. C. V. RILEY.—On the edibility of the periodical cicada.

Prof. C. V. RILEY.—Observations on the natural history of *Cicada septendecim*.

Mr. E. A. SCHWARZ.—On a *Scolytus* bred from hickory bark and wrongly referred to *S. rugulosus*.

Prof. C. V. RILEY.—*Walshia amorphella* bred from roots of loko weed.

Prof. C. V. RILEY.—The habits of *Pædisca scudderiana*. *P. saligneana* not identical with *scudderiana*, as generally supposed.

Prof. C. V. RILEY.—On the identity of the noctuid genera *Arzama* and *Sphida*.

12. CURRENT ADMINISTRATIVE WORK.

(a) *Buildings and labor; police and public comfort.*

On January 1 the staff employed for police and inspection under the charge of Henry Horan, superintendent of buildings, consisted of 2 assistant superintendents, 10 watchmen, 5 doorkeepers; for construction, care of buildings and repairs, 3 carpenters, 2 painters; for labor and cleaning, 19 laborers, 6 cleaners, and 7 attendants. For heating and lighting there was employed 1 engineer, with 4 firemen.

From February 17 to March 9, 4 additional female attendants were engaged on account of the increase in the number of visitors which was anticipated during the inauguration season. On May 27 three extra carpenters were employed for a short time, owing to the press of work

in connection with the preparation of cases for the reception of the exhibits then shortly expected from New Orleans.

From the semi-annual report of the superintendent are abstracted the following paragraphs, which will serve to show in part the work accomplished by the laboring force during the first half of the year:

In January the cases containing the collection of fossils were removed from the east-south and west-south ranges into the south-east court. The north-east court was cleared for the exhibition of specimens in the Department of Ethnology. The laboratory and offices of the curator of Metallurgy were moved from the first floor of the south-west pavilion to the second floor. The offices of the curator of Mammals were moved from the south tower to the first floor of the south-west pavilion. The installation of certain metallurgical exhibits was commenced. Some of the specimens are very heavy, and required much time and a large force to effect their transfer properly.

In February cases were prepared for the reception of the basket exhibit by the Department of Ethnology. The cases containing the textile exhibit were arranged in the west hall. The collections of modern pottery and terra-cotta were installed on the north side of the west hall. Several cases containing minerals were removed from the west-south range into the Mineral hall. The handling of heavy cases full of specimens was continued for several days during this month.

In March the force of attendants was increased, and many of the laborers assigned to duty as watchmen, on account of the extra crowds of visitors expected during the "inauguration season." During the five days, March 2 to March 6, no less than 48,148 people visited the Smithsonian building and the National Museum. On March 3 10,781 people were registered in the Museum and 9,719 in the Smithsonian building. On March 19 the heavy specimens of pottery, terra-cotta, tiling, &c., were transferred from the Smithsonian building to the Museum. The walls of the south hall were decorated with heads of elk, deer, and buffaloes.

In April the U. S. Fish Commission steamer Albatross arrived with several wagon-loads of specimens for the Department of Marine Invertebrates. These were transferred without delay. Work-rooms were constructed and fitted up in the Annex building for the use of the modelers. A large and heavy portion of the exhibits from the London Fisheries Exhibition, which had been stored on the east balcony, were assigned and transferred to the proper departments. The laboratory of the Department of Mollusks was fitted with standard wall cases.

In May a shed for the accommodation of stone-cutters was built between the Museum building and the Annex. The south and east fronts of the Museum building were paved with concrete. A very large collection of birds was removed from the Agricultural Department to the Smithsonian building. Much time was devoted to the preparation of cases for the exhibits to be returned from the New Orleans Exposition.

In June a loft was constructed in the Annex building for storage purposes. The collection of scientific apparatus was removed from the Smithsonian building into the Museum building and installed in suitable cases. The north-west gallery of the Smithsonian building was cleared and fitted with cases and shelving for the collections of marine invertebrates, which were transferred thither from the west hall. This work involved the expenditure of much time and labor. Nineteen car-loads of metallurgical exhibits were received from Philadelphia and unpacked. The painting of the exterior wood-work of the Smithsonian building was commenced.

(b) *Electric service.*

The only additions during the first half of the year consisted in (1) replacing the 50-drop annunciator with a 100-drop instrument; (2) a new standard-time clock connected with the Naval Observatory and

placed in the Smithsonian building, and (3) the establishment of a fire-alarm box connecting the National Museum with the fire headquarters. In April a telegraph office was opened in the telephone room, providing for the transmission and receipt of messages over the Western Union, Baltimore and Ohio, and Government lines. An underground cable was laid for telephone wires from the south front of the Smithsonian building to the north-west basement of the Museum building.

All the doors and windows in the Museum building are connected with an electric communicator, which contains 100 drops. By this means the watchman is notified if any door or window is open after the closing of the Museum, or of any burglarious entry. There are also insulated wires laid under all the marble floors at a distance of 8 feet apart. These are easily accessible, and are for the purpose of connecting the exhibition cases to a 50-drop annunciator. To all of the alarm apparatus switches are attached for the purpose of disconnecting during business hours any or all portions of the Museum building that may be desired.

The time-service consists of one Howard Company's standard eight-day electric-clock movement, which by metallic circuit connects with and gives correct time to six 36-inch dials placed in the main exhibition halls of the Museum and Smithsonian buildings, and also to seven 18-inch dials situated in the offices of the buildings. The motive power is supplied by 50 cells of Smee battery, situated in the basement of the Museum and controlled by two electric relays. There are two standard clocks, one in the Museum building and the other in the Smithsonian building, which have a metallic connection with the Naval Observatory, and by that means are corrected every day, thereby giving exact time in both buildings. There is also a Howard Company's standard time and watch clock in the electrical room. This is connected to fourteen station boxes. These station boxes are visited every hour by the watchman patrolling the building, who, by inserting his key in each box, registers the time of each visit upon the dial placed within the clock. There is also a similar clock of smaller dimensions placed in the superintendent's office of the Smithsonian Institution, which works in the same manner.

Electrical push-buttons are arranged on each corner of all the exhibition halls of the Museum. These are connected with an electric annunciator for the use of floor inspectors, watchmen, and others who may need immediate assistance.

The electric call-bell system is comprised of twelve large gongs placed in different portions of the Museum building. These are connected with call-buttons for the purpose of calling the officers or messengers.

A similar system, consisting of six gongs, is also distributed through the Smithsonian building. There is also a system of District messenger call-boxes, by which outside messengers can be summoned any time day or night.

The watchmen in charge of the buildings are required to report

through the messenger call-boxes to the District messenger headquarters every hour during the time when the buildings are closed.

The electrical-light system is comprised of one six-light dynamo and governing dial run by a twenty horse-power engine. This supplies a current to six electric arc lamps of 1,500 candle-power, for which suitable wires and connections are placed in all the main exhibition halls. The dynamo is used principally for supplying current to two photographic electric lamps. There is also a single-light dynamo and lamp used as a reserve. One Brush storage battery, consisting of sixty-three elements, is used for supplying current to forty incandescent lamps, which supply light to the lecture hall.

In connection with the electrical service there is at the Armory building an electric hydrostatic indicator for the purpose of giving the height and depth of the water in the reservoir in the building.

The telephone system now consists of forty separate lines. These include two lines to the city exchange, and lines connecting the residences of the chief officers, and all annexes and branches of the Museum and Smithsonian buildings. The lines connect to a switch-board in the Museum building, through which communication can be had at any time either day or night. The number of communications transmitted and received through these lines daily averages one hundred and twenty-five.

“Nature,” commenting upon the electric service in the Museum, in an article of the issue dated June 28, 1883, says:

“The National Museum at Washington is one of the best examples in the United States of the practical application of electricity. In so large a building it was found advisable to take advantage of the best means of communication, first being its system of telephones and call-bells, by which those in any room can communicate with every room in the building. Twenty-six telephones are connected by a local telephone exchange, which in turn is connected with the main telephone office of the city. The result is that but three messengers are needed in this vast establishment. The photographic laboratory is independent of the sun, owing to the electric light there used. If one of the 850 windows or 230 doors is opened, a bell rings, and an annunciator shows to an attendant at the main office which window or door it is. This system is soon to be applied to every case of specimens. The watchmen at night, also, are kept to their posts by hourly releasing an electric current at certain stations, which pierces a dial and records their visit. The sixteen clock-dials are likewise run by electric currents.”

