

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

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FOR THE YEAR ENDING JUNE 30

1915



(Publication 2379)

WASHINGTON
GOVERNMENT PRINTING OFFICE
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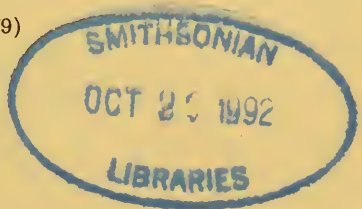
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REPORT
OF THE
SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1915.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith the annual report on the operations of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1915, including work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper and briefly summarizes the operations of its several branches, while the appendices contain detailed reports by the assistant secretary and others directly in charge of various activities. The reports on operations of the National Museum and the Bureau of American Ethnology will also be published as independent volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington and the other four shall be inhabitants of some State, but no two of them of the same State."

In regard to the personnel of the board there were no changes during the fiscal year. The roll of Regents on June 30 was as follows: Edward D. White, Chief Justice of the United States, Chan-

cellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Henry French Hollis, Member of the Senate; William J. Stone, Member of the Senate; Scott Ferris, Member of the House of Representatives; Ernest W. Roberts, Member of the House of Representatives; Maurice Connolly, former Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

The board held its annual meeting on December 10, 1914. The Hon. George Gray was on that date elected chairman of the executive committee to fill the vacancy caused by the death of Senator Bacon on February 14, 1914. The proceedings of the above meeting, as also the annual financial report of the executive committee, have been printed, as usual, for the use of the Regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the Secretary. A detailed statement of disbursements from Government appropriations, under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches, will be submitted to Congress by the Secretary in the usual manner in compliance with the law.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of James Smithson, 1846.....	\$515, 169. 00
Residuary legacy of James Smithson, 1867.....	26, 210. 63
Deposit of savings of income, 1867.....	108, 620. 37
Bequest of James Hamilton, 1875.....	\$1, 000
Accumulated interest on Hamilton fund, 1895.....	1, 000
	2, 000. 00
Bequest of Simeon Habel, 1880.....	500. 00
Deposits from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins, 1907.....	7, 918. 69
Deposit from savings of income, 1913.....	636. 94
Part of bequest of William Jones Rhees, 1913.....	251. 95
Deposit of proceeds from sale of real estate (gift of Robert Stanton Avery), 1913.....	9, 692. 42
Bequest of Addison T. Reid, 1914.....	4, 795. 91
Deposit of savings from income Avery bequest, 1914.....	204. 09

Deposit of savings from income Avery fund, 1915-----	\$1, 862. 60
Deposit of savings from income Reid fund, 1915-----	426. 04
Deposit of balance of principal \$248.05 and income \$28.39 Rhees fund, 1915-----	276. 44
Deposit of first payment of Lucy T. and George W. Poore fund, 1915-----	24, 534.92
Total of fund deposited in the United States Treasury----	987, 600. 00

Other resources.

Registered and guaranteed bonds of the West Shore Railroad Co., part of legacy of Thomas G. Hodgkins (par value)-----	42, 000. 00
Total permanent fund-----	1, 029, 600. 00

The first installment to the Lucy T. and George W. Poore fund, amounting to \$24,534.92, was received in March, 1915, and was immediately deposited in the United States Treasury to the credit of the permanent fund. Other deposits to this fund during the year were from the income of several funds amounting to \$2,565.08, or a grand total of \$27,100, making a total now deposited in the Treasury to the credit of the permanent fund of \$987,600.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$112,035.90, was derived as follows: Interest on the permanent foundation, \$59,310; contributions from various sources for specific purposes, \$12,000; first installment of a bequest known as the Lucy T. and George W. Poore fund, amounting to \$24,534.92; the original bequest designated as the George H. Sanford fund of \$1,020; the balance of the William Jones Rhees fund, amounting to \$248.05; and from other miscellaneous sources, \$14,922.93; all of which was deposited in the Treasury of the United States.

With the balance of \$30,560.13 on July 1, 1914, the total resources for the fiscal year amounted to \$142,596.03. The disbursements, which are given in detail in the annual report of the executive committee, amounted to \$100,430.17, leaving a balance of \$42,165.86 on deposit June 30, 1915, in the United States Treasury and in cash.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1915:

International Exchanges-----	\$32, 000
American Ethnology-----	42, 000
Astrophysical Observatory-----	13, 000

National Museum:

Furniture and fixtures.....	\$25,000
Heating and lighting.....	46,000
Preservation of collections.....	300,000
Books.....	2,000
Postage.....	500
Building repairs.....	10,000
Bookstacks for Government bureau libraries.....	10,000
National Zoological Park.....	100,000
International Catalogue of Scientific Literature.....	7,500
Tower telescope, Astrophysical Observatory, Mount Wilson, Cal.....	2,000
Repairs, Smithsonian Building.....	16,000
Total.....	606,000

In addition to the above specific amounts to be disbursed by the Institution there was included under the general appropriation for public printing and binding an allotment of \$76,200, to cover the cost of printing and binding the annual report and other Government publications issued by the Institution, and to be disbursed by the Public Printer.

EXPLORATIONS AND RESEARCHES.

The "increase of knowledge" is one of the fundamental objects of the Smithsonian Institution, and toward the accomplishment of that object it has inaugurated and maintained or has participated in astronomical, anthropological, biological, and geological explorations in every portion of the world, resulting in greatly increasing our knowledge of the meteorology, the geography, the fauna and flora, and the ethnology of all lands, and in the acquisition of large amount of valuable material for the National Museum. The Institution has likewise, through special grants, aided laboratory researches in practically every line of natural science. The extent of these explorations and researches during the last 60 years covers a wide range, although a great deal more of most important work could have been accomplished had adequate funds been available. Friends of the Institution have many times, and particularly during the last few years, generously aided the work through the contribution of funds for specific purposes, but much yet remains undone, and opportunities for undertaking important lines of investigation are constantly being lost through lack of means to carry them into execution.

I will here allude only briefly to some of the activities of the Institution in these directions during the year and for details of other investigations may refer to the appendices containing the reports of those directly in charge of the several branches of the Institution.

GEOLOGICAL EXPLORATIONS IN THE ROCKY MOUNTAINS.

In continuation of my previous geological researches in the Rocky Mountains of Canada and Montana I spent a week during the field season of 1914 at Glacier, British Columbia, where I assisted Mrs. Walcott (née Mary M. Vaux) in measuring the flow of the Illecillewaet and Asulkan Glaciers.

From Glacier we proceeded to White Sulphur Springs, Mont., for the purpose of studying the ancient sedimentary pre-Paleozoic rocks of the Big Belt Mountains. These explorations were made on the eastern and southern slopes of this range, and then extended to the south on the Gallatin, Madison, and Jefferson Rivers.

It was found that the pre-Paleozoic sedimentary rocks were exposed by the uplift of the granite mass forming the summit of Mount Edith of the Big Belt Mountains in such a way that the thickness of the sandstones, limestones, and shales could be readily measured in the numerous sections exposed in the canyons worn by waters descending from the higher points to the valley surrounding the range. Nearly 5 miles in thickness of rock were measured, and in the limestone belts reefs of fossil algal remains were studied and large collections made with the assistance of Mrs. Walcott and Charles E. Resser and sent on to Washington.

It was found that the algal remains were deposited very much in the same manner as those that are now being deposited in many fresh-water lakes, and that many of the forms had a surprising similarity to those being deposited in the thermal springs and pools of the Yellowstone National Park.

In the lower portion of Deep Creek Canyon, southeast of the city of Helena, a deposit of siliceous shale was examined where some years ago I had discovered the remains of crablike animals suggesting in form the fresh-water crayfishes found in the streams and ponds all over the world. These fossils are the oldest animal remains now known, and the algal deposits which occur at intervals for several thousand feet below the shales containing the crustaceans are the oldest authentic vegetable remains. It is also most interesting that two types of bacteria have been found in a fossil state in the rock in association with the algal remains.

On the north side of the Gallatin River two very rich beds of algal remains were found, many of which, on account of the fossil being silicified and embedded in a softer limestone, were weathered out in relief.

For the season of 1915 I have planned some investigations in the Yellowstone Park in order to be able to better interpret the fossil algal remains found in and about the Big Belt Mountains.

STRATIGRAPHIC STUDIES IN CENTRAL TENNESSEE.

Under the joint auspices of the United States Geological Survey and the United States National Museum Dr. E. O. Ulrich and Dr. R. S. Bassler, of the Museum, were engaged for several weeks during the summer of 1914 in a study of debated points in the stratigraphy of the Central Basin of Tennessee with a view to determine accurately the division line between the Chazyan and Black River groups and to secure additional information on the black shale problem.

The well-known marble beds of east Tennessee and associated shales and sandstones of Upper Chazyan age, with a thickness of over 3,000 feet, have never been found in central Tennessee or, in fact, in any area west of the Appalachian Valley. The first problem was therefore to determine either the corresponding rocks in the more western areas or, if such strata were wanting, to discover the unconformity representing this great thickness. It was found that the Lower Chazyan or Stones River rocks of central Tennessee are succeeded directly by the lowest Black River or Lowville formation, and central Tennessee therefore was presumably a land area during the time of deposition of the celebrated east Tennessee marbles.

The second problem entailed further work on the determination of the age of the widespread Chattanooga black shale, which previously had been considered to be middle to late Devonian. In recent years this determination had been questioned, and facts had accumulated showing it to be of younger age. Two features of considerable significance in this problem were the discoveries in northern Tennessee, where the shale is well exposed, that (1) this black shale passes without a discernible break into the overlying Mississippian (Kinderhook) shales, and (2) that the fossils of this overlying shale are of late instead of early Kinderhook age. As a result of this work good collections of several well-preserved faunas were added to the Museum collection.

FOSSIL ECHINODERMS IN WESTERN NEW YORK.

Field work carried on during the summer of 1914 under the supervision of Mr. Frank Springer, for the purpose of adding to the Springer collection of fossil echinoderms in the Museum, was devoted mainly to a careful examination of Silurian rocks exposed along the new Erie Canal in western New York, especially the waste material thrown out in excavations for the canal. The most valuable specimens from this part of New York occur in the Rochester shales of Niagaran age, which weather rapidly into mud upon exposure to the elements, and it was therefore necessary that the new outcrops be examined at once to secure the best results. Numerous specimens

of crinoids and cystids were found, a number of them having, as is rarely the case, root, stem, and crown preserved.

VERTEBRATE FOSSILS IN MONTANA.

Through cooperation with one of the field parties of the United States Geological Survey, Mr. Charles W. Gilmore, of the National Museum, spent three weeks during the summer of 1914 searching for fossil vertebrate remains in the Judith River formation in north central Montana. The most noteworthy discovery was the fragmentary remains of a fossil bird related to *Hesperornis*. It came from practically the same locality as the type of *Coniornis altus* Marsh, and is of importance as showing these bird remains as occurring in the upper part of the Claggett formation, whereas heretofore it was thought that *Coniornis* had come from the lower part of the Judith River formation.

CORAL INVESTIGATIONS.

Dr. T. Wayland Vaughan has for some time been engaged under the auspices of the Carnegie Institution in a study of the growth of corals, their rôle in reef building, and related problems. His field of investigation has been chiefly the coast of Florida, the Bahamas, and other regions of the West Indies. Large collections made by him in those localities have been received by the Museum.

BORNEO AND CELEBES EXPEDITIONS.

Through the generosity of Dr. W. L. Abbott, who for so many years has been a most generous contributor to the zoological and ethnological collections of the Museum, Mr. H. C. Raven conducted a collecting expedition in Borneo for a period of about two years. His work there was completed in September, 1914, having yielded about 3,000 interesting specimens of mammals and birds. Mr. Raven next crossed the Macassar Strait to the Island of Celebes, where he expects to remain for a considerable period and to secure important collections from a region heretofore poorly represented in the National Museum.

EXPEDITIONS TO THE FAR EAST.