The following is a complete list of the electrical property of the National Museum on June 30, 1885:

2 100-drop Museum annunciators.	1 Brush reflecting lamp.
2 25-drop Museum annunciators.	40 Swan incandescent lamps.
1 6-drop Rosseau annunciator.	1 Howard tower clock.
1 Howard time and watch clock.	13 Western Electric Company's bells.
18 Howard time and watch clock stations.	30 LeClanche battery cells.
6 Howard 30-second clocks.	1 Barnes's foot-lathe.
7 Howard 15-second clocks.	1 bench vise.
50 cells Howard clock battery.	1 set of lathe drills.
1 Brush storage battery.	2 lathe chucks.
1 Brush single light dynamo.	1 set taps dies.
5 Brush electric lamps.	1 step-ladder.
	3 post-magneto bells.

(c) Property and supplies.

The property clerk is charged with the inspection of all articles of furniture and with the distribution of supplies under the prescribed rules. It is intended to bring this department into closer connection with the department of accounts and requisitions, and for this reason a detailed statement of the exact duties of this office will be deferred until the next report.

(d) Accounts.

The routine work pertaining to the issue of orders and the adjustment of accounts, preparatory to their payment from the office of the chief clerk of the Smithsonian Institution, has been carefully and satisfactorily performed by Mr. W. V. Cox, financial clerk. A statement of the receipts and expenditures of the Museum will be found in the report of the executive committee of the Board of Regents of the Smithsonian Institution.

13. THE WORK OF THE MUSEUM PREPARATORS.

The work of preparing specimens for exhibition in the Museum or for the study series has progressed very satisfactorily during these six months. The force of preparators now includes nine men of undoubted skill, whose work amply testifies to the thoroughness of their methods.

(a) William T. Hornaday, chief taxidermist; Henry Marshall.

(b) Frederic A. Lucas, osteological preparator.

(c) Joseph Palmer and J. W. Hendley, modelers.

(d) T. W. Smillie, photographer.

(e) A. Zeno Shindler, artist.

(f) E. H. Hawley and T. W. Sweeney, preparators in the Division of Anthropology.

(a) Taxidermists.

The most valuable accessions of fresh specimens in the Taxidermic Department during the first half of 1885 were as follows:

A water-buck, dorcas gazelle, axis deer, and a fine ostrich from Mr. W. A. Conklin.

A fallow deer, olive baboon, and dog-faced baboon from Barnum, Bailey & Hutchinson.

A Coypu rat, Hoffman's sloth, and two kangaroos from A. E. Brown, superintendent Philadelphia Zoological Gardens.

A white-faced antelope and olive baboon from W. T. Hornaday.

A fine series of 8 large skins of California elephant seal.

Three skins of harp-seal from C. Hart Merriam.

Three tiger cubs from Mr. Adam Forepaugh.

The most noteworthy of the animals mounted during the same period were as follows:

A fine specimen of the rare and remarkable guereza monkey, an olive

baboon, a mandrill, a Japanese macaque, a large mountain sheep, a prong-horned antelope, harnessed antelope, a peccary, a large dusky shark (*Carcharinus obscurus*), a fine dugong, ten feet in length, and three heads of large mammals.

In addition to the above, twelve large Mammal heads were repaired, remounted, and hung in the mammal hall.

The collection of mammals sent from the Museum and the exhibit of the Society of American Taxidermists were unpacked and installed at the New Orleans Exposition in the month of January, and in June were repacked for return shipment, all of which greatly lessened the number of specimens which would have been mounted during the half year.

The following is a list of the mammals, etc., mounted in the taxidermic workshops from January 1 to July 1, 1885:

<p style="text-align: center;">PRIMATES.</p> <p>14511. <i>Colobus guereza</i>. 14672. <i>Cynocephalus sphinx</i>. 14229. <i>Cynocephalus porcarius</i>. 14324. <i>Cynocephalus anubis</i>. 14956. <i>Cynocephalus anubis</i>. 13632. <i>Ædipus titi</i>. 13830. <i>Macacus speciosus</i>. 14604. <i>Papio maimon</i>. 14664. <i>Semnopithecus</i> sp.</p> <p style="text-align: center;">CARNIVORA.</p> <p>14123. <i>Ursus americanus</i>, var. <i>cinnamomeus</i>.</p> <p style="text-align: center;">SIRENIA.</p> <p>13721. <i>Halicore australis</i> (10 feet long).</p> <p style="text-align: center;">RODENTIA.</p> <p>14995. <i>Myopotamus coypu</i>. 14065. <i>Neofiber Allenii</i>.</p>	<p style="text-align: center;">UNGULATA.</p> <p>14938. <i>Memimna indica</i>. 14517. <i>Ovis montana</i>. <i>Ovis cycloceras</i>. 14708. <i>Ovis nivicola</i>. 14874. <i>Antilocapra americana</i>. 14875. <i>Antilocapra americana</i>. (Head.) 14326. <i>Tragelaphus scripta</i>. 14667. <i>Dicotyles torquatus</i>.</p> <p style="text-align: center;">MARSUPIALIA.</p> <p>14665. <i>Macropus gigas</i>.</p> <p style="text-align: center;">MISCELLANEOUS OBJECTS.</p> <p><i>Carcharinus obscurus</i> (Dusky shark, 10 feet long). <i>Ardetta exilis</i> (Least bittern). <i>Chroicocephalus philadelphia</i> (Bonaparte's gull). Two specimens. <i>Salmo salar</i> (Potomac salmon).</p>
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- 16 mammals skinned and preserved.
- 11 heads of large mammals repaired and remounted.
- 19 skins of large mammals poisoned, dried, and dressed.
- 22 mounted mammals dismantled and made into skins.
- 28 mounted mammals dismantled and destroyed.
- 1 *Lagenorhynchus* repaired.
- 5 boxes of skins packed and shipped.

The following exhibits were unpacked and installed at the New Orleans Exposition :

	Specimens.
Mammals	147
Mammal casts	14
Skeletons	28
Taxidermic exhibit	56

The following exhibits were packed at the New Orleans Exposition for return shipment :

	Specimens.
Mammals	150
Birds	163
Skeletons	28
Society of American Taxidermists	56
Casts of mammals	14
Heads of mammals	8
Antlers of mammals	8

The following is a list of mammals, etc., in flesh secured for the taxidermic department during first half of 1885.

14750. <i>Cynocephalus babouin</i> , Baboon.	14952. <i>Cervus axis</i> , Axis Deer.
14956. <i>Cynocephalus anubis</i> , Olive Baboon.	14999. <i>Cervus dama</i> , Fallow Deer.
14763. <i>Semnopithecus siamensis</i> .	15054. <i>Cervus dama</i> (young).
14984. <i>Felis tigris</i> , Tiger (cub).	14938. <i>Meminna indica</i> , Musk Deer.
14984. <i>Felis tigris</i> , Tiger (cub).	14997. <i>Kobus ellipsiprimnus</i> , Waterbuck.
14984. <i>Felis tigris</i> , Tiger (cub).	14995. <i>Myopotamus coypu</i> , Coypu Rat.
14956. <i>Damalis pygarga</i> , Bonte-bok.	21765. <i>Cholæpus Hoffmanni</i> , Sloth.
14955. <i>Gazella dorcas</i> , Dorcas Gazelle.	14772. <i>Macropus rufus</i> , Red Kangaroo.
	<i>Struthio camelus</i> , Ostrich.

The following is a list of objects donated to the National Museum for the exhibit of the Society of American Taxidermists, and placed in charge of W. T. Hornaday, curator of the collection of the Society of American Taxidermists :

Name of donor.	Object.
W. T. Hornaday	Setter dog and quails, "Coming to the Point." (Silver medal.)
F. A. Lucas	Group of hawks, "An Interrupted Dinner." (Diploma of honor.)
F. A. Lucas	Group of turtles. (Bronze medal.)
F. A. Lucas	Group of herons.
F. S. Webster	Wounded heron. (Bronze medal.)
T. W. Fraine	Peacock screen.
Prof. Henry A. Ward	Head of caribou.
John Wallace	Bald eagle.
John Wallace	Great horned owl. (Bronze medal.)
Mr. and Mrs. George H. Hedley	Group of humming birds.
Joseph Palmer	Group of squirrels.
William Palmer	Group of ducks.
J. F. D. Bailly	Two groups of frogs. (Grotesque.)
E. A. Capen	Dead gull.
P. W. Aldrich	Fox squirrel.
Thomas Rowland	Snowy egret.
J. F. D. Bailly	Portrait of Jules Verreaux.
G. L. Nicholas	Series of 5 specimens to show process of removing and preserving bird skins.
G. L. Nicholas	Series of 14 bird skins.
G. L. Nicholas	Series of 3 bird pedestals, showing style adopted by the Museum of the College of New Jersey.
Dr. J. B. Holder	Series of 2 bird pedestals, to show the styles adopted in the American Museum of Natural History.

Mr. Henry Marshall devoted his time, as usual, to mounting specimens for the Department of Birds. During the six months covered by this report he prepared 235 specimens for the exhibition series, nearly all of which were mounted from dried skins,

(b) Osteological preparator.

Mr. Frederic A. Lucas reports that during the last six months twelve specimens, mostly of large size, have been received and cared for, nineteen cleaned, and twenty-nine mounted and placed in the exhibition series. Chief among these last is an almost unique skeleton of the extinct sirenian, *Rhytina gigas*. The regular work of maceration was begun early in the spring, nine jars, thirty-five barrels, and three large tanks being filled with some two hundred specimens. The collection of bird bones has been removed from the Smithsonian to the Museum building, and part of the material, received in exchange from the Army Medical Museum, transferred to the Institution. The rapid growth of the osteological collections necessitates frequent changes in the arrangement of both the exhibition and study series, and a continual increase of time in caring for the specimens. It is to be regretted that the force available in this section is so small, since the work, owing to its peculiar nature, is necessarily slow and subject to frequent interruptions. One more trained assistant would relieve the chief osteologist of much of the manual work and leave him time for more important duties. The limit of work in cleaning skeletons with the present force has been reached, and it is difficult, if not impossible, to keep pace with the accessions of material. Mr. Lucas has been assisted by Mr. Scollieck.

(c) Modelers.

Mr. Joseph Palmer states that his principal work has been that of casting from molds which have accumulated from former years, and in repairing fish, reptile, and porpoise casts that had been returned broken from the various expositions to which they had been sent. A fine specimen of the rare sperm-whale porpoise, *Kogia breviceps*, in the flesh, was received and molded, and also a spotted porpoise, *Prodelphinus*, the molds of which, together with others, notably a large grampus, bottle-nosed porpoise, halibut, spiny shark, &c., have been prepared and cast, and are now ready for painting.

In making a mold of a snake it was found that usually a globule of air would form at the point of the scales and produce in the cast a similar globule of plaster, the removal of which caused considerable minute work. By experiment this has been remedied by molding the snake in a wet condition, which allows the air to be taken up by the plaster used in making the mold.

Improvements have also been made in the method of making paper casts of the large fishes, porpoises, &c., and the work has been greatly facilitated thereby.

Major Powell having vacated the room for several years occupied by his photographers, Mr. Marshall has moved into them, thus giving increased space, which has been still further added to by the use of a shed at the rear of the Smithsonian building for casting the larger molds.

It is to be regretted that better accommodations under a single roof cannot be furnished for this work.

Mr. Hendley made and painted a large number of casts of archæological specimens for display at the New Orleans Exposition, and also of twenty-seven mound pipes. A series of experiments was also made in the use of cements in casting.

(d) *Photographer.*

During the six months 410 negatives have been added to the files; of these 293 are ethnological, 43 of fishing-boats and fish-hatching stations, &c., and 74 mineralogical, lithological, osteological, and miscellaneous.

Sixteen hundred and six prints have been made, as follows:

Ethnological and archæological.....	1,002
Mineralogical prints	87
Fishing vessels, boats, &c.....	232
Miscellaneous.....	285

Three hundred and six cyanotypes, plans of cases, &c. (for distribution to correspondents).

Sixty-one enlargements by electric light have been made, as follows:

For the Department of Metallurgy.....	27
For the Department of Fabrics	13
For the Department of Mammals.....	10
For the Department of Lithology.....	2
Of fish-hatching stations, &c	9

The numbering and filing of negatives has been completed to date, and a sample book of photographs is now being prepared.

Five pupils have been instructed in the elements of the art of photography. Lieutenant Winterhalter has already done valuable work in photographing the eclipse of the sun. Mr. Merrill has photographed for his own department numerous stone quarries, mud cracks, drift boulders, &c. Mr. J. Templeman Brown has photographed a number of fishing vessels, and Dr. Nash is now in Alaska with Lieutenant Stoney, in charge of the photographic work of the expedition.

(e) *Artist.*

Mr. A. Zeno Shindler painted several life-size busts of Indians, modeled by Achille Collin, sculptor; also, a large number of photographs of costumes. He restored an ancient oil-painting of Constantinople, and colored several casts of Indian implements for the Department of Antiquities.

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

Mr. E. H. Hawley devoted a portion of his time to the completion of exhibits for the New Orleans Exposition.

The installation of the collection of costumes has been commenced. It is intended to exhibit with each costume a photograph. In some cases persons wearing a given costume have already been photographed, and these photographs, colored by Mr. Shindler, will be displayed in connection with the costumes. By this means the visitors can not only see the costume, but learn its manner of habiliment. For the preservation of certain costumes whose fibers or colors are too delicate to be poisoned in the usual way, Mr. Hawley has adopted the method of sealing the boxes with strips of cloth smeared with poisoned glue. The installation of the Chelsea Art Castings, contributed by the Magee Furnace Company, a collection of Indian blankets, and a series of models of Zuñi idols, symbols, &c., has also been commenced. Labels are in course of preparation for the collection of Hindoo religious and household utensils, and for the small statuettes illustrating the castes and costumes of those people.

In order to place on permanent record the work accomplished in this department of the Museum service, the management issued a circular on June 1 to all preparators, requiring that after that date reports should be made as to the amount and character of work received, commenced, and finished during each week.

14. SKETCH OF THE EXHIBIT MADE BY THE SMITHSONIAN INSTITUTION AT THE NEW ORLEANS EXPOSITION.

On pages 51 and 52 of the Report for 1884 reference is made to the participation of the Smithsonian Institution, including the National Museum, in the New Orleans Exposition, with a brief statement of the exhibit made by the Museum. The weight of the collections sent from the Institution was 176,000 pounds. A portion of this material had already been exhibited at the Louisville and Cincinnati exhibitions and was forwarded from those places to New Orleans. In the middle of November, 1884, was commenced the shipment of material from Washington, and the entire collection, consisting of seventeen car-loads, was forwarded within a few weeks. The extent of the space allotted to this exhibit in the building provided for the display of Government and State exhibits, was 81½ feet wide and 300 feet long, including 24,750 square feet.

On December 6, Mr. G. Brown Goode and Mr. R. E. Earll started for New Orleans to begin the work of installing the collections, and at various times during the progress of the Exposition many of the curators whose departments were represented, attended the Exposition in the interests of their exhibits. A brief sketch of these collections is now given, the exhibits being referred to in order, according to the amount of floor-space occupied.

The Animal Products exhibit occupied the largest amount of space (2,400 square feet). Specimens of fur from nearly every fur-bearing animal in the United States were shown, and in general the methods of

utilizing the hair, fur, feathers, skin, scales, flesh, bones, horns, teeth, claws, viscera, and excrements of various animals were displayed. A collection of models and illustrations of traps were also included.

In the section of Fisheries and Fish-culture (2,345 square feet) was displayed a large collection of fishing apparatus and 150 photographs illustrative of the methods employed in our sea and river fisheries; also a large number of plaster models of food-fishes of North America. The operations of hatching young fish of several species were fully shown.

The exhibit of the Department of Metallurgy and Economic Geology (1,274 square feet) was one of the largest prepared by the Smithsonian Institution. The various kinds and grades of the ores of each metal were shown, and also collections representing the processes for the extraction of the metals from their ores.

The exhibit of the Department of Ethnology (1,904 square feet) consisted of a collection illustrating the social condition of the various tribes of North American Indians and Eskimo.