Through the liberality of a gentleman who desired to remain unknown, Mr. Arthur de C. Sowerby has continued his zoological explorations in Manchuria and northeastern China and has forwarded a valuable collection of insects and vertebrates, including two wapiti bucks, a roe deer, two bears, and a peculiar rabbit.

Mr. Copley Amory, jr., a collaborator of the National Museum, joined a party accompanying Capt. J. Koren to the northeast coast

of Siberia. It was Mr. Amory's intention to explore such territory as may be practicable from Nijni Kolymsk as a winter base, giving special attention to mammals and birds. When last heard from he had made a trip up the Lesser Ammi River, where he obtained a good number of fossil specimens, also some birds and small mammals.

BIRD STUDIES IN ILLINOIS.

Incidental to continued work on preparation of manuscript of the unpublished volumes of "Birds of North and Middle America" (Bulletin 50, U. S. National Museum), Mr. Robert Ridgway, during the past year, made a careful study of bird life in southern Illinois in order to compare present conditions with those existing half a century ago. It was found that with few exceptions the native birds are greatly decreased in numbers. At least three species (the passenger pigeon, wild turkey, and ruffed grouse) have totally disappeared from the region examined, while several others are on the verge of extermination. A few species, such as the crow blackbird (bronzed grackle) and blue jay, and perhaps the robin, are, apparently, as numerous as they were 50 years ago.

The principal causes which have brought about this greatly diminished bird life are: (1) In the case of the game birds, relentless shooting; (2) greatly reduced breeding and shelter areas, through clearing of forests, cutting away of woody growths along roadsides and fence lines, and drainage of swampy or marshy areas; (3) introduction of the European house sparrow, which has increased to such an extent that it now outnumbers, even on the farms, all the smaller native birds combined, greatly reducing their food supply and monopolizing the nesting sites of such species as the bluebird, purple martin, wrens, swallows, and other birds that nest in cavities or about buildings; (4) invasion of the woods and fields by homeless house cats and destruction of eggs and young (often the parents also) of ground-nesting species by "self-hunting" bird dogs (setters and pointers); and, probably, (5) spraying of orchards.

HENDERSON EXPEDITION IN CUBA.

Since the *Tomas Barrera* expedition to western Cuba, Mr. John B. Henderson, a regent of the Smithsonian Institution, has made two trips to eastern Cuba to supplement the work of that expedition.

One of these visits was to Cardenas Bay, where extensive, as well as intensive, dredgings yielded a lot of interesting marine organisms. The second trip embraced Cubitas Mountains, and was made in quest of land shells, which were needed to elucidate problems in the geographic distribution of the land mollusks.

As heretofore, Mr. Henderson's yacht, the *Eolis*, has been kept busy exploring the Pourtales Plateau. Numerous hauls in all depths

of water have been made, and the material, which has arrived here from time to time, is exceedingly rich in marine invertebrates, particularly mollusks.

This year's efforts have resulted in the discovery of grounds with a more prolific, varied, and interesting fauna than previously known in this region.

BOTANICAL EXPLORATIONS IN SOUTH AMERICA.

Through cooperation with the Carnegie Institution of Washington the Museum was enabled to benefit by an expedition carried on by Dr. J. N. Rose during the summer and fall of 1914 along the west coast of South America in furtherance of his work on the Cactaceæ. About 3,000 specimens of cacti and other plants collected by him have been permanently deposited in the National Herbarium.

Dr. Rose explored a section through central Peru from Callao to Oroya, from sea level to the top of the Andes, at an altitude of 15,665 feet. Cacti were found in the greatest abundance at an altitude of 5,000 to 7,500 feet; but the various species range from a few feet above sea level to as high as 12,000 to 14,000 feet.

A second section was made across southern Peru, from Mollendo to Lake Titicaca via Arequipa. The highest point reached was 14,665 feet. Here also the cacti are found from near sea level nearly to the top of the Andes; but the most remarkable display is on the hills surrounding Arequipa, at an altitude of from 7,000 to 8,500 feet. While the cacti are abundant in both these regions, they are, with only a few possible exceptions, quite distinct. Side trips were made from Arequipa to Juliaca and Cuzco, in Peru, and to La Paz, Oruro, and Comanche, in Bolivia.

On the pampa below Arequipa are found the famous crescent-shaped sand dunes. Each dune or pile of sand is distinct in itself, often separated some distance from any other dune, and occurring, too, on rocky ground devoid of other sand. The dunes are found on the high mesa some 5,250 feet above the sea. They form definite regular piles of sand, each presenting a front 10 to 100 feet wide and 5 to 20 feet high, nearly perpendicular, crescent shaped, and from the crescent-shaped ridge tapering back to the surface in the direction from which the wind blows. These piles of shifting sand go forward about 40 feet a year.

In Chile two sections were made into the interior—one from Antofagasta to Calama, and one from Valparaiso to Santiago. The first is through the rainless deserts of northern Chile, the whole region being practically devoid of all vegetation. The second is across central Chile, the hills and valleys of which are veritable flower gardens, the hills often being a mass of yellow. Various trips were made in the central valley of Chile and one journey along the Longitudinal Railway of Chile extended from Caldera to Santiago. Special trips were made for certain rare plants like *Cereus castaneus*, first collected in 1862 and not since observed until found by Dr. Rose; and *Cactus horridus* and *Cactus Berteri*, described in 1833, but long since discarded by cactus students. In the central valley of Chile is seen that beautiful palm, the only one native of Chile, *Jubaea spectabilis* H. B. K., which often forms forests of considerable extent. From this palm is made the "Miel de Palma" so much used as a sirup on ships and at hotels.

Botanical explorations by Dr. Rose on the east coast of South America were in progress at the close of the fiscal year.

ANTHROPOLOGICAL RESEARCHES IN AFRICA AND SIBERIA.

In connection with the work of the division of physical anthropology in the National Museum, two expeditions were sent out during the year 1914 under the joint auspices of the Smithsonian Institution and the Panama-California Exposition at San Diego.

One of these expeditions was in charge of Dr. V. Schüick, anthropologist of Prague, Bohemia, and its objects were: 1, to study the negro child in its native environment, and thereby create a basis of comparison for the study of the negro child in our country; 2, to visit the South African Bushmen for the purpose of obtaining measurements, photographs, and facial casts of the same; and 3, to visit British East Africa in search of the Pygmies. The tribe chosen for the child study were the Zulu, of Natal or Zululand, and over 1,000 children and adolescents of all ages—ages which could be definitely determined—were examined. These data are expected to contribute some very important results to anthropology. The Bushmen were reached in the Kalahari Desert, and besides other results 20 first-class facial casts were obtained of the people, which have since then been installed among the anthropological exhibits at San Diego. As to British East Africa, the work soon after a successful beginning was interrupted by the war.

The second expedition was in charge of Dr. St. Poniatowski, head of the ethnological laboratory at Warsaw. The object of this expedition was to visit a number of the remnants of native tribes in eastern Siberia, among which are found physical types which so closely resemble the American Indian. The expedition reached two such tribes, and secured valuable data, photographs, etc., when its work also was interrupted by the war.

THE NATURAL HISTORY OF MAN.

Some of the results of exploration and field work by the Institution among various races of mankind are shown in connection with the anthropological exhibits of the Panama-California Exposition at San Diego. These exhibits were in preparation for over three years. They are original and much more comprehensive than any previous exhibits in this line, either in this country or abroad. Dr. Hrdlička, under whose direction this exhibit was prepared, describes it as follows:

The exhibits fill five large connecting rooms, which occupy the building of the Science of Man at the Exposition. Four of these rooms are devoted to the natural history of man, while the fifth is fitted up as a modern anthropological laboratory, library, and lecture room. Of the four rooms of exhibits proper, the first is devoted to man's phylogeny, or evolution; the second, to his ontogeny, or life cycle at the present time; the third, to his variation (sexual, individual, racial); and the fourth, to his pathology and death.

The exhibits in room 1, on Human Evolution, consist of: (a) A large series of accurate, first-class casts of all the more important skeletal remains of authentic antiquity; (b) photographic enlargements and water color sketches showing the localities where the specimens were discovered; (c) charts showing the relation of the archeological position of the various finds, and their relation to the extinct fauna and to archeological epochs; (d) a series of sketches by various scientific men showing their conception of the early man, with several illustrations of drawings, statuettes, and bas-reliefs, showing early man as drawn or sculptured by the ancient man himself; and (e) a remarkable series of 10 large busts prepared by the eminent Belgian sculptor, M. Maseré, under the direction of Prof. Rutot, representing early man at different periods of his physical advancement.

The main part of the exhibits in room No. 2, devoted to man's development at the present time, from the ovum onward, are three series of true-to-nature busts, showing by definite age-stages, from birth onward and in both sexes, the three principal races of this country, namely, the "thoroughbred" white American (for at least three generations in this continent on each parental side), the Indian, and the full-blood American negro. These series, which required two and one-half years of strenuous preparation, form a unique exhibit, for nothing of similar nature has ever been attempted in this or any other country. Each set consists of 30 busts, 15 males and 15 females, and proceeds from infants at or within a few days after birth to the oldest persons that could be found. The oldest negro woman is 114. After the new born, the stages are 9 months, 3 years, 6, 10, 15, 20, 28, 35, 45, 55, 65, and 75 years. The utmost care was exercised in ascertaining the age, particularly among the negro and Indian. No choice was made of the subjects beyond that due to the requirements of pedigree, age, and good health. The whites and negroes were obtained, with a few exceptions, in Washington and vicinity, but their places of birth range over a large part of the Eastern, Southern, and Middle States; for the Indian, we chose the Sioux, a large, characteristic, and in a very large measure still pure-blood tribe, and one in which the determination of the ages of the subjects was feasible. Special trips were made to these people, and no pains were spared to get just what was wanted; in the case of the new born, it was actually necessary to wait until they came.

Other exhibits in room 2 show the development, by various stages, of the human brain, the skull, and various other parts of the body. A large series of original specimens show the most closely related animal forms to man at the present time, particularly the anthropoid apes; a series of charts on the walls deal with the phenomena of senility; finally, 10 photographic enlargements show living centenarians of various races.

Human variation is shown in room 3 by 10 sets of large busts representing 10 of the more important races of man; by 200 original transparencies giving racial portraits; by over 100 bronzed facial casts, showing individual variations within some of the more important branches of humanity; and by numerous charts and other exhibits.

In room 4 a series of charts and maps relates to the death rate in various countries, to the principal causes of death in the different parts of the world, and to the distribution of the more common diseases over the earth. Actual pathology is illustrated extensively by prehistoric American material. Many hundreds of original specimens, derived principally from the pre-Columbian cemeteries of Peru, show an extensive range of injuries and diseases, such as have left their marks on the bones. In many instances the injuries are very interesting, both from their extent and the extraordinary powers of recupera-

tion shown in the healing; while among the diseases shown on the bones there are some that find no, or but little, parallel among the white man or even the Indian of to-day. In addition this room contains a series of 60 skulls with pre-Columbian operations (trepanation).

ISLAND OF TIMOR EXPEDITION.

Among the projected expeditions interrupted by the European war was one to the Island of Timor, in the East Indies. This island has been a rich collecting ground for scientific study, though little has been done by the paleontologist. An opportunity was offered for making collections at Timor through the courtesy and interest of Mr. N. E. Crane, a retired engineer, of Pittsburgh, who had planned to visit the island. The fund for this enterprise was contributed by Mr. Crane, Mrs. E. H. Harriman, and Mr. Frank Springer, but the expedition has been postponed for the present.

CLEARING OF FOG BY ELECTRICAL PRECIPITATION.

The fact was long ago scientifically established that all dust and fog particles in the open atmosphere are electrified and subject to dispersion or precipitation, but how to clear fog from a street, along a railway, or from the neighborhood of a ship at sea, and to do it in a manner commercially feasible has been a matter of serious study for many years. The question having recently aroused fresh attention, particularly in the neighborhood of San Francisco, through researches planned by the University of California in cooperation with the United States Lighthouse Service, it was decided by the Smithsonian Institution during the past year to make an appropriation to further this investigation, which is under the general direction of Dr. F. G. Cottrell, who has done so much toward the practical precipitation of dust, smoke, and chemical fumes at large industrial plants. The American Institute of Electrical Engineers has also appointed a committee to cooperate in this great work, and reports on the results of the study are awaited with much interest. The essential element to success in scattering fog seems to be some form of electrical apparatus of very high direct voltage, with facilities for its control and ready application.