The Textile display (1,624 square feet) was intended to show the numerous fibers used in the manufacture of textiles, and, as far as practicable, the various stages of preparation and the processes of manufacture. The fibers of foreign countries were largely represented.

The exhibit of the Department of Mollusks (1,328 square feet) included several cases of the fresh-water mussels, marine shells, the edible mollusca of the United States, and selected specimens from the Indo-Pacific region.

In the Mineral exhibit (1,290 square feet) was a collection of the minerals which afford gems and ornamental stones, and several specimens of cut and polished stones.

The Mammal exhibit (1,082 square feet) consisted of 160 specimens, representing 150 species and varieties, and including all of the North American ruminants except the musk-ox, the important carnivores, the noxious rodents, representative species of porpoises, the manatees, and the more characteristic monkeys, sloths, bats, and insectivores.

A collection illustrating the development of the vessels of the merchant marine was shown in the space allotted to the section of Naval Architecture (686 square feet). Prominent among these were models showing the development of cotton-ships.

In the Art exhibit (652 square feet) a collection of 120 autotypes was arranged chronologically by countries, and was intended to represent the most noted pictures of the principal artists of the world and the most renowned pieces of sculpture. The process of photo-engraving was also illustrated by a collection from the Photo-Engraving Company of New York.

An interesting exhibit was made by the Society of American Taxidermists. This occupied 595 square feet, and included specimens prepared by some of the leading members of the society.

The collection of birds, occupying 540 square feet of floor-space, con-

sisted of 163 finely-mounted specimens of the game birds of North America, mounted on stands made of polished black walnut.

A collection of stone implements from various localities in North America, occupying 406 square feet, was exhibited in six cases.

The exhibit from the Department of Lithology and Physical Geology (384 square feet) consisted of (1) a collection of 358 4-inch cubes representing the building and ornamental stones of the United States; (2) 12 specimens of foreign and native marbles; (3) 150 specimens of rock-forming minerals; (4) a "structural series," intended to represent all the more common forms of rock structure and texture; (5) 198 specimens of rocks illustrating the geology and lithology of the Comstock lode and Washoe district, Nevada; and (6) a lithological collection of 500 specimens of rocks of various kinds.

An extensive series of models in plaster of the turtles and snakes of North America, occupying a floor-space of 300 square feet, was shown. These casts were life-size and accurately colored from living specimens or colored sketches.

These collections attracted marked attention, and sustained the reputation of the Smithsonian Institution in its ability to prepare creditable displays at very short notice.

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

15. DIVISION OF ANTHROPOLOGY.

(a) *Department of Arts and Industries.*

In the Department of Arts and Industries several sections have already been organized.

That of *Materia Medica*, under the charge of Dr. H. G. Beyer, U. S. N., who has been detailed for this service by the Surgeon-General of the Navy, is in excellent condition, and the collection is the most extensive of its kind in America. The work of labeling has been finished, and during the year the exhibition series will be extended and rearranged. Dr. Beyer is prosecuting a chemical investigation of the different species of cinchona barks in the collection—numbering over one hundred—and has made some important determinations of the alkaloids of some cinchona barks from new regions in Guatemala and Costa Rica. He has also carried on investigations upon the physiological actions of atropia, cocaine, and caffeine on the circulatory apparatus, the results of which have already been published in the *American Journal of the Medical Sciences*. Other experiments on the action of atropine on the heart, and of blood at different temperatures, have been discussed in the *Proceedings of the Museum*.

In the section of Foods, under the honorary curatorship of Professor

Atwater, some progress has been made in the work of building up a collection illustrating the physiological action of foods and the composition of the human body, similar to the famous collection in the Bethnal Green Museum in London.

Mr. Hitchcock, who is acting curator of this collection, has, however, devoted most of his time to the development of the section of Textiles, which is directly under his charge. This section has been largely increased by donations from abroad, but especially through collections made by himself while preparing for the exposition at New Orleans. The object of these collections is twofold: First, to place upon view the various textile fibers available for use in this country and abroad, with specimens of articles made therefrom, such as cloth, rope, twine, mats, &c.; second, to provide a series of specimens of every fiber that can be used in the arts, to be used for scientific examination, tests of tensile strength, and especially to serve as type specimens for the identification of other fibers by microscopical examination. A number of collections which have been received are worthy of special mention; among these a particularly fine set of fibers from Brazil, collected by Dr. J. Charles Berrinni, of Quissanam, who has devoted unusual care and labor to the work. All the textile fibers in the museum of the Department of Agriculture were placed in Mr. Hitchcock's charge during January, and from this collection some valuable specimens have been selected and placed on exhibition. Mr. George W. Bond, of Boston, has selected a large collection of native and foreign wools, from samples belonging to the United States customs department, which have been prepared for exhibition; they are not yet, however, on exhibition, as the cases for their display are not yet made. This collection is probably already the best thing of the kind to be found in any museum, and when all the wools belonging to the Museum collections are mounted, the display of this textile will be, if not quite complete, at least very large and valuable.

Owing to the restricted floor-space in the Museum which has been assigned to this department, it has been impossible to make the display of specimens as instructive and attractive as it might be. By far the greater part of the collection, and some of the most interesting specimens, have been sent to the exposition at New Orleans, where this department was well represented. A detailed account, however, of the display there made would not be of interest in this report, and the subject may be passed over with the statement that there were sent to New Orleans 290 unit boxes to represent the Textile Department of the Museum. The display is said to have been very attractive.

Mr. Hitchcock has also been requested to take charge of the physical apparatus belonging to the Smithsonian Institution which has been transferred to the National Museum and placed in cases. The arrangement has been necessarily very unsystematic, owing to the limited space at his disposal, but in a general way it is classified under three heads,

namely : apparatus for experiments on sound, heat and light, and electricity. A list of the instruments in this collection (which is of interest as having been used by Professor Henry) is in course of preparation. In connection with it may be mentioned the relics of electrical and chemical apparatus of Dr. Joseph Priestley, which is on exhibition in the same place.

The collection of historical relics has received but little attention during the six months, and no effort is at present being made to increase its extent. Perhaps no part of the Museum is more attractive to visitors than that in which the relics of Washington are displayed, and it is believed that the section of Historical Relics will receive from year to year a constant increment of valuable memorials of the past. The heirs of General Robert E. Lee have presented a claim for the recovery of articles of furniture removed from Arlington in 1862, and since then on exhibition with the Washington relics at the Patent Office and in the Museum. Most of these appear never to have been the property of General Washington. They will, however, be held in the Museum until official instruction for their delivery has been received.

There has been little activity in connection with the section of Fisheries, the section of Naval Architecture, and the collection of Musical Instruments, all of which are, however, in excellent order and have been considerably extended, though without direct effort. An accession to the section of Naval Architecture of very great popular interest is the corrugated metallic life-car invented by Joseph Francis.*

*Joseph Francis was born in Massachusetts, March 12, 1805. When only eleven years old he manufactured a boat to which he applied cork, confined in wood, in the bow and stern, as a buoyant power. This boat, when filled with water, supported four men. This determination to devote his life to the invention of life-saving apparatus was fixed by the occurrence of many terrible shipwrecks along the coasts of New Jersey and Long Island in 1812, and between this year and 1821 he made a series of experiments with the view of obtaining more buoyant power in boats. In 1819 he invented and built a light, fast row-boat, possessing all the life-saving qualities he had perfected up to that time, and for this he was awarded an "honorable recognition" at the first fair of the Massachusetts Mechanics' Institute.

Among the special boats constructed under the direction of Mr. Francis may be mentioned the Brazilian barge; the barge ordered for the Emperor of Russia; a section metallic bateau for the Russian Government; the first Venetian gondola made in the United States; portable screw-boats which were easily adjusted, being built in sections and fastened together with screws; the life and anchor launch; the double or reversed bottom life-boat, &c.