RESEARCH CORPORATION.

In previous reports I have called attention to the Research Corporation formed primarily to undertake the development of certain precipitation patents generously offered to the Institution by Dr. F. G. Cottrell. Although it was impracticable for the Smithsonian Institution to administer this work directly, yet there was no objection to the Secretary becoming a member of a distinct organization

that would undertake its development. An independent organization was accordingly formed in 1912 under the laws of the State of New York, the Secretary of the Institution becoming one of the directors of the Research Corporation and a member of the executive committee. The board of directors includes a number of prominent men of wide business experience, such as James J. Storrow, of Lee, Higginson & Co., Boston; Charles A. Stone, of Stone & Webster, Boston; Arthur D. Little, of the Little Chemical Co., Boston; T. Coleman du Pont, of Wilmington, Del.; Elon H. Hooker, president of the Hooker Electrochemical Co., Niagara Falls, N. Y.; Benjamin B. Lawrence, mining engineer, New York; George F. Kunz, of Tiffany & Co.; Frederick A. Goetze, dean of the engineering department of Columbia University, New York; William Barclay Parsons, engineer, of New York; and Hennen Jennings, mining engineer, of Washington.

The principal object of the corporation is to acquire inventions and patents and to make them more available in the arts and industries, while using them as a source of income, and, second, to apply all profits derived from such use to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors.

The chief assets of the corporation at present are the Cottrell patents relating to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. Dr. F. G. Cottrell, the inventor and donor of these patents, has described their operation and advantages and the progress thus far made in their installation in an article printed in the Smithsonian Report for 1913.

There is now under consideration the acceptance and development of other patents besides those presented by Dr. Cottrell. It is planned that when the funds of the corporation received from royalties and other sources shall have reached \$100,000, to apply the income "to the advancement of technical and scientific investigation and experimentation" as provided by the act of incorporation.

Owing to the wide experience of the members of the board and their standing in the business community, it has been possible to do work in connection with the Research Corporation that would have required the expenditure of large sums if undertaken by an ordinary business organization or private individual.

HARRIMAN TRUST FUND.

Aided by the income of a special fund established by Mrs. E. H. Harriman, Dr. C. Hart Merriam, research associate of the institution, has continued and practically completed his studies of the big bears of America, so that it is now possible to determine the relations

of most of the species and to arrange them in definite groups. Of the true grizzlies there appear to be about 38 species and subspecies representing a dozen groups, and of the brown bears about 10 species, representing 5 groups. Opportunity will now be afforded for study in other fields of biological research.

THE LANGLEY AERODYNAMICAL LABORATORY.

The Langley Aerodynamical Laboratory was reopened under resolution of the Board of Regents adopted May 1, 1913, and on May 23 an advisory committee was organized, as detailed in my report for that year. In my last report I reviewed what had been accomplished up to June 30, 1914, in certain lines of investigation, including the successful flights of the Langley aeroplane built in 1898-1903, and further trials of that machine were described by Dr. A. F. Zahm in an article in the general appendix of the Smithsonian Report for 1914.

During the past year it was found necessary for legal reasons to discontinue the advisory committee as originally organized, and it therefore seemed advisable to call upon Congress to authorize the establishment of a national advisory committee for aeronautics.

Following an urgent appeal by myself and others to the Senate Committee on Naval Affairs, there was inserted in the naval appropriation act (Public, No. 271, 63d Cong.) approved March 3, 1915, the following provision for a national advisory committee for aeronautics.

* * * * *

An Advisory Committee for Aeronautics is hereby established, and the President is authorized to appoint not to exceed twelve members, to consist of two members from the War Department, from the office in charge of military aeronautics; two members from the Navy Department, from the office in charge of naval aeronautics; a representative each of the Smithsonian Institution, of the United States Weather Bureau, and of the United States Bureau of Standards; together with not more than five additional persons who shall be acquainted with the needs of aeronautical science, either civil or military, or skilled in aeronautical engineering or its allied sciences: *Provided*, That the members of the Advisory Committee for Aeronautics, as such, shall serve without compensation: *Provided further*, That it shall be the duty of the Advisory Committee for Aeronautics to supervise and direct the scientific study of the problems of flight, with a view to their practical solution, and to determine the problems which should be experimentally attacked, and to discuss their solution and their application to practical questions. In the event of a laboratory or laboratories, either in whole or in part, being placed under the direction of the committee, the committee may direct and conduct research and experiment in aeronautics in such laboratory or laboratories: *And provided further*, That rules and regulations for the conduct of the work of the committee shall be formulated by the committee and approved by the President.

That the sum of \$5,000 a year, or so much thereof as may be necessary, for five years is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available, for experimental work and investigations undertaken by the committee, clerical expenses and supplies, and

necessary expenses of members of the committee in going to, returning from, and while attending, meetings of the committee: *Provided*, That an annual report to the Congress shall be submitted through the President, including an itemized statement of expenditures.

On July 27, 1914, the Institution published a report by Dr. Zahm on European aeronautical laboratories, in which he describes the buildings, equipment, and operations of laboratories in England, France, and Germany.

Although, as above stated, it was not practical to continue the advisory committee of 1913 as originally planned, nevertheless the individual members of the committee have been active in their investigations, and several valuable reports have been received, some of which are as yet confidential or incomplete, one of those being a report on wireless communications to and from air craft.

Mr. Buckingham completed and published a masterly paper on the mathematical principle governing the relations of experimental models of all sorts to those of full-scale machines. Dr. Humphreys published a long paper on the Physics of the Atmosphere. Dr. Zahm helped to design for the United States Army a 200-horsepower bi-plane, and published a mathematical method of analyzing the stresses sustained by such an aeroplane during flight.

At the annual meeting of the Regents on December 10, 1914, Dr. Alexander Graham Bell, Senator William J. Stone, Representative Ernest W. Roberts, Mr. John B. Henderson, jr., and Secretary Walcott were appointed a committee to consider questions relative to the Langley Aerodynamical Laboratory.

PUBLICATIONS.

The publications of the Smithsonian Institution and its branches during the year comprised a total of 6,753 printed pages, accompanied by 655 plates of illustrations, and the number of copies distributed of these various publications, both pamphlets and bound volumes, aggregated 132,010.

The Institution has for one of its primary objects the "diffusion of knowledge," and this aim is carried out by printing and distributing the results of scientific investigations, accounts of explorations and researches, of progress in the various branches of science, and of development in any phase of human endeavor which would tend to increase "knowledge among men." Of its three series of publications, the Contributions to Knowledge, Miscellaneous Collections, and the annual reports, the first two are issued in limited editions at the expense of the Institution and are sent out to libraries, institutions, and interested individuals throughout the world. The annual reports, containing in addition to the administrative reports a general appendix of original and selected papers showing the recent progress made in all branches of natural and applied science, are

printed under congressional appropriation, so that a larger edition and more widespread distribution is possible.

Under the direction of the Institution are issued the various publications of its branches, (*a*) the annual report, the Proceedings, and the Bulletins of the National Museum, including the series of Contributions from the National Herbarium; (*b*) the Annual Reports and Bulletins of the Bureau of American Ethnology; and (*c*) the Annals of the Astrophysical Observatory. These series are all public documents and are printed by means of annual allotments by act of Congress.

Smithsonian Contributions to Knowledge.—The requirements for memoirs in this series are that they be accounts of extended original research constituting important additions to knowledge. Since the first appearance of this series in 1848, 35 quarto volumes containing 150 memoirs have been issued, the most recent one being the “Langley Memoir on Mechanical Flight,” in which are recorded the results of the late Secretary Langley’s experiments establishing the practicality of heavier-than-air flying machines.

Smithsonian Miscellaneous Collections.—Fourteen papers forming parts of four volumes of this series were issued during the year, among them one paper on Cambrian geology by your Secretary. Another interesting paper was that by Messrs. Abbot, Fowle, and Aldrich recording new solar radiation researches, in the course of which free balloons carrying recording apparatus, ascended to a height of over 15 miles and were found on their descent with the records in good condition. As a result of these and other experiments, the authors abide by their former results, namely, that “the mean value of the ‘solar constant’ is 1.93 calories per square centimeter per minute.” In this series, the sixth revised edition of the Smithsonian Physical Tables was issued, and was practically exhausted at the close of the year, showing the continued popularity and usefulness of this work. The publication of a further edition was being considered at the close of the year. The usual annual account of the Institution’s explorations and field work was issued, and being profusely illustrated, was of considerable popular interest.

Smithsonian report.—The report for 1913 was received from the printer and distributed during the year. Separates of the articles forming the general appendix of the 1914 report were issued, the completed volume, however, not being received from the printer until shortly after the close of the fiscal year. Incorporated in the congressional act providing for printing for the Institution and its branches was a clause increasing the edition of the Smithsonian annual reports from 7,000 to 10,000, a very desirable change, as the edition of this volume has heretofore been exhausted almost immediately following its appearance.

Special publications.—Of the opinions rendered by the International Commission on Zoological Nomenclature, which the Institution has published for some years past, Opinion 66 was issued, and the Institution has continued to provide clerical services in connection with the office of the secretary of the commission.

Among other special publications was a short biographical sketch of James Smithson, abridged from the chapter on Smithson by S. P. Langley in the history of the first half century of the Institution.

National Museum publications.—The National Museum issued an annual report, 1 volume of the Proceedings and 41 separate papers forming parts of this and other volumes, 6 bulletins, and 1 volume of Contributions from the National Herbarium.

Bureau of Ethnology publications.—The Bureau of American Ethnology published two bulletins and three miscellaneous publications. Among the latter was a circular of information regarding Indian popular names, to be distributed in response to the numerous letters requesting information of this kind. Four annual reports and five bulletins were in press at the close of the year.

Reports of historical and patriotic societies.—The annual reports of the American Historical Association and the National Society of the Daughters of the American Revolution were submitted to the Institution and transmitted to Congress in accordance with the charters of these organizations.

Allotments for printing.—The allotments to the Institution and its branches under the head of "Public printing and binding" were utilized as far as practicable, although there was a large amount of material which the Public Printer was unable to complete, and this will therefore become a charge against the 1916 allotment.

The allotments for the year ending June 30, 1916, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies.....	\$10,000
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks, and for the Bulletins and Proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half morocco or material not more expensive, scientific books, and pamphlets presented to or acquired by the National Museum library.....	37,500
For the annual reports and Bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau....	21,000
For miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature.....	100
National Zoological Park.....	200
Astrophysical Observatory.....	200
For the annual report of the American Historical Association.....	7,000
Total.....	76,200

Committee on printing and publication.—All manuscripts submitted for publication by the Institution or its branches have, as usual, been examined and passed upon by the Smithsonian advisory committee on printing and publication. The committee has also considered various general matters concerning printing and binding. During the year 18 meetings were held and 109 manuscripts acted upon. The personnel of the committee was as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, acting chairman; Dr. C. G. Abbot, director of the Astrophysical Observatory; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution, secretary of the committee; Mr. F. W. Hodge, ethnologist-in-charge of the Bureau of American Ethnology; and Dr. George P. Merrill, head curator of geology, United States National Museum.

THE SMITHSONIAN LIBRARY.

The formation of a library of science was one of the earliest activities of the Smithsonian Institution and its natural growth during the last 60 or more years has resulted in the accumulation of nearly half a million works bearing on practically every branch of natural science, the fine arts, and the industrial arts. For administrative reasons a large portion of the library, consisting in the main of transactions of learned societies, was in 1866 deposited in the Library of Congress. This deposit is constantly being increased, the accessions during the past year numbering 24,713 items of publications and making the total number of entries to June 30, 1915, 521,616.

The several libraries still directly maintained by the Institution and its branches include the Smithsonian office library; the libraries of the National Museum, comprising over 100,000 titles; the Bureau of American Ethnology, about 35,000 titles; the Astrophysical Observatory; the National Herbarium; and in addition to these should be mentioned the more recently formed aeronautical library, which contains probably the most complete series of works on this subject in the United States. One of the chief contributors to this library during the year was Dr. Alexander Graham Bell, whose gift included a working library of 46 volumes and 156 volumes of newspaper clippings covering the recent years of rapid development of the art of aeronautics.

Among other accessions to the art section of the library during the year I may mention the loan by Mrs. Walcott of nine volumes of Japanese art and about 400 volumes of architectural publications which formed the library of her brother, Mr. George Vaux, of Philadelphia.

The report of the assistant librarian, appended hereto, describes the improvements recently made by the construction of steel stacks in the Smithsonian building for assembling in accessible quarters many general works belonging to the Government bureaus under the Institution which had heretofore been widely scattered in unsuitable rooms.

LUCY T. AND GEORGE W. POORE FUND.

In my last report I referred to a number of bequests then awaiting settlement. One of these was the bequest of George W. Poore, of Lowell, Mass., who died December 17, 1910, and by the terms of his will made the Smithsonian Institution his residuary legatee. As mentioned in my 1910 report, the estate, estimated at about \$40,000, is bequeathed under the condition that the income of this sum should be added to the principal until a total of \$250,000 should have been reached, and that then the income only should be used for the purposes for which the Institution was created. Although I have heretofore called attention to Mr. Poore's reason for making this bequest, it is so apt and appropriate that I will repeat it here. The will says:

I make this gift not so much because of its amount as because I hope it will prove an example for other Americans to follow, by supporting and encouraging so wise and beneficent an institution as I believe the Smithsonian Institution to be, and yet it has been neglected and overlooked by American citizens.

In March, 1915, the Institution received from the executors of the Poore estate the first installment of the bequest, amounting to \$24,534.92, as noted under the head of finances. It will be known as the Lucy T. and George W. Poore fund.

THE FREER COLLECTION.

In 1906 Mr. Charles L. Freer, of Detroit, Mich., presented to the Institution about 2,300 paintings and other objects of art, and from time to time since then he has supplemented that gift by further generous donations until this wonderful collection now aggregates 4,811 pieces, including 991 paintings, engravings, lithographs, etc., by American artists, and 3,820 oriental works of art, many of them of high historic and intrinsic value. It was stipulated by Mr. Freer in connection with the gift that the collection should remain in his custody during his lifetime, and that he would provide funds for the erection of a suitable building for the permanent preservation of the collection. He is now considering the question of erecting such a building and a committee of the Regents has been appointed "on the securing of a site for the Freer Art Gallery."

THE NATIONAL MUSEUM.

The report of the Assistant Secretary in charge of the National Museum, hereto appended, indicates most gratifying progress in all lines of Museum activities. To the collections there have been many large and most valuable additions, and installation of exhibits, particularly in the new or natural history building, has been greatly advanced and improved.

More than 300,000 specimens were accessioned during the year, over two-thirds of which pertained to paleontology and zoology, one-sixth to botany, and the remainder to anthropology, geology, mineralogy, textiles, and to other divisions of the Museum.

The ethnological exhibits were enriched by a large series of old Japanese art assembled some 30 years ago by the late J. Crawford Lyon; baskets, musical instruments, and other objects from Dutch Borneo, presented by Dr. W. L. Abbott; also many interesting articles pertaining to the American Indians. In American archeology the principal accession was a series of implements and other objects of stone, metal, and terra cotta from various parts of the United States and Mexico, secured through cooperation with the management of the San Diego Exposition. Dr. Alexander Graham Bell added very greatly to the electrical exhibits by his gift of 280 pieces of experimental apparatus and relics relating to the early history of the telephone.

Special mention should also be made of the gift of Mr. Hugo Worch of a large number of pianofortes, illustrating the progress and development of piano making from about 1770 to 1850. The earliest of European pianos in the series dates from about 1770 and of American pianos about 1790. Many interesting accessions pertaining to American history are mentioned by the Assistant Secretary in his report, as also important additions to the zoological, geological, and botanical collections. A most notable contribution of mollusks, consisting of a very large collection of specimens from practically every part of the world, was a gift from Mr. John B. Henderson, a Regent of the Institution.

As in previous years, much material was received from the United States Geological Survey, the Bureau of Fisheries, the Department of Agriculture, and other Government establishments, these accumulations from various field researches having served their purpose in the preparation of reports on scientific investigations.

The National Gallery of Art has already outgrown the space allotted to the display of paintings. Each year the additions to the permanent collection of paintings, as well as the loan exhibits, causes more and more embarrassment to those in charge of their installa-

tion, and the time has now come when serious consideration must be given to securing adequate quarters for these national collections.

I can not pass without mention of the very interesting exhibition of laces, embroideries, and other art textiles, as also the historical costumes, especially those representing the several administrations at the White House since the period of President Washington. I will not attempt to describe any of the gowns recently received, further than to say that they include a lavender silk dress worn by Mrs. Fillmore, one of black moiré worn by Mrs. Pierce at the inauguration of President Pierce in 1853, and a pale green brocade worn by Mrs. Cleveland during President Cleveland's first administration.

The division of textiles has greatly increased in popular interest through the installation of a series of machines illustrating methods of manufacture as well as exhibits of the raw and finished products.

Likewise, mineral technology is being illustrated by models and products, showing the manufacture of mica plate from material heretofore thrown away as waste, the preparation of asbestos products, and the manufacture of graphite and its industrial products.

The Museum is participating in the expositions at San Francisco and San Diego, although the very small allotment allowed the Institution and its branches from the appropriation for Government exhibits permitted only a comparatively small display at San Francisco. At the San Diego Exposition, however, for which no appropriation was granted for Government exhibits, it was possible, through cooperation with the exposition management, to prepare an interesting exhibit of physical anthropology and one illustrating American aboriginal industries. The former exhibit, more fully described on a previous page, is an entirely novel one. It illustrates man's evolution, his development or growth, his racial, sexual and individual variations, and the causes, other than normal senility, which result in the decline of the human organism.

For many years it has been possible to aid the schools and colleges of the country in their teaching of natural history through the distribution of duplicate material. During the past year 163 sets of such duplicates, aggregating 14,843 specimens, were thus distributed. And about 8,000 duplicate specimens, nearly three-fifths of which were plants, were utilized in exchanges with other museums and institutions.

The total number of visitors to the older Museum building during the year was 133,202, and to the new building 321,712. The latter aggregate includes 59,577 Sunday visitors to the new building, the older building not being open on that day.

The Museum issued its usual annual report and series of scientific papers, the total distribution for the year aggregating 54,000 volumes and pamphlets.

BUREAU OF AMERICAN ETHNOLOGY.

The field work of the Bureau of American Ethnology during the last year resulted in the accumulation of a large amount of important data relating in particular to the early inhabitants of the western and southwestern portions of the United States. There was also brought together a great deal of material bearing on the habits, customs, beliefs, institutions, ceremonies, and languages of vanishing tribes of Indians throughout the country. The report of the ethnologist-in-charge, appended hereto, reviews in detail many lines of systematic research now being conducted by the bureau. Among these I may note interesting explorations in New Mexico and Utah among ancient village sites which appear characteristic of peoples probably of a considerable earlier period than those heretofore known from those regions. Ancient earthenware collected by Dr. Fewkes in such sites in the lower Mimbres Valley in New Mexico bear decorations of animals and geometric designs in some measure resembling certain ancient paintings on the walls of caves in France. In southern Arizona are some extensive aboriginal ruins awaiting investigation, which bid fair to add much to our knowledge of the early inhabitants of that region.

Among documents preserved in the Santa Ines Mission in California there has been brought to light an old manuscript of special interest in connection with the study of the former Chumash Indians, and a complete copy of the manuscript has been made for the use of the bureau.

Special researches have been in progress for some years in the preparation of several series of handbooks relating to American Indians. One of these series, devoted to Indian languages, is in course of publication, the first volume already having been issued, under the editorship of Dr. Franz Boas. A Handbook of American Antiquities, the first part of which will soon be ready for the printer, is being prepared by Mr. W. H. Holmes. The "Handbook of American Indians North of Mexico," published some years ago, has had several reprintings, and the public demand for it still continues. A handbook in course of preparation is devoted to Aboriginal Remains East of the Mississippi.

There had been such doubt and discussion as to the probable age of certain Indian mounds in northeastern Kansas and southeastern Nebraska that it seemed important for a representative of the bureau to make an investigation of the facts in the case. This task was undertaken by Mr. Gerard Fowke. His report indicates that instead of dating back many thousands of years, as some had claimed, "it is safe to say that no earthwork, mound, lodge site, or human bones along this part of the Missouri River has been here as long as 10 centuries."

The study and analysis of Indian music is a subject to which the bureau has devoted considerable attention during the last few years, and there have already been published two bulletins on Chippewa music, which have attracted much attention in the musical world. There is now in press an extended account of "Teton Sioux Music" with transcriptions of 240 songs and about 100 illustrations; and a paper on the music of the Ute Indians is in preparation.

The collection of manuscripts pertaining to American Indians which has been accumulated by the bureau during the last 30 years now numbers about 1,700 items. Many of these manuscripts have come to be of priceless value, comprising as they do records which it would be impossible now to duplicate. There was added to this collection during the last year a number of interesting records, including a Laguna Indian dictionary, 49 Arapaho and Gros Ventre notebooks, the war record of "Sitting Bull" depicted in 55 pictographs, and a photostat copy of "A Grammar of the Pottewatomy Language."

The bureau issued two bulletins, and there was in press at the Government Printing Office at the close of the year the twenty-ninth, thirtieth, thirty-first, and thirty-second annual reports, and four bulletins. The completion of several of these works is delayed by the European war, the authors in some cases residing in belligerent countries. The distribution of publications aggregated 10,185 volumes and pamphlets. There were about 500 books added to the library, which now numbers 20,237 volumes, 13,188 pamphlets, and several thousand unbound periodicals.

ASTROPHYSICAL OBSERVATORY.

One of the principal researches by the Astrophysical Observatory during the past year was the continuation of observations as to the intensity of solar radiation at various altitudes, with a view to definitely determine the value of the solar constant of radiation. By means of sounding balloons, to which were attached automatic recording pyrheliometers, successful records were secured up to a height of 25,000 meters or about 15 miles, where the barometric pressure is only one twenty-fifth that at sea level. Director Abbot, in his report and in a special publication (Smithsonian Miscellaneous Collections, Vol. 65, No. 4, June 19, 1915), reviews the observations in solar radiation made at various altitudes from sea level up to the highest practicable mountain peak (Mount Whitney), thence in a balloon as high as man could live, thence to a height of 15 miles, and concludes that the solar constant of radiation is 1.93 calories per square centimeter per minute. Dr. Abbot discusses also the interesting fact that considerable fluctuations of the "solar-constant" values occur from day to day ranging over nearly 10 per cent between the extreme limits,

1.81 and 1.99 calories. In 1913 the radiation of the sun was 2.5 per cent below the mean, and 1 per cent above the mean in 1914. A high average value is said to be indicated for 1915. In concluding his report for the year Dr. Abbot says:

Short-period fluctuations of solar radiation were large in 1913, but small in 1914. Associated with these quick, irregular fluctuations are found variations of contrast of brightness between the center and edges of the solar disk. Curiously enough, while greater contrast is associated with greater radiation and with numerous sun spots in the general march of the sun's activity, lesser contrast is associated with greater solar radiation in the march of the quick, irregular fluctuations of the sun's emission. This paradox points to two causes of solar radiation—the long period changes may probably be caused by changes of the sun's effective temperature attending the march of solar activity; the quick fluctuations may be ascribed to changes of the transparency of the outer solar envelope.

INTERNATIONAL EXCHANGES.