The crowning success in Mr. Francis's life, as an inventor, was the discovery of the fact that corrugated metal could be used as a substitute for wood in the construction of life-cars or life-boats. He found very great difficulty in corrugating metal on curved and irregular surfaces. After repeated experiments two perfect sides of a boat were produced with deep and full corrugations and with a surface free from wrinkles; the two sides were riveted together, and the "first corrugated metal boat was made," being the first practical result of his invention of the covered life-car, invented in 1838. His experiments in connection with the corrugating of metal continued during 1840 and 1841. It was not, however, until 1847 that Mr. Francis manufactured a life-car which he considered absolutely perfect. The original Ayrshire life-car con-

An illustrated catalogue of the Catlin collection of Indian paintings has been prepared by Mr. Thomas Donaldson, and constitutes Part V of this report.

Mr. J. E. Watkins, of Camden, N. J., who is one of the leading authorities in the country upon the history of railroads and steam transportation, and who is indorsed by many of the leading railroad men of the country, was in June appointed honorary curator of the section of Steam Transportation. It is intended, as opportunity offers, to gather in the Museum a collection of objects illustrating the history of American railroads and steamboats, with a view to preserving permanently the memorials of the growth of this most important interest, which has been so closely connected with the material progress of the United States. Several important specimens have already been received, notably the "John Bull" locomotive engine, which was built in 1831, in England, by George and Robert Stephenson, for the Camden and Amboy Rail and Tramway Company, by whom this engine was used from 1831 to 1861. This is now stored at the Armory building, but will be on exhibition as soon as proper space can be provided.

(b) *Department of Ethnology.*

The Department of Ethnology has made rapid advances under the care of its new curator, Prof. Otis T. Mason, although his detail for special services in connection with the New Orleans Exposition necessitated his absence for nearly two months. During the remainder of the time he has been occupied in preparing for exhibition monographic collections of those classes of objects in which the Museum is rich, paying special attention to the subject of aboriginal baskets, throwing-sticks, and weapons.

(c) *Department of American Prehistoric Pottery.*

Mr. William H. Holmes, of the Bureau of Ethnology, has continued the installation of aboriginal pottery, directing his efforts chiefly to labeling, cataloguing, and classifying the accessions received in the summer and fall of 1884. The very extensive collections of Pueblo

constructed in 1847 was the first of the kind ever used, and this was only used once, when, on January 12, 1850, two hundred men, women, and children were saved from the wreck of the ship *Ayrshire*. This life-car is now on exhibition in the National Museum.

After the discovery of corrugating iron many metallic forms of boats, military pontoons, ponton-wagons, buoys, steamers, floating-docks, whale-boats, canal-boats, &c., were produced.

In the "History of Life-Saving Appliances and Military and Naval Constructions," from which many of the above facts are derived, is a very interesting account of the exhibition and test of the iron corrugated military ponton-wagon at Closternewburg, before the Emperor of Austria. His interviews with foreign potentates were numerous, and the exhibitions of his wonderful inventions always aroused great enthusiasm.

material made for the Exposition in New Orleans arrived too late to be made fully available for exhibition, but a small representative series of vessels and other objects of clay was forwarded to New Orleans. The collection of ancient pottery, recently obtained from Chiriqui, Panama, and partially paid for from the exposition funds, was also represented. The most important accessions have been from the explorations of Mr. L. H. Aymé, in Mexico. It is hoped that a portion at least of the pottery court will be opened to the public by the end of the present calendar year.

(d) *Department of Antiquities.*

Dr. Charles Rau has continued his work in the Department of Antiquities, carrying on toward completion the system of arrangement which he began ten years ago. He reports important accessions from the Bureau of Ethnology; from explorations of Edward Palmer in Arizona; from Oaxaca, Mexico, by L. H. Aymé; from Costa Rica by J. C. Zeledon; and from the island of Guadeloupe by Guesde. A very valuable collection of casts of antiquities of Mexico and Yucatan has been deposited in the Museum by Señor Eufemio Abadiano, of Mexico, by whom they were made. This collection, of which a list is given in Part IV* of this report includes full-size reproductions of thirty-two exceedingly important objects, such as the Mexican Aztec Calendar Stone, the Sacrificial Stone, the Aztec Goddess of Death (Teoyoamiqui), and the wonderful reclining figure of Chac-Mool. This collection has been forwarded from New Orleans and will soon be on exhibition, and it is hoped that by some means it may ultimately become the property of the Museum. It will be installed by the side of the Lorillard collection and other Central American antiquities. These two collections of casts, together with the originals already in possession of the Museum, will entirely fill one of the small exhibition galleries and constitute a display of native American sculpture and architecture which is equaled nowhere in the world.

16. DIVISION OF ZOOLOGY.

(a) *Department of Mammals.*

At the beginning of the year the work of the Mammal Department, incident upon the preparation of a collection to be exhibited in New Orleans, having been entirely completed, the regular routine work was resumed. The Mammal exhibition hall has been rendered less attractive than formerly by the removal of numerous large specimens to New Orleans, and a temporary rearrangement of the collections was attempted in order to make the deficiencies less conspicuous. During the first quarter of the year thirty-three mounted specimens were added to the exhibition series, including several large forms, such as Siberian sheep, a baboon, &c. A list of all the mounted mammals was made in February, and soon afterwards temporary labels were written and distrib-

* Accession 16185.

uted among the specimens. Manuscript for printed labels for the entire series was also prepared.

In April the Commissioner of Fisheries offered a reward for the capture of a specimen of a spotted dolphin, said to be abundant in the Gulf of Mexico. A fresh specimen was soon afterwards received through Messrs. Warren and Stearns, of Pensacola, Fla., and proved to be remarkably interesting scientifically. On the 9th of April three telegrams were received from life-saving-station keepers, announcing the stranding of cetaceans, two having reference to blackfish stranded near Cape Henry, and the third to a finback whale ashore near Truro, Mass. The most interesting cetaceans received during the half year were a male pygmy sperm-whale (*Kogia*) and the skull of an Atlantic right whale (*Balæna cisarctica*).

Messrs. Barnum, Bailey & Hutchinson, Mr. Adam Forepaugh, and the authorities of the Philadelphia Zoological Gardens (through Mr. A. E. Brown), and the Central Park Menagerie (through Mr. W. A. Conklin), have continued to send many interesting animals in the flesh.

In June the chief taxidermist was ordered to New Orleans to superintend the packing of the mammals exhibited in that city. During his stay he negotiated an exchange in behalf of the Museum by which three valuable specimens of *Quadrupana* were acquired, including a specimen of the interesting gibbon, *Hylobates concolor*. The New Orleans exhibit was not received at the Museum until after the 1st of July. (For a preliminary account of this collection see Museum report, 1884, p. 133.)

At the beginning of the year an office and a commodious laboratory in the south-west pavilion of the Museum building were assigned to the department. In consequence of this arrangement the collections are now more accessible than formerly.

(b) *Department of Birds.*

Mr. Ridgway, curator of birds, prepared for exhibition at the New Orleans Exposition a collection of North American game-birds, numbering 163 finely-mounted specimens and representing nearly all the species. The exhibit was at first intended to be much more comprehensive, the original plan being to exhibit all the known species of North American birds, so far as they could be secured, together with typical groups to illustrate the avian fauna of the several zoo-geographical divisions of the earth's surface. To this end more than 700 specimens were mounted by special contract, it being impossible to make up a suitable collection from the birds already mounted. The collection had been nearly completed on the original plan, when it became necessary, on account of the limited space available, to make a great reduction. This collection was installed by Dr. Leonhard Stejneger, assistant curator, who, left Washington January 3 and returned on the 16th of the month. Dr. Stejneger reports that "in regard to complete-

ness, perfection of mounting and preservation, scientific exactness, and popular instructiveness" this collection "was superior to any other ornithological exhibit at the Exposition." The collection filled two double Museum cases, fitted with two rows of terraced shelves, the exhibition surface amounting to a little over 600 square feet. Each specimen was mounted on a stand of polished black walnut, and provided with a printed label, on which were printed in large, clear type both the scientific and popular names.