The operations of the International Exchange Service have been necessarily curtailed for some months because of the European war. The total number of packages handled during the year was 275,756, or 65,911 less than the year before, and their weight was 367,854 pounds, a decrease of 199,131 pounds. There has accumulated, moreover, a large number of packages awaiting opportunity of shipment, particularly to Austria, Belgium, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Servia, and Turkey, which were entirely shut out of the service at the close of the year, although correspondence is in progress to secure renewal of shipment with some of those countries.

One of the important functions of this service is the interchange of official Government documents with various countries, resulting in the building up of a most important division of the Library of Congress. During the past year there was received in this connection from the Chinese Government a set of the Imperial Institute of the Ching Dynasty and other valuable records aggregating 684 volumes.

Fifty-six full sets and 36 partial sets of United States official publications are now sent regularly to depositories abroad, in accordance with treaty stipulations and congressional resolutions. A list of these depositories and detailed statistics of the service are given in the appendix to this report.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The Smithsonian Institution has administered the United States Bureau of the International Catalogue since its organization in 1901. There are 33 of these regional bureaus located in the principal coun-

tries with a central bureau in London, where reference cards are assembled and published annually in 17 volumes covering each branch of science. During the past year there were collected and classified in the Smithsonian office and sent to London 12,386 cards of reference to the scientific literature of the United States for the year 1914, besides 14,027 references for the years 1906 to 1913, or an aggregate of 26,413 cards, making 345,349 references to American literature since 1901.

Through a minute system of classification, the equivalent of a brief digest of the subject contents of each paper, the International Catalogue places before students and investigators references to practically all the scientific literature of the world.

On account of the necessarily high cost of the annual volumes subscriptions to the series are limited as a rule to the most important institutions and libraries, where, however, the catalogue is available to everyone desiring to consult this work.

As in all lines of scientific work, the European war temporarily interferes with the finances and general work of the catalogue and the amount of literature produced in most of the countries at war is greatly curtailed.

NATIONAL ZOOLOGICAL PARK.

There was added to the collections in the National Zoological Park during the past year a number of interesting animals, including 25 species not before represented there. The total accessions aggregated 498. The census of animals on hand June 30, 1915, was 1,397 individuals, representing 151 different species of mammals, 185 of birds, and 22 of reptiles, as compared with 1,362 animals on hand July 1, 1914. The report of the superintendent of the park, on another page, records a detailed systematic list of all the animals, numbering 629 mammals, 696 birds, and 72 reptiles.

Every year since 1890, when the park was established, many specimens have been received through the individual donations of those interested in its growth. Forty-three such donors during the past year contributed 60 animals.

The total number of visitors was 794,530, an increase of about 60,000 over the year preceding, and the largest attendance in the history of the park. Among the visitors were 3,485 students from various schools and classes on special visits to the park for educational purposes.

The superintendent notes among the improvements of the year the construction of a cage and shelter house for pumas; and an out-of-doors inclosure with a small shelter house for a band of 25 rhesus monkeys which thrived there well throughout the winter.

Near the close of the year work was begun on a hospital and laboratory building, the urgent need of which was noted in my last report.

In the sundry civil act making appropriations for the fiscal year ending June 30, 1914, provision was made for the acquisition of about 10 acres of land along the western boundary of the park, but necessary legal proceedings to complete the purchase had not come to a close at the end of the year.

Among the primary objects in establishing the Zoological Park was the "instruction and recreation of the people." To this end the playground department of the District of Columbia has been allowed to install several pieces of apparatus in a meadow tract which has become a favorite resort for picnic parties.

The needs of the park become greater with the growth of the collections and the increasing popularity of the resort as an attractive public institution. The appropriations from year to year, while sufficient for absolute maintenance, have permitted the construction of but few of such permanent buildings as are needed for the adequate care of the animals. Among these urgent needs I may mention an aviary building and a building for the proper housing of elephants, hippopotami, and certain other animals now sheltered in mere temporary quarters.

Accompanying the superintendent's report is an outline map on which are indicated desirable building sites where necessary grading for that purpose would permit the desirable filling of certain ravines now practically useless.

NECROLOGY.

THEODORE NICHOLAS GILL.

Theodore Nicholas Gill was born at New York March 21, 1837, and died at Washington September 25, 1914. The following tribute to his memory was adopted at a meeting of his associates on September 26:

TRIBUTE TO THE MEMORY OF DR. GILL.

Theodore Nicholas Gill, master of arts, doctor of medicine, doctor of philosophy, doctor of laws, associate in zoology in the United States National Museum, died at Washington, D. C., September 25, 1914, in the seventy-eighth year of his age.

His associates in the Smithsonian Institution and its several branches, assembled at a meeting in his memory at the National Museum on September 26, do here record their deep sorrow in the loss of a sincere friend, profound scholar, one of America's foremost men of science, and one officially connected with the Smithsonian Institution in various capacities for more than half a century.

Trained in private schools and by special tutors in New York City, he early acquired a love for natural science which he made his life work, rising to the

highest rank in the field of zoology, and through his critical studies adding greatly to the sum of human knowledge.

As one of the founders of the Cosmos Club; as a professor in the Columbian (now the George Washington) University for more than 50 years; as a member of the American Association for the Advancement of Science, the Philosophical Society, the National Academy of Sciences, and of many other scientific societies in the United States and foreign lands, Dr. Gill was most highly esteemed and was widely known to biologists throughout the world as a man of deep and accurate learning, particularly in the study of his specialty, ichthyology. A man of phenomenal memory, familiar with many languages, he was a veritable cyclopedia of science and knew how to make plain to the layman its technical phraseology. He was a constant and willing source of information and inspiration to all who sought his aid in professional studies.

Through devotion to his chosen calling and his genial disposition Dr. Gill has left to his associates a cherished memory and a brilliant example worthy of emulation.

WILLIAM WOODVILLE ROCKHILL.

William Woodville Rockhill, former ambassador to Russia, Turkey, and other countries, one who had ably filled many other important diplomatic positions in China, Korea, and elsewhere, and had served as Assistant Secretary of State, was born in Philadelphia in 1854 and died in Honolulu, December 8, 1914. From 1888 to 1892 he conducted two scientific missions to China, Mongolia, and Tibet under the auspices of the Smithsonian Institution, resulting in a large accumulation of most interesting and important data bearing on the habits and customs particularly of the then little-known Tibetans. Much of this valuable information was embodied in his "Diary of a Journey through Mongolia and Tibet," published by the Institution. To the National Museum collections he added a large amount of ethnological material resulting from his journeys. Mr. Rockhill was intensely devoted to oriental study and had been a constant collaborator of the Smithsonian Institution throughout all his official career. At the time of his death he was en route to assume his duties as financial adviser to the Chinese Government.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1915:

INTRODUCTORY.

In the last two reports the general status and arrangement of the public collections in all departments were briefly reviewed. Since then the exhibits of anthropology, biology, and geology in the new building have undergone few material changes, though they have received many important additions and there has been an improvement in the condition of a large number of specimens which needed renovation. It having become necessary to provide a place for the larger whale skeletons, which were not transferred at the time of the general moving of the zoological collections, the south hall in the second story of the west wing, previously assigned to marine invertebrates, was allotted to this purpose and the invertebrates were taken to the north side of the building on the same floor. The re-installations necessitated by these changes were in progress at the close of the year.

The accommodations afforded by the improvised picture gallery in the north main hall have been entirely outgrown and the point has been reached where the paintings must be so crowded as to utterly destroy their effect. There is no other suitable location to which this important collection can be extended and would-be contributors find no encouragement in the conditions. The time has certainly arrived when serious consideration should be given toward providing proper means for sheltering and displaying the art treasures of the Museum, in which connection the interests of the National Gallery of Art are vitally at stake.

The work of renovation of the main hall in the Smithsonian building, which continued throughout the year, prevented the execution of the proposed plans for the enlargement and improvement of the exhibition series of the graphic arts. In the older Museum building the installations, especially in the recently reorganized divisions, steadily progressed with very measurable advancement. In

the division of textiles much material was added, many gaps were filled, and numerous novel features were introduced. In mineral technology, where the construction of models makes progress slower, the number of comprehensive educational features was nevertheless considerably increased, and so many more are in course of preparation that another year should see a wide representation of the subjects covered. Toward the end of the year a section of wood technology was established with the main object of setting forth in a manner to satisfy the artisan and the public the qualities and sources of the woods available for any purpose to which that material is put. It is not doubted that a creditable collection can soon be gathered.

COLLECTIONS.

The additions to the collections, comprised in 1,481 accessions, aggregated approximately 304,647 specimens, which were classified and assigned as follows: Anthropology, 15,140; zoology, 101,928; botany, 51,295; geology and mineralogy, 4,063; paleontology, 129,981; textiles and animal and vegetable products, 1,511; mineral technology, 607; National Gallery of Art, 122. Loans for exhibition were also received to the extent of 1,760 articles, consisting of paintings and sculptures, laces, embroideries and tapestries, costumes and other historical objects, ethnological specimens, etc. The number of lots of material sent in for examination and report amounted to 790, of which about 64 per cent were geological and 28 per cent zoological.

Among the more important gifts to the division of ethnology were a large series of old Japanese art, assembled about 30 years ago by the late J. Crawford Lyon and presented by the Misses Lyon; a collection of baskets, bark cloth, sword hilts in process of making, quivers for blowgun darts, musical instruments, and other objects, gathered in Dutch Borneo by Mr. H. C. Raven, and donated by Dr. W. L. Abbott; examples of modern Egyptian clothing contributed by Mr. Herbert E. Winlock; and interesting articles from the Plains Indians, which belonged to the late Maj. George Henry Palmer, United States Army, presented by Mrs. Palmer. A valuable series of musical instruments, household articles, tools, and other objects from the Ute Indians of the Uintah and Ouray Reservation, southeastern Utah, was purchased. The loans comprised objects from southern Mindanao, P. I., Abyssinia, Japan, China, Egypt, and Europe.

The principal accession in American archeology was secured through the cooperation of the Smithsonian Institution with the management of the Panama-California Exposition at San Diego, and comprised important series of implements and other objects of stone,

metal, and terra cotta from various localities in the United States and Mexico. Many specimens of like nature from the same countries were also received in exchange from the Naturhistoriska Riksmuseum at Stockholm, and the Bureau of American Ethnology transmitted a quantity of pottery displaying a distinct type of decoration from the lower Mimbres Valley, N. Mex. A banner stone of rose quartz, a very remarkable Indian relic and probably one of the finest examples of its kind yet brought to light, from Woodruff County, Ark., and one image of gold and two of gilded copper from Chiriqui, Panama, were purchased. The principal gifts consisted of a notable jade ax from Alta Verapaz, Guatemala, a small stone celt from Ahuachapan, San Salvador, and a clay figurine from Tepecoyo, in the same country, presented by Mr. Emilio Mosonyi, of San Salvador, and a pottery vase from a mound in Marion County, Tenn., contributed by Mr. Clarence B. Moore.

In Old World archeology there were only two relatively important accessions. The first, an exchange from Dr. Rutot, of the Royal Museum of Natural History at Brussels, consisted of 90 Neolithic stone implements from Belgium, representing the first epoch of polished stone culture in Europe, known as the "Spiennian"; the second, a gift from Mr. Herbert E. Clark, of Jerusalem, of 19 stone implements, forming a valuable addition to the present collection from Palestine.

The more important contributions in physical anthropology comprised skeletal material from a Minsi burial place on the Jersey side of the Delaware River, 3 miles below Montague, N. J., one of the most complete and carefully recorded collections of such specimens so far acquired, from Mr. George G. Heye, of New York; similar material from Alabama and Tennessee, from Mr. Clarence B. Moore; eight prehistoric skeletons and four skulls from Bohemia, from Prof. J. Matiegka, of the University of Prague; and three nearly complete and four partial human skeletons, from Montana, collected by Mr. C. W. Gilmore, of the Museum staff.

The electrical collections were enriched by a most noteworthy gift from Dr. Alexander Graham Bell, consisting of 280 pieces of experimental phonographic apparatus and several relics connected with the early history of the telephone. Under a special act of Congress, the Coast and Geodetic Survey transferred a large number of antiquated surveying instruments which are now of much historical importance; and a quantity of guns needed to fill gaps in the collection were deposited by the Navy and War Departments. Of especial interest is a gasoline automobile of 1896, presented by the Olds Motor Works.

The section of musical instruments received during the year such a contribution as places its collection among the most notable of the

kind in the world. The gift came from Mr. Hugo Worch, of Washington, D. C., a student of the history of the pianoforte in America, who has been assembling a collection of these instruments, which he offered to the Museum in order to provide for their permanent preservation. While accommodations for the entire series may not be found, 70 instruments have already been delivered, the selection following lines to best illustrate the progress and development in piano making down to about 1850. Too much praise can not be accorded Mr. Worch for this splendid donation, which now includes 24 examples of European make and 46 of American make. With few exceptions, the latter are the product of manufacturers in Philadelphia, New York, Baltimore, and Boston, and represent, among others, the names of Taws, Albrecht, Harper, Geib, Kearsing, Loud, Hisky, Osborne, Nunns, Goodrich, Stewart, Chickering, Meyer, Babcock, and Wise. The earliest of the American pianos is of date about 1790 and of the European about 1770. While in most cases the examples are no longer in playing shape, the mechanism is preserved, and some remain in excellent condition.

In the section of ceramics the more noteworthy additions consisted of two loans, one including an old porcelain rice bowl and a tea set of cloisonné on porcelain from Miss Julia H. Chadwick, the other being a collection of Chinese and Japanese porcelains from Miss Eliza R. Seidmore. The division of graphic arts received a large number of specimens mainly required for filling gaps in the collections, among the more important being illustrations of a process for color printing from photographs and of the rapid rotary intaglio process, besides many examples of lithographs, collotypes, and other prints.

The additions to the memorial collection of American history were numerous and of great variety, the most important being loans, in which were included a water-color portrait of Washington by James Peale; articles of military equipment carried by Capt. William Walton during the War of the Revolution; a silver tea service of five pieces once the property of Laura Wolcott, daughter of Oliver Wolcott, a signer of the Declaration of Independence; a pair of gold and jeweled earrings formerly belonging to Mrs. Rebecca Madison, niece of President Madison; and three gold medals and one of bronze added to the collection of Rear Admiral Robert E. Peary, United States Navy. There was also a large contribution of silver and bronze coins of the nineteenth century, issues of the United States and several foreign countries; and the collection of postage stamps, envelopes, and post cards was very materially increased.

The exhibition of historical costumes was greatly increased both by gift and loan, most noteworthy being appropriate costumes for representing four additional presidential administrations at the White

House. The earliest of these belonged to Betty Taylor, daughter of President Zachary Taylor, 1849-1850. The next, a lavender silk dress, was worn at the White House by Mrs. Fillmore, wife of President Millard Fillmore, 1850-1853. The third, a black moiré, was worn by Mrs. Pierce on the occasion of the inauguration of her husband, Franklin Pierce, March 4, 1853. The last, a pale-green brocade, was used by Mrs. Cleveland during the first administration of President Cleveland, 1885-1889.

In the section of art textiles the acquisitions, all loans, comprised over 100 pieces of lace, besides embroideries, brocades, velvets, tapestries, etc. Six tapestries of great beauty and value were also lent for a short period by Messrs. P. W. French & Co., of New York. The room containing this collection was entirely renovated and repainted, the materials were also for the most part rearranged, and where necessary new and more effective backgrounds were substituted.

As during many successive years, the Museum was indebted to Dr. W. L. Abbott for large collections of the higher animals, one made at his expense in Dutch East Borneo by Mr. H. C. Raven, the other, composed entirely of mammals, obtained by himself in Kashmir. Of no less importance was a collection from the northwest coast of Cuba, secured during an expedition by Mr. John B. Henderson, comprising at least 10,000 mollusks and other invertebrates, nearly 3,000 fishes, and many reptiles and batrachians. The Bureau of Fisheries made extensive deposits of marine invertebrates and fishes; and Mr. Arthur de C. Sowerby continued to transmit valuable series of vertebrates and insects from little known districts in China. Birds, reptiles, batrachians, fishes, and marine invertebrates from Panama were contributed by Mr. James Zetek; plants and marine invertebrates in large numbers by the Carnegie Institution of Washington; and animals of various groups by the Biological Survey.

Besides those above mentioned, interesting collections of birds were received from Ecuador and Australia. A unique accession consisted of the last of the pair of passenger pigeons which had been so long preserved in the Cincinnati Zoological Gardens, and whose death signaled the absolute extinction of this remarkable form. Additional specimens of reptiles and batrachians were obtained from Texas, California, Mexico, and Baluchistan; and of fishes from the Philippine Islands, Formosa, and Panama.

The most notable contribution of mollusks was a gift from Mr. John B. Henderson of a very large collection of selected and generally identified specimens assembled from practically every part of the world. Eight separate transfers of invertebrates by the Bureau of Fisheries were of much scientific value. Four of these consisted of material that had been studied and described and therefore contained numerous type specimens, and the remainder of new collections from

recent surveys of the steamer *Albatross* on the Pacific coast. Through the courtesy of the Carnegie Institution of Washington, about 1,000 specimens of corals from the Bahama Islands and Florida, 300 specimens from Australia, and many other marine forms were acquired. The Bureau of Entomology was the principal contributor of insects, which belonged mainly to the Hymenoptera, Diptera, and Odonata. Peruvian Diptera to the number of over 3,000, besides several hundred preparations, were presented by Dr. C. H. T. Townsend; and numerous wasps and other insects, by Dr. T. D. A. Cockerell. Two other important collections, consisting of Coleoptera and Hymenoptera, were received from Copenhagen.

The number of plants received was greater than in any of the previous 10 years except 1913. Nearly one-fourth were deposited by the Department of Agriculture, including 7,300 specimens of grasses, of which the larger part will be distributed in sets to scientific establishments. Two other noteworthy collections from the same department consisted of phanerogams from the western United States and western Canada. Important accessions otherwise obtained came from the West Indies, the Philippine Islands, China, the Canary Islands, western South America, Mexico, and several of the States.

Though the accessions in geology were not extensive, they furnished a considerable variety of valuable material. A collection from the Geological Survey was illustrative of the economic phases of the feldspar deposits of the United States. Individual gifts comprised excellent specimens of ferberite-bearing pegmatite from Arizona; tungsten ore and roscelite-bearing sandstone from Colorado; and a sample of ferro-vanadium made from patronite ores of Minasragra, Peru; besides several slabs of marble for the exhibition series of ornamental stones. The meteorite collection was enriched by specimens from 13 falls, obtained by gift, exchange, and purchase, to which may be added fragments of 12 meteorites deposited by the National Academy of Sciences.

The most important single accession in mineralogy consisted of several hundred specimens of minerals and cut stones, including a suite of unique titanite crystals from an exhausted locality at Bridgewater, Pa., received as a bequest from the late Brig. Gen. William H. Forwood, United States Army. Among the transfers from the Geological Survey were various lots of gem minerals, in both rough and cut form, including many specimens of exceptional value, consisting for the most part of types of new species, or restudied and redescribed material from new localities. From several other sources rare and interesting examples were also obtained, such as one of the largest known nuggets of osmiridium, large crystals of phenacite, tarbuttite, roepperite, pseudomorphs from the Blue Jay Copper Mine, scheelite, large rhodonites, etc. The additions in petrology

consisted, as usual, largely of studied material, representing folio series, deposited by the Geological Survey. Mention should also be made of an interesting collection of obsidians from Iceland, presented by Dr. F. E. Wright, and illustrating his studies on the origin of spherulitic structure.

An extensive series of Devonian fossils, representing the lifelong collecting of Prof. Henry Shaler Williams, and including many faunas not previously represented in the Museum, formed the largest and most important accession in invertebrate paleontology. It was transferred by the Geological Survey, which also deposited nearly 600 specimens of type and other monographic material. Other large acquisitions consisted of about 5,000 specimens of European Paleozoic and Mesozoic fossils; some 6,000 specimens of Ordovician and Silurian fossils from Illinois, Indiana, and Kentucky; and about 5,000 Cambrian fossils from China. A series of Mesozoic sponges from Germany is especially adapted for exhibition purposes, as is also a large slab containing numerous Devonian glass sponges from New York. Additional specimens from the cave deposit at Cumberland, Md., referred to in previous reports, comprising 15 more or less complete skulls and other fragmental material, were obtained through the generous financial aid of Mr. John B. Henderson. Portions of a mastodon discovered at Winamac, Ind., indicate the existence at that place of a more or less complete skeleton, which the Museum has obtained permission to excavate. Other important contributions include 30 dinosaurian skin plates from the Lance formation in Wyoming; a composite skeleton of a dog, and three skulls and lower jaws, from the Rancho La Brea asphalt deposits at Los Angeles, Cal.; and a large part of the skeleton of the extinct swimming reptile, *Mosasaurus*, from Montana.

The division of textiles received so many and such variety of additions as to render an adequate summation impossible within the compass of this report. Of particular popular interest is a series of machines for ginning, drawing, spinning, and weaving cotton, which it is intended, in part at least, to provide with motive power so as to be able to actually demonstrate to the public the processes of manufacture from the raw material to the finished product. The processes in the manufacture of worsted goods and of carded woolen fabrics are also fully illustrated by a large series of specimens. Besides standard goods of cotton, wool, silk, etc., the contributions include a great array of specialties and novelties, materials recently placed upon the market, or soon to be, in satisfaction of the ever-increasing demand for new stuffs and new patterns. Printed cotton goods, printed cotton draperies, upholstery fabrics; pile fabrics for dress and decorative purpose, including beautiful examples of artificial furs; brocaded dress silks for the fall season of 1915, new printed satins,

pongees, tussah silks, trimming silks, taffeta dress silks in Mexican and Indian designs; satins, crêpes, and chiffons decorated by means of spray printing; machine and hand made laces; embroidered and brocaded Chinese silks; Cashmere shawls; the manufacture of American rugs; oilcloths—these and many samples of other goods were all well represented in the accessions of the year. Additions were also received for the historical collection of textile machinery, including several early appliances marking important stages in the development of the industry.

Following the plans outlined in a previous report, the work of preparing exhibits in mineral technology was actively carried on. The principal ones, including models and products, installed during the year were illustrative of the occurrence, mining, and treatment of rock salt for the manufacture of sodium compounds by the Solvay Process Co., of Syracuse, N. Y.; the manufacture of glass, additional to the models received the previous year, from the Macbeth-Evans Co.; the processes employed in the manufacture of gypsum as a building material at Oakfield, N. Y.; the manufacture of mica plate by a process which permits the utilization of what was formerly thrown away as waste; the occurrence, derivation, and adaptability of abrading materials; asbestos fiber and the manufacture of asbestos products; a by-product coke furnace, its operation, and products; and the manufacture of graphite and its industrial products.

THE NATIONAL GALLERY OF ART.

By a supplemental transfer executed in January, 1915, the splendid gift of Mr. Charles L. Freer, of Detroit, Mich., was increased by 110 articles, of which 8 are American and 102 oriental. The American works comprise 1 oil painting by Dwight W. Tryon, 1 oil painting and 2 silver points by Thomas W. Dewing, and 3 drawings and sketches and 1 lithograph by James McNeill Whistler. The oriental objects consist of 43 Chinese and 7 Japanese paintings, mainly panels, kakemono, and makimono; 14 pieces of pottery, of which 12 are Chinese and 1 each Rakka and Raghés; and 24 pieces of jade, 5 sculptures in stone, and 9 bronzes, all Chinese. By this addition the Freer collection now aggregates 4,811 items of American and oriental art.