The curator in his report calls attention to the "American Ornithologists' Union," which was formed at the urgent request of the various ornithological interests of the country for the main purpose of harmonizing existing differences in the nomenclature of North American birds, and thereby removing the most serious obstacle to the study of ornithology. At the meeting of organization in New York City, a "committee on classification and nomenclature" was formed, of which the curator of the Department of Birds in the United States National Museum was made a member; and this committee, in pursuance of a call from the chairman, held a meeting in Washington, from April 15 to 23, inclusive, in the office of the bird department, the collections of which were appealed to in all cases where there was a difference of opinion among members of the committee, and many perplexing problems were thus settled to the satisfaction of the committee as a whole. The importance to ornithology of this meeting, together with one held the previous year in the office of the bird department, can scarcely be overstated, the whole subject of zoological nomenclature having been exhaustively reviewed, and a carefully prepared code adopted, in which the satisfactory rules of the existing codes were maintained and their unwieldy provisions rejected. This new code has been the guide of the committee in the preparation of a new list of North American birds, and will, without much doubt, be adopted by zoologists generally. The curator having been charged by the above-mentioned committee with the determination of names of North American birds, according to the new code of nomenclature, this duty has been very carefully performed, and the copy for the new list put in the hands of the president of the union. At this date the list is being printed.

The naturalists of the U. S. Fish Commission steamer Albatross having made an extensive collection of birds on the almost unknown island of Cozumel, off the coast of Yucatan, it became the duty of the curator, as a part of his official work, to determine the species and describe those which proved new to science. The latter were no less than nineteen in number, the greater part of which have already been published, while the remainder are described in a full report upon the collection now being printed as a part of Volume VIII of the Proceedings of the National Museum.

The offer of the mounted birds which had for some years been on exhibition in the museum of the Department of Agriculture having been

accepted by the Museum, the transfer of the specimens to the Smithsonian building was effected during the month of May. This collection, numbering 712 specimens, consisted largely of common North American birds, the mounting of which was not up to the standard required for exhibition in the Museum collection. Being, however, suitable for purely educational purposes, this surplus stock is at present being made up into sets for distribution to schools or other public educational establishments which may require such material. The remainder of the collection, consisting of a very good series of the different varieties of the domesticated fowl and a smaller number of specimens of exotic *Phasianidae*, has been properly arranged for exhibition in the Museum cases.

Mr. Ridgway reports the accession of 3,681 specimens of birds and 185 specimens of nests and eggs.

(c) *Department of Reptiles and Batrachians.*

Active work in this department has been practically suspended during these six months, owing to the absence of the honorary curator, Dr. H. C. Yarrow, on business connected with the Army Medical Museum.

(d) *Department of Fishes.*

Dr. Tarleton H. Bean, curator of the Department of Fishes, reports 297 entries on the catalogue. The most important collections were made, as usual, by the vessels of the U. S. Fish Commission. The Albatross collections are very large and important. The curator accompanied the Albatross from the 3d of January to the 20th of February, during her cruise off the southern coast and the West Indies, and in the Caribbean Sea, and in the Gulf of Mexico until the time of her arrival at New Orleans, being engaged in making observations upon the living specimens of the deep-sea fishes and upon the southward range of the east coast food-fishes. During the week spent at the island of Cozumel he had opportunity, incidentally, of aiding Mr. Benedict in securing a large series of the birds of that island, while the seining for fishes along the shore yielded 57 species. At New Orleans a short time was spent in attaching descriptive labels to casts of fishes in the exposition.

(e) *Department of Comparative Anatomy.*

This department is under the care of Mr. F. W. True, curator of mammals.

Mr. F. A. Lucas has prepared the osteological specimens for the exhibition and study series, and it is hardly too much to say that a more beautiful and accurately mounted collection is not anywhere to be found.

Early in the year a number of exhibition cases were set up in the east-south range, and in the latter part of February a provisional ar-

arrangement of the exhibition series of vertebrate skeletons was effected. A month later the entire collection of bird skeletons was brought from the Smithsonian building and stored in the exhibition hall. An arrangement was made with the authorities of the Army Medical Museum for the exchange of a collection of human skulls for skeletons and skulls of North American vertebrates, and in April the first installment, consisting of about 500 skulls and 350 skeletons of North American vertebrates, was transferred to the U. S. National Museum.* In April an agreement was entered into between the Army Medical Museum and the National Museum to undertake post-mortem examinations of animals in the flesh received by the Institution, and of which the donors desire to know the cause of death. Under this arrangement it was agreed that the viscera of such animals should become the property of the Army Medical Museum, the skeletons, unless otherwise specified, to be returned to the National Museum. A series of casts of bones of *Dinoceras*, presented by Prof. O. C. Marsh, was placed on exhibition. One of the most interesting of the recently exhibited skeletons is that of *Rhytina gigas*, obtained by Dr. L. Stejneger for the Institution in Bering Island. Some progress has been made in the preparation of a series of specimens illustrative of the modifications of the limbs and other portions of the skeletons in the different classes of vertebrates. Experiments in special cases for the exhibition of this and other similar series have proved very successful. But little work has been done in connection with the reserve series, except for the purpose of ascertaining that the specimens are in good order.

(f) *Department of Mollusks.*

This department has been making extraordinary progress under the charge of Mr. William H. Dall, assisted by Dr. R. E. C. Stearns. Mr. Dall reports that the department under his charge has been making steady advance in its administration upon the mass of accumulations of the last ten years, and, except in regard to the New Orleans exhibit, has

* *Summary of specimens received from Army Medical Museum.*

Vertebrates.	Crania.	Skeletons.
Mammals.....	108	23
Birds.....	241	13
Reptiles and Amphibians.....	74	95
Fishes.....	71	220
Total.....	494	351

The curator reports that while this showing is good in quantity, yet the quality is very poor. The larger crania are good, or fairly so; but a large part of the smaller skulls are imperfect and not clean. The skeletons are all small and united by natural ligaments. None were in sufficiently good shape to be placed on exhibition, and owing to the methods of preparation they cannot be now cleaned. They may eventually be used to break up for study specimens, but that is their only value.

little more to offer than a record of such uneventful work which is indispensable for making the collections useful for the paleontologist or the conchologist who may desire to consult it. The most interesting accession was a small lot of Japanese shells contributed by Mr. Uchimura, and containing several great rarities. The preparation of material for the New Orleans Exposition, which absorbed several months' time prior to the beginning of the year, was completed under the direction of Dr. Stearns, so that the boxes containing the specimens and the cases required for their display reached their destination and were ready for arrangement early in January. About the middle of the month Dr. Stearns proceeded to New Orleans and remained there until the installation of this exhibit was complete. The exhibit in this division of natural history probably surpassed in extent and general excellence any previously made at any great Exposition. It was arranged in twenty-one table-cases, equivalent to a floor-space of not less than 400 square feet, the species being placed in trays inside of the cases and labeled. The general system followed was a geographical one, and presented a characteristic representation of the more conspicuous and interesting forms of the various zoological zoo-geographical provinces. The exhibit included several cases of the fresh-water mussels of the Mississippi drainage area, which is remarkable for the great number and beauty of the shells; also the rare and peculiar forms belonging to this group from other parts of the world. The land and pond snails of the Mississippi basin were each represented by a separate case. The marine shells of the Atlantic coast of America, from the Arctic Sea to the Caribbean, and the sea-shells of the Pacific coast from Bering Sea to Panama, were also shown, including the principal species inhabiting the tidal areas of Puget Sound in the north, and the Gulf of California in the south. Other cases contained selected specimens from the Indo-Pacific region, such as live in the warm waters of the great coral areas of the tropical and semi-tropical seas between the shores of Western America and Eastern Asia. Four cases were devoted to the edible mollusks of the United States. Two of these contained clams, cockles, &c., of the Atlantic seaboard, and two cases were devoted to similar forms peculiar to the coast of Western North America from Alaska to San Diego, Cal. The systematic and critical selection of the foregoing involved a great deal of work and the overhauling of a large quantity of material, the accumulation of many years. This labor was, however, incidentally advantageous to the Museum, as a considerable portion of the work consisted in the examination and partial preparation of molluscan material, hereafter to be incorporated in the national collection, and of very great importance for reference in connection with the study of fossil forms of Quaternary or even of the Tertiary ages. Unlike the results to some other departments of the Museum, the additions made to this exhibit at the Exposition were of very small moment, and, indeed, the Museum was the only contributor of an important molluscan exhibit.

(g) Department of Insects.

Prof. C. V. Riley continues to perform the duties of curatorship without assistance, but arrangements have been made for the appointment of a paid assistant curator at the beginning of the next fiscal year. Professor Riley reports a number of important accessions, including a large collection of Coleoptera and Lepidoptera sent from Sikkim by the Rev. C. H. A. Dall, of Calcutta. A varied collection of insects was secured by the U. S. Fish Commission steamer Albatross, from the West Indian region, and an important general collection of alcoholic material was received from Dr. R. W. Shufeldt, stationed at Fort Wingate, New Mexico. The most valuable addition, from a classificatory standpoint, to the collection is the collection of diptera, flies, &c., of Mr. Edward Burgess, treasurer of the Boston Society of Natural History, which was bought by Professor Riley; while the most valuable from a popular and economic view was the exhibit collection prepared for the New Orleans Exposition. This has been returned with little injury, and is only awaiting space for permanent placing in the Museum. It is made up of the following material, arranged in cases made on the same unit plan as those of the Museum:

1. *Insects injurious to agriculture.*—Arranged according to the particular plant and the particular part of the plant affected, and containing, as far as possible, the different states of growth of the insect, its enemies and parasites, a statement of the remedies or preventives available, and a reference to the chief articles where full information can be found upon it. These references are principally to Government and State reports, to which the farmer will most likely have access.

2. *Insecticide substances.*—In the catalogue of this collection the aim has been to add, as briefly as possible, a statement of the method of using such substances, so that whenever in the first section a particular substance is recommended for a particular insect the reader can turn to this second section for further details.

3. *Insecticide machinery and contrivances for destroying insects.*—In the catalogue of this section there is given such information as will add to the instructive value of the exhibit, and a large proportion of the more useful contrivances are such as have been designed and perfected in the work of the Entomological Division, or of the U. S. Entomological Commission during the past four years.

4. *Bee culture.*—This collection is designed to show all the more valuable methods and contrivances now in use among the advanced apiarists.

5. *Silk culture.*—In this collection the aim has been to make the exhibit instructive rather than full in detail. The collection includes, in addition to the foregoing, a number of framed plates, both colored and plain, that have been prepared in the work of the division, and a number of Prof. Riley's enlarged colored diagrams of some of the more im-

portant injurious insects were also used. A catalogue of this exhibit has been published under the direction of the Department of Agriculture, giving a full and detailed statement of its contents.

The routine work of the department has consisted in answering letters, and in acknowledging and determining accessions. A good deal of work has also been done in the proper arrangement and classifying of material, particularly in the Micro-Lepidoptera and in the Lepidoptera generally. In this work Prof. Riley was assisted by Mr. Albert Koebele, who was detailed from the Department of Agriculture for the purpose.

The researches in entomology have been carried on chiefly in connection with the work of the curator for the Department of Agriculture. Some of the results have been published in the bulletins and publications of that Department.

(h) *Department of Marine Invertebrates.*

Mr. Richard Rathbun, curator, reports that the most important addition to this department was made by the U. S. Fish Commission steamer Albatross in April, on her return from a three months' cruise in the Gulf of Mexico, mainly spent in investigating the grouper and red-snapper fishing grounds off our southern coast. The collection turned over to the Museum was much larger and contained many more novelties than that made by the Albatross in the same region and the Caribbean Sea the previous year, and the unassorted materials filled nearly 1,000 packages of all sizes. Of peculiar interest was a series of several hundred specimens of sea-lilies, mostly collected off Havana, Cuba, and representing the various stages of growth of two species of *Pentacrinus* and one of *Rhizocrinus*. Over thirty species of Echini or sea-urchins were also contained in the collection, and other divisions of the Echinodermata, as well as the Cœlenterata, Crustacea, and Mollusca were very fully represented. The bathymetrical range covered by these explorations extended from the shore level to a depth of 1,467 fathoms.

Prof. A. E. Verrill, of New Haven, has transferred to the Museum over 1,000 packages of identified specimens resulting from the explorations of the Fish Commission in former years.

Mr. Henry Hemphill continued his collecting on the Florida coast, begun the previous winter, until March of this year, and has contributed several cases of specimens belonging to many groups.

The other principal accessions have been a fine series of the sea-urchins and star-fishes of the west coast of Mexico, from Mr. A. Forrer; numerous specimens of Pacific corals and echinoderms from Prof. R. E. C. Stearns, and the collection of marine invertebrates made by Lieut. George M. Stoney, U. S. N., in Alaska, in 1884.

Much progress has been made in the determination and cataloguing of specimens.

Prof. Walter Faxon has completed his studies of the collection of

cray-fishes, which is now the second in size and number of species in the United States, being exceeded only by that at the Museum of Comparative Zoology, Cambridge. It contains forty-six North American species. The collection of Echini, which holds the same relative rank, has also been almost completely identified, and other groups are being rapidly worked over.

In June, the west hall of the Smithsonian building, devoted to the exhibition of marine invertebrates, was opened to the public, and although the collections now displayed, fill only the wall cases surrounding the room, they present a very creditable appearance, and all the groups belonging to this department are represented to a greater or less extent. The dried collections not on exhibition have been mostly transferred to the north-west gallery of the main hall, which will also serve as a general work-room for the department.

Soon after the middle of June, the curator and his assistants left for Wood's Holl, Mass., to take part in the summer explorations of the U. S. Fish Commission.

(i) Department of Invertebrate Fossils (Paleozoic).

Mr. Charles D. Walcott, honorary curator of this department, reports that his principal work has consisted in identifying and labeling a collection of Carboniferous fossils which were in the old Smithsonian collection. This work is now well advanced, and will soon be completed as far as identifying the species from the register can be done. In the laboratory the time of the curator has been chiefly devoted to the preparation and study of the Cambrian faunas of North America. This has been done in connection with his work for the Geological Survey.* A large number of types and a great quantity of specimens of described species will be added to the Museum collections as a result of this work. A number of minor accessions have been received from various persons throughout the country. A large addition was made to the collection in the latter part of 1884, a full discussion of which was presented in the report for that year. Another valuable contribution from the Geological Survey will probably be made in the autumn of the present year.

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

Dr. Charles A. White, the honorary curator of this department, states that a number of important accessions have been received during the first six months of this year, and that some of them constitute new additions to the collection. Descriptions of these have been published in the various bulletins of the U. S. Geological Survey. The work of preparing the collections of the Museum has been in progress, and the installation of types has been commenced. Since the beginning of the year considerable space has been assigned to this department in the gallery of the Smithsonian Institution, and the work of preparing ma-

* See Bulletin 10, U. S. Geol. Survey.

terials for exhibition has steadily progressed. The space in the south-east court of the Museum building is occupied by specimens belonging to this department which have been turned over to the Museum, and in this court the collections are prepared for installation.

17. DIVISION OF BOTANY.

Departments of Fossil and Recent Plants.

Prof. Lester F. Ward, curator, reports that the work of his department was exclusively confined to fossil plants until near the close of the year 1884, and no collections of recent plants were received until February last, when rooms were assigned to him for the purpose, and the "Joad Collection" from Kew was placed in his charge. With this Professor Ward joined his own collection, consisting of nearly five thousand species. The two collections combined form a nucleus for a future herbarium of not less than fourteen thousand species, represented by twice that number of herbarium specimens. He submits the following suggestions:

All botanical collections have for many years been turned over to the Department of Agriculture to be cared for by the botanist of that Department. When, in 1881, I was requested to take charge of the fossil plants of the National Museum, and consented to do so, I perceived at once the great inconvenience to the Department of Fossil Plants of this arrangement. The collections of fossil plants were largely undetermined and required to be studied and identified. Most of them were from recent formations, and represented types of vegetation still living, requiring constant comparison with the recent forms to be seen in herbaria. Even the installation and care of those that were named necessitated such comparison, and the difficulties of this nature that were encountered were very great. It was rarely possible to carry the fossils to the Department of Agriculture, and as it was usually necessary to search through large families of plants, the temporary transportation of the botanical specimens was still more impracticable. I therefore early began to urge the establishment of a permanent collection at the Museum of the plants still growing in America and other countries where the catalogues of fossil plants were likely to occur.