The other permanent acquisitions numbered 12, of which the principal donor, as heretofore, was Mr. William T. Evans, of New York, who contributed 4 paintings and 1 bronze, namely: "Moonrise at Ogunquit," by H. Hobart Nichols; "Portrait of Mrs. William T. Evans and Son," by Henry Oliver Walker; "Portrait of William T. Evans," by Wyatt Eaton; "Portrait of Wyatt Eaton," by J. Alden Weir; and a bronze bust inscribed "William Thomas Evans

MCMIV," by J. Scott Hartley. The further contributions were as follows: "Wooded Landscape," oil painting, by Samuel Isham, received from the estate of the artist in accordance with his wish; "Fisher Girl of Picardy," oil painting, by Elizabeth Nourse, presented by Mrs. Elizabeth C. Pilling, of Washington, in memory of her husband, the late John Walter Pilling; "Full Moon," a landscape at Limache, Chile, oil painting, by Alfredo Helsby, presented by the Embassy of Chile at Washington; the original plaster model of the bronze equestrian statue of Lafayette, by Paul Bartlett, erected in the Square of the Louvre, Paris, France, in 1900, as a testimonial from the school children of the United States, presented by the artist; a bronze bust, heroic size, of Viscount Bryce, formerly ambassador of Great Britain to the United States, by Henry Hudson Kitson, presented by the artist; a full-length statue of the goddess Sappho, in white marble, typifying the Muse of Poetry, modeled between 1865 and 1870 by Vinnie Ream Hoxie and presented by Brig. Gen. Richard L. Hoxie, United States Army (retired); and the original plaster cast of the statue of The Falling Gladiator, by William Rimmer, presented by his daughter, Miss Caroline Hunt Rimmer.

The loans to the Gallery aggregated 121 paintings, 2 bronzes, and 2 plaster casts, received from 14 sources. Included in the paintings were 27 portraits by 23 artists, forming a special loan exhibition on behalf of The National Association of Portrait Painters, which was held from March 6 to April 7, 1915, a special view by invitation being given on the first evening. This exhibition, like the corresponding one of the year before, was especially noteworthy.

MEETINGS, CONGRESSES, AND SPECIAL EXHIBITIONS.

The facilities afforded by the new building for meetings, lectures, and congresses were extensively utilized. The Washington Society of the Fine Arts continued its lecture courses, which, as customary, were divided into three series, one being on "The art of to-day," another on "The decorative arts," and the third on "The romantic period of music." Seven interesting lectures on various scientific subjects were given, five under the auspices of the Washington Academy of Sciences, and two under the joint auspices of the same organization and the Biological Society of Washington. The Washington Society of the Archaeological Institute of America provided two lectures, as did also the Audubon Society of the District of Columbia.

The National Academy of Sciences during its regular annual meeting in April used the auditorium for its public sessions, which included two lectures under the William Ellery Hale foundation, and also held a *conversazione* in the picture gallery and rotunda. The annual meeting of The American Fisheries Society took place in Sep-

tember and October, in the course of which two lectures on the salmon industry of the Pacific coast, illustrated by moving pictures, were given. Accommodations were furnished for two conventions. The first was the twelfth annual convention of the National Rural Letter Carriers' Association, held in August, and the second a joint convention of postmasters from Delaware, Maryland, Virginia, and North and South Carolina, which met in October. Two special exhibitions of exceptional interest on July 16, consisted of illustrations of marine life below the surface of the sea at the Bahama Islands by means of moving pictures. The films were the first of their kind known to have been taken, and this was the first occasion of their public display, arranged through the courtesy of the Submarine Film Corporation.

Two receptions were given by the Regents and Secretary of the Institution, the first, on April 17, in honor of the National Society of the Daughters of the American Revolution, the second, on May 13, to the delegates to The American Federation of Arts, then in session in the city. The auditorium and other rooms were used on a number of occasions by branches of the Department of Agriculture for hearings and meetings, including a series of 12 Saturday lectures under the auspices of the Bureau of Plant Industry.

Outside of the National Gallery of Art, the only special loan exhibition of importance held during the year was one assembled under the auspices of The American Federation of Arts. It relates wholly to industrial art in the United States, was opened on May 13, and will continue until the middle of September of the current year. Favored by a very large number of contributors, including manufacturers, craftsmen, artists, and schools, it has proved one of the most notable displays of its kind ever held in this country, and, while not claiming to be complete, it is remarkably comprehensive and representative. The standard upheld is extremely high, and two things are especially emphasized—the value of beauty in design and the fine quality of artistic products now being made in America.

The Museum is participating in the two California expositions, which, beginning in January and February, respectively, will continue until the close of the calendar year 1915. For preparing Government exhibits to be shown at the larger of these, the Panama-Pacific International Exposition at San Francisco, Congress gave \$500,000, of which amount the small and inadequate sum of \$23,750 was allotted to the Smithsonian Institution and its branches. The representative of these, by designation of the Secretary, is Mr. W. de C. Ravenel, administrative assistant of the Museum. The display made by the Museum has, in view of the circumstance, been almost entirely restricted to ethnology, of which the most prominent features are

four large family groups, representing the Alaskan Eskimo, the Zulu-Kafir of southern Africa, the Caribs of British Guiana, and the Dyaks of Borneo. These are supplemented by a series of 10 aboriginal dwelling groups, a large collection of artifacts, and several synoptic series illustrating the history of fire making and illumination, the jackknife, the saw, the spindle and shuttle, and the hafted and perforated stone ax. Outside of ethnology the only material exhibit is a splendid group of the common elk, or wapiti, of the Rocky Mountain region, comprising male, female, and young, but the important Museum exhibits in anthropology, biology, and geology are represented by means of an extensive series of lantern slides for use with the stereomotorgraph.

While the Panama-California Exposition at San Diego received no aid from the Government, the Museum was enabled to take part and also to derive considerable benefit through a cooperative arrangement between the management of the exposition and the Smithsonian Institution, whereby the latter assumed charge of the assembling and installation of an exhibit of physical anthropology and another illustrating certain important industries of the American aborigines. The expenses were entirely defrayed by the exposition company, which allotted \$27,000 for the former subject and \$5,000 for the latter. Preparations were begun in 1912, and in physical anthropology, under Dr. Aleš Hrdlička, of the Museum staff, entailed extensive explorations which were carried to many quarters of the globe. The collections as finally installed greatly surpass in richness, instructiveness, and harmony anything before attempted in this line. They are divided into four sections, illustrating, respectively, man's evolution; his development or growth; his racial, sexual, and individual variations; and the causes, outside of normal senility, which contribute to the decline of the human organism, as disease and injury. The other exhibit, prepared under the direction of Mr. William H. Holmes, head curator of anthropology, consists primarily of six lay-figure groups, representing the mining of iron ore and pigment materials, and of copper, the quarrying of soapstone, obsidian and building stone, and the arrow makers. These groups are supplemented by extensive series of the implements, utensils, and art works generally of these ancient peoples. Particular interest attaches to these collections, as they have been installed as permanent exhibits in a building specially erected as a museum feature for the city of San Diego. The benefits derived by the National Museum through its participation in this exposition consist in the division of a part of the collections, the opportunity of reproducing many novel features, and the working up and publication of the scientific results of the expeditions which were mainly into new and important fields.

MISCELLANEOUS.

Duplicate specimens of natural history to the number of 14,843, accurately classified and labeled, and put up in 163 sets, were distributed for teaching purposes among the schools and colleges of the country. They consisted mainly of rocks, minerals, ores, fossils, and recent mollusks, though other zoological groups and ethnological and archeological subjects were also represented. In making exchanges 7,927 duplicates were used, over three-fifths being plants. The number of specimens, all belonging to natural history, sent out for study by specialists located elsewhere, was 10,269, the preponderating subjects being plants, insects, marine invertebrates, and fossils.

The total number of visitors to the new building aggregated 262,135 for week days and 59,577 for Sundays, being a daily average of 837 for the former and of 1,145 for the latter. At the older Museum building the attendance for week days (the building not being opened on Sundays) was 133,202, a daily average of 425. The Smithsonian building was closed to the public during five months on account of extensive alterations in progress, and the attendance was thereby reduced to 40,324 persons.

The publications issued during the year comprised 9 volumes and 41 separate papers. The former consisted of the annual report for 1914; volume 47 of the Proceedings; volume 19 of the Contributions from the National Herbarium; and 6 bulletins, 3 of which related to paleontology and 3 to marine animals. The separate papers formed parts of volumes 47, 48, and 49 of the Proceedings. The total number of copies of Museum publications distributed was about 54,000.

The library received 2,209 volumes, 2,530 pamphlets, and 183 parts of volumes, and at the close of the year contained 45,818 volumes and 76,295 pamphlets and unbound papers, or a total of 122,113 titles.

Respectfully submitted.

RICHARD RATHBUN,
Assistant Secretary in Charge,
United States National Museum.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

SEPTEMBER 27, 1915.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: Pursuant to the communication of the Acting Secretary dated July 2, I have the honor to present the following report on the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1915, conducted in accordance with the act of Congress approved August 1, 1914, making appropriations for the sundry civil expenses of the Government, and with a plan of operations submitted by the ethnologist-in-charge and approved by the Secretary of the Smithsonian Institution. The provision of the act authorizing the researches of the Bureau of American Ethnology is as follows:

American Ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archæologic remains, under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees and the purchase of necessary books and periodicals, including payment in advance for subscriptions, \$42,000.

SYSTEMATIC RESEARCHES.

As in the past, the systematic researches of the bureau were conducted by its regular staff, consisting of 9 ethnologists, including the ethnologist-in-charge, and of 10 ethnologists during part of the year. These operations may be summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, devoted most of his attention during the year to the administration of the affairs of the bureau, but opportunity was found, with the assistance of Miss Florence M. Poast, to add materially to the compilation of the bibliography of the Pueblo Indians, which now comprises about 2,400 titles. Mr. Hodge also read several extended manuscripts submitted for publication by the bureau; he likewise continued to represent the bureau on the Smithsonian advisory committee on printing and publication and the Smithsonian Institution on the United States Geographic Board.

Dr. J. Walter Fewkes, ethnologist, at the beginning of the fiscal year brought to a close his archeological researches in the valley of the lower Rio Mimbres, N. Mex., reference to which was made in the last annual report. These studies of the many village sites of the prehistoric people of the section named lead to the belief that the

ancient habitations were not terraced community houses, such as characterize typical pueblos, but were of an older form, hence Dr. Fewkes assigns them to a period and a people which he designates pre-Puebloan. This conclusion is based not only on the character of the house structures as indicated by their ground plans, but also on the character and decoration of the pottery vessels found under the floors. The most noteworthy feature of this earthenware is the remarkable painted decoration on the inside of the bowls, consisting of representations of men engaged in various pursuits, animals, and geometric designs of exceptional forms, suggesting the culture of the Keres Indians of New Mexico rather than that of other Pueblos. A distinctive feature of some of the animal pictures on the Mimbres pottery is the fusion of two different animal forms, as the antelope and a fish, in a single representation. Dr. Fewkes suggests that the almost constant presence of rectangular and other geometric designs on the bodies of the animals depicted on the pottery may be considered in a sense parallel with certain very ancient paintings on the walls of caves in France, as described by Dr. Capitan and others. The special value of the study of the painted designs on the Mimbres pottery lies in the light which they cast on general problems connected with the culture-genesis and clan migrations of the sedentary Indians of the Southwest. These designs are related, on the one hand, to those on Pueblo painted pottery of northern New Mexico and Arizona and, on the other, to the decorations on the earthenware of the prehistoric inhabitants of the valleys of the southern part of the Sierra Madre Plateau, notably those of the celebrated Casas Grandes in Chihuahua. An illustrated preliminary report, under the title "Archeology of the Lower Mimbres Valley, New Mexico," was prepared by Dr. Fewkes and published in Smithsonian Miscellaneous Collections (Vol. 63, No. 10, pp. 1-53, pls. 1-8, figs. 1-32).

In January Dr. Fewkes visited southern Arizona, where he made several archeological reconnoissances, following the Rio Santa Cruz almost to the Mexican boundary. He visited the old Indian missions of San Xavier del Bac and Tumacacori, and in their vicinity examined extensive aboriginal ruins, which were found to belong to the same type as Casa Grande, Ariz. The group of prehistoric ruins near the dilapidated mission of Tumacacori (which imposing structure, now preserved as a national monument, is greatly in need of repair) presents unusual advantages for thorough archeological investigation, with promise of important collections. The walls of the compound can be traced readily, and if uncovered by excavation would reveal important information on the ancient culture of the Santa Cruz Valley. Similar remains were noted in other parts of this valley and elsewhere in southern Arizona. While in this general area Dr. Fewkes observed that the Papago Indians of the desert have been

little affected by civilization, retaining many of their original customs, beliefs, and ceremonies, and a wealth of folklore.