While I am highly gratified at the progress in this direction already made as reported above, still it must be evident to you that only a beginning has thus far been made, and that the present collection of living plants is still very inadequate. The Joad collection represents chiefly the flora of Southern Europe, which is widely different from all Tertiary floras, and especially so from the Cretaceous and Tertiary floras of North America. The collections that I have made are exclusively American, and, in so far as they go, are valuable aids to the study of American fossil plants; but they are, of course, too limited in extent to be trusted in critical cases. The parts of the world next after those in North America with which our fossil floras most closely agree are Eastern Asia, the East Indies, Australia, and South Africa, and from all these vast regions scarcely any representatives are to be found in the present herbarium of the National Museum. It is therefore highly desirable as a necessary adjunct to the Department of Fossil Plants, and aside from the still greater desideratum of establishing a truly national herbarium at the Museum, that all reasonable efforts be made to enlarge and enrich the botanical collections.

The routine work of the department of botany has been entrusted to Mr. Frank H. Knowlton, who, in addition to identifying and installing the material, has devoted much time to bibliographical research

and to the development of the sectional library. Very large collections have been made by Mr. A. Schott during the spring and summer months from the parks and gardens of the city. These collections are designed primarily to aid in the preparation of a catalogue of the ornamental plants of Washington, but while serving this purpose they are at the same time valuable accessions to the herbarium and highly useful in connection with the study of fossil plants. In collecting and preserving these specimens, Mr. Schott has shown great industry and skill. In addition to this work Mr. Schott has undertaken the preparation of a check-list of genera from the *Genera Plantarum* of Bentham and Hooker, of which about half the manuscript was completed at the end of June. The time of the curator was almost exclusively spent in the study and determination of fossil plants collected by himself, and over one hundred species, many of which are new, were identified and will be duly incorporated in the Museum collections.

18. DIVISION OF GEOLOGY.

(a) *Department of Minerals.*

This department has been under the charge of Prof. F. W. Clarke, assisted by Mr. William S. Yeates. There have been made during the first half of the year 534 entries, representing 2,137 specimens, all of which are new accessions except 138 specimens, which were found in the old collections without evidence of having been previously catalogued. Eighteen sets of minerals have been sent out as exchanges, comprising about 1,200 specimens, and much valuable material has been obtained in return. This department was represented at New Orleans by collections of the minerals from which are obtained gems and ornamental stones, and also by a collection of cut and polished stones. These collections attracted the general attention of connoisseurs and visitors to the Exposition. The minerals were classified after Dana's system and were arranged in seven flat-top table-cases. The gems were displayed in two cases, the specimens being mounted on white and black velvet pads. This department did not secure a large amount of material from the New Orleans Exposition, most of the mineral collections on exhibition belonging to private individuals, to whom the agents were responsible for the safe return of their specimens. One-half of the south-west court has been assigned to this department as its exhibition space, and the collections have been removed thither.

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

The curator, Mr. George P. Merrill, was on duty at the New Orleans Exposition at the beginning of the year, but has nevertheless accomplished very satisfactory results in the work of reinstalling the collections upon the extended floor-space recently assigned to this department. The opening of the year found the affairs of this department in

a quiescent though somewhat confused state, owing to the fact that since the preceding July the entire energies of the working force had been devoted to the preparation of the exhibit designed for the New Orleans Exposition, and the regular work of the Museum had consequently fallen behind. The special exhibit was completed late in December and the extra hands discharged. This exhibit consisted of (1) a collection of 358 specimens of building and ornamental stones of the United States in the form of 4-inch cubes; (2) a collection of some twelve specimens of foreign and native marbles in the form of polished slabs; (3) a collection of 150 specimens of rock-forming minerals; (4) a collection called a "structural series," intended to represent all the common forms of rock structure and texture; (5) a collection of 198 specimens of rock illustrating the geology and lithology of the Comstock lode and Washoe district, Nevada; (6) a lithological collection comprising 500 specimens of various rocks, this last, together with numbers 3 and 4, forming a part of the regular educational series of the Museum. As these collections were all fully described in the report of this department for 1884 no further reference to them in this place is necessary. The large quantity of building-stone and other material occupying the space in the south-west court was removed and stored temporarily in a shed outside the eastern entrance of the Museum, the court being less available for exhibition purposes. By a reassignment of exhibition space, this department was made to include the whole of the west-south range, and a portion of the court, as heretofore. The new arrangement is vastly preferable both on account of better light thus obtained, and of convenience in arranging and classifying the exhibit. In May the force of the department was increased by the addition of one aid, one clerk, and three stone-cutters, and the preparation of a collection of building-stones was commenced for the American Museum of Natural History in New York. This collection will, when complete, comprise not less than one thousand specimens, and an equal number of thin sections for microscopical study. This work was still in progress at the end of June. The number of entries in the department catalogue during the six months has been 486, comprising some 700 specimens. Considerable time has been devoted to the preparation of the various exhibition series, particularly those included under lithology, and historical, dynamical, and structural geology. The last three are as yet far from completion, and at the present rate of progress, which is necessarily very limited, must so continue for several years. On this point Mr. Merrill comments as follows:

"I may, perhaps, be pardoned for mentioning here the fact that from past experience I am convinced that the only satisfactory way in which these last named branches of my department can be built up is to allow the curator or some experienced person a certain sum of money to be expended either in the purchase of collections under his direct supervision or of especially desirable material. A very considerable portion of the material now necessary for this purpose is of such a nature—principally on account

of the bulk and weight of the specimens—as to be beyond the scope of the ordinary collector, and in too little demand to be found in many of the natural history stores. I might mention such examples as fault structure, examples of folds, contortion, false bedding, &c., which can scarcely be obtained by other than the means suggested.”

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

At the opening of the year the curator, Mr. F. P. Dewey, was still detained at New Orleans arranging the collection which had been sent from his department to the exposition, and he did not return to Washington till the middle of January. The design of the collections of this department was to show, as far as the time and means at disposal would permit, the prominent occurrences of each metal, the methods of abstracting the metals from their ores, and the utilization of the metals. To these were added a few illustrations of non-metallic ores and their utilization, including a very extensive and valuable illustration of the coal industry. Most of the ore material was selected from the Museum collection, and only a very few new collections were made. These latter were selected upon a systematic plan, representing the mine as a unit. In the plan adopted, specimens were taken to represent sections across and up and down the vein, and to show an average of the product of the vein, while to these were added the walls and other interesting material. In representing the abstraction and utilization of the metals, it was the design to begin with the ore as it leaves the mine, and to follow it through the various steps in all the operations to the production of the finished article, showing, when possible, every material going into each operation and every product of each operation. In the case of coal, the collections were based largely on the ethnological aspects of the question, and thus included many specimens aside from those of an economic or geological value.

Throughout the new collections of the department special attention has been paid to gathering as full and complete a description of everything shown as possible, while the pictorial side of the question has been treated very elaborately, and includes some views of the interior of a coal mine taken by electric light, the first views of the kind ever taken. These collections form a basis for a full and complete representation of the mineral resources of the country, and it is hoped that they will increase until they shall fill their highest educational value. They have been fully described in Museum Circular No. 31. The regular force of the department having been reduced to a scientific assistant and a laborer, the work of preparing the collections in the Museum has been at a comparative standstill during the first half of the year. The laboratory of this department has been moved to the second floor of the south-west pavilion, and the work-room on the floor of the Museum has been cleaned out and space prepared for exhibition purposes, so that now the entire work of preparing material for exhibition has been concentrated into one place. The work of investigating the New

Orleans material has been carried on as far as practicable, and, with the assistance of Mr. Allen, a number of very valuable analyses have been made. A large number of accessions have been received, among which may be specially mentioned an interesting series representing the smelting of copper from the oxidized ores of Arizona, donated by the Copper Queen Company, and a series of apatite from many localities, donated by Pickford and Wingfield, of London, England. In the middle of May the curator returned to New Orleans to pack up the collection and to solicit contributions for increasing the value of the permanent collections. No attempt was made to obtain large, entire collections without regard to their value to the Museum, requests being made for material of only two classes, *i. e.*, those of intrinsic value, and of such as would fill gaps in our permanent collections. This effort was so successful that much very valuable material was obtained and some of the most important gaps were filled; among the former should be especially noticed the important and interesting collection received from Mexico, and among the latter the valuable series of iron ores from the Menominee region in Michigan. After the return of the curator to Washington, in June, the collection donated to the Museum by the American Institute of Mining Engineers commenced to arrive, and claimed his attention during the remainder of the fiscal year.