Dr. Fewkes visited also the ruins of a large pueblo compound on the road between Phoenix and Tempe, chiefly for the purpose of determining the advisability of its excavation and repair, as an effort is being made by citizens of Phoenix to preserve the ruins with a view of having the compound created a national monument and receiving adequate scientific treatment.

Leaving Arizona in February, Dr. Fewkes proceeded again to the Mimbres Valley, but found the weather unpropitious for field work except for excursions with the view of locating sites for possible future excavation. He returned to Washington about the middle of the month and continued the preparation of his memoir on "Antiquities of the West Indies," which is to include the results of archeological research conducted in the Greater and the Lesser Antilles under the joint auspices of the bureau and the Heye Museum of New York, as referred to in a previous report. In connection with this work Dr. Fewkes visited New York for the purpose of studying recently acquired collections, in the Heye Museum, illustrating the culture of the ancient inhabitants of the West Indies.

The greater part of May was devoted by Dr. Fewkes to the completion of a paper on "Prehistoric Hopi Pottery Designs," which comprises 138 manuscript pages, 12 plates, and 105 figures. In this article the author treats of the pictography on the ceramics of the ancient village dwellers of the East Mesa of the Hopi of northwestern Arizona, including the Keres and Tewa colonists of early times, as well as the designs of the more modern period. The memoir considers in detail the probable genesis of modern Hopi symbolic figures, and devotes attention also to their connection with clan and other sociologic groups.

The opening of the fiscal year found Mr. James Mooney, ethnologist, engaged in field studies among the Cherokee Indians of North Carolina, which were continued until the middle of September. Mr. Mooney devoted his efforts especially to the further collection and translation of the sacred formulas of the Indians named, together with the collection, for botanical identification, of the plants mentioned in the formulas, with others of Indian economic importance. The remainder of the fiscal year was spent by Mr. Mooney in the office, most of the time being devoted to the final elaboration of the Cherokee formulas, of varying length, originally written down by the priests of the tribe in the native Cherokee alphabet and used by them for purposes of medicine, love, hunting, fishing, agriculture, protection, etc. Each formula consists usually of a prayer or a song, or both, in an archaic and highly figurative form of the language, followed by brief directions couched in the everyday language, and

relating to the manner of the ceremony or the plants to be used in the prescription. The printed formula will consist of three parts, namely, transliteration, translation, and explanation. The glossary will comprise perhaps 4,000 words, largely archaic and otherwise unusual in form. The botanical appendix will deal with the names and uses of from 500 to 700 plants mentioned in the formulas, nearly all of which have already been collected and botanically identified. There will also be an extended chapter on Cherokee religion and mythology. Approximately a third of the transliterations and translations have been written in final form from the interlinear notebooks, and half of the work has been glossarized on cards.

Considerable time was spent by Mr. Mooney in furnishing special information for use in answering inquiries of correspondents.

Dr. John R. Swanton, ethnologist, in addition to supervising the final work incident to the publication, as Bulletin 45, of "Byington's Choctaw Dictionary," edited by himself in conjunction with Mr. H. S. Halbert, devoted attention to the study of the Creek Indians, to which reference is made in former reports. The first draft of his memoir on the Creeks is practically completed, but the amount of material was found to be so great that it has seemed best to separate it into two, if not three, sections. The first of these, embracing a discussion of the location and classification of the southern tribes, their early history, and their population, Dr. Swanton is now revising, incorporating new material and making such changes as fuller information has shown to be necessary. It is hoped that this section may be ready for publication at a comparatively early date.

Through an Alibamu Indian living in Texas the bureau has been able to add several hundred words and a few pages of text to the Alibamu material gathered by Dr. Swanton.

During the first three months of the year Mr. J. N. B. Hewitt, ethnologist, completed the translating and editing of a collection of texts and legends for the memoir on "Seneca Myths and Fiction" to be published in the Thirty-second Annual Report, consisting of material originally collected in native texts and in English by the late Jeremiah Curtin and Mr. Hewitt. This material, aggregating 2,300 pages, besides 350 notes and additions by Mr. Hewitt, was submitted early in October for publication. Subsequently, and as opportunity was afforded throughout the year, Mr. Hewitt devoted special attention to the preparation of material for a grammatical sketch of the Iroquois languages, especially as spoken by the Mohawk, Onondaga, and Cayuga, for incorporation in the "Handbook of American Indian languages."

In December Mr. Hewitt visited the Grand River Reservation in Canada for the purpose of prosecuting his studies among the Indians dwelling thereon. A serious epidemic of smallpox interfered some-

what with his work, but with the efficient assistance of Mr. William K. Loft, a Mohawk speaker, Mr. Hewitt was able to make a critical phonetic and grammatic study of portions of the Mohawk texts relating to the league of the Iroquois, recorded by him in former years. Work was also done in recording a selected list of Mohawk verbs for comparative use, and with the painstaking aid of Mrs. Mary Gibson, widow of the late noted chief John Arthur Gibson, Mr. Hewitt was able to supply the Cayuga equivalents to this list, as well as to record other vocabulary terms of the Cayuga. From Mrs. Gibson also was obtained an extended text in Cayuga relating to the origin and the ritual of the death feast of the women. On the same reservation Mr. Hewitt, with the aid of Mr. Hardy Gibson, a Cayuga chief, elucidated certain mooted points in regard to the ritual significance of a number of words and phrases employed in the chants of the condoling and installation council of the Iroquois league. From Miss Emily Carrier, a mixed-blood Nanticoke, he obtained a list of 50 Nanticoke words. This short list is of singular interest, as the Nanticoke dialect of the Algonquian stock has become practically extinct through absorption of its speakers by the Iroquois-speaking peoples. Mr. Hewitt also made about 70 photographs, principally of persons.

On his return to Washington on January 15 Mr. Hewitt at once resumed his analytic study of the Mohawk, Onondaga, and Cayuga dialects for the purpose of obtaining proper material for the preparation of the grammatic sketch above referred to.

In addition to these investigations, Mr. Hewitt furnished much information for use in preparing replies to inquiries from correspondents, some of them requiring considerable research. No fewer than 130 such letters were answered by means of data supplied by Mr. Hewitt. As in the past, he performed the duties connected with the custodianship of manuscripts, which required more than the usual time and effort owing to the preparation of more thoroughly fire-proof quarters and transfer of the manuscripts thereto, as will later be mentioned. During June Mr. Hewitt was engaged in reading the first proofs of "Seneca Myths and Fiction."

Mr. Francis La Flesche, ethnologist, was engaged during the year chiefly in assembling his notes on the Noⁿ'zhizhoⁿ, or fasting degree, of the tribal rites of the Osage called Noⁿ'hoⁿzhiⁿga Ie Ita, or Sayings of the Noⁿ'hoⁿzhiⁿga. Of the seven degrees, the Noⁿ'zhizhoⁿ is said to be the longest and the next in importance to the Níkie degree; it is also said that this degree contains nearly all the symbols and ceremonial forms (wégaxe), for which reason it is regarded as higher in rank than the other degrees, excepting the Níkie. From information given by Watsémoⁿ of the Black Bear gens and by Waxthízi of the Puma gens, both of the Hoⁿ'ga dual division, their version of the ritual of the Noⁿ'zhizhoⁿ degree is composed of 116 songs, 14 wígie

(parts of the ritual that is spoken), and a number of ceremonial acts and forms. Waxthízi, from whom the songs and wígie were obtained, gave 14 wígie and 74 songs; he was unable to give the entire 116 songs, having lost some of them by reason of long disuse of the ritual. To the close of the year 206 pages of this ritual have been completed by Mr. La Flesche; these comprise 9 wígie with literal and free translations, 25 songs with translations, and explanations of the songs, ceremonial acts, and movements, as well as of the various symbols and paraphernalia used in the ceremonies.

Mr. La Flesche's work on the Noⁿ'zhizhoⁿ ritual has twice been interrupted by visiting Osage, from whom, however, further information has been obtained concerning the great war rites of the Osage people. First, Wáthuxage, who visited Washington in the autumn of 1914, gave the ritual of the Wa^xobe degree of the Tsízhu Wáshage gens, of which he was a member. The wígie and songs of this ritual cover 76 typewritten pages, including the music, which has been transcribed from the dictaphone. Besides the Wa^xobe ritual, Wáthuxage gave, in fragmentary form, the Níkíe ritual of his gens; this covers 20 typewritten pages, including the music of the songs, which also have been transcribed from the dictaphone. The translations of the songs and wígie of these rituals have yet to be made and the explanatory texts written. Wáthuxage died in May, 1915.

The second interruption was by Xuthá Watoⁿiⁿ and Watsémoⁿiⁿ, from whom additional information was obtained. The former gave three of the wígie: Wígie Tonga or Great Wígie, Kínoⁿ Wígie or Symbolic Painting Wígie, and Wazhóigathe Wígie or Gentile Symbol Wígie, which it was his part to recite at the tribal ceremonies. These cover 37 typewritten pages. Besides the three wígie, Xuthá Watoⁿiⁿ gave the ritual of the Níkíe degree of his gens. The wígie and songs of the ritual, including the music, comprise 15 pages. The translations of the three wígie, and the wígie and song of the Níkíe ritual, have yet to be made and the explanatory notes assembled. Watsémoⁿiⁿ gave another version of the Nídse Wa^xpe Wígie, or Black Bear Wígie, which he had already given some time ago. This new version is the one recited when the widow of a deceased member of the Noⁿ'hoⁿ'zhiⁿga is admitted to take his place in the order; it comprises 6 typewritten pages and will form a part of the Noⁿ'zhizhoⁿ ritual. This informant also gave some information concerning his great grandfather, who was a prominent "medicine-man." The notes recorded from the dictation of Watsémoⁿiⁿ have yet to be transcribed. The story will form a part of the chapter on the Wakoⁿdagi, or "medicine-men."

Mrs. M. C. Stevenson, ethnologist, continued her researches among the Tewa Indians of New Mexico, but failing health prevented her

from completing the final revision of the manuscript of her memoir as she had hoped, and it remained unfinished at the time of her unfortunate death, on June 24, in the suburbs of Washington. It is believed, however, that when an opportunity of fully examining Mrs. Stevenson's completed manuscript and notes is afforded, it will be found in condition for publication after the customary editorial treatment. Mrs. Stevenson was an efficient and industrious investigator of the ethnology of the Pueblo Indians, to which subject she had devoted many years of her life, giving special attention to the Sia, the Zuñi, and the Tewa Tribes. Three memoirs on these Indians, published in the annual reports, are replete with information on the subjects of which they treat, and there is no doubt that when Mrs. Stevenson's memoir on the Tewa Indians finally appears much valuable knowledge will be added to that which she has already given on the sedentary Indians of the extreme Southwest.

With the opening of the fiscal year Dr. Truman Michelson proceeded to Wisconsin in the hope of obtaining ethnologic and linguistic information regarding the Stockbridge Indians residing in that State. It was found that, with respect to the language of this remnant tribe, about a dozen members remembered isolated words, but only one could dictate connected texts, half a dozen of which were recorded. Although knowledge of the language is now too limited to enable restoration of the grammar, enough material was obtained to show that Stockbridge was intimately related to Pequot and Natick, as well as to Delaware-Munsee. The Stockbridges have long since abandoned all their native customs and beliefs, consequently their ethnology may be regarded as beyond recovery.

While in Wisconsin Dr. Michelson procured also ethnologic and linguistic notes on the Menominee. A visit to the Brotherton Indians resulted in the acquirement of little information excepting historical data, as these people have become greatly modified.

Dr. Michelson next visited Tama, Iowa, for the purpose of renewing his researches among the Fox Indians, to which he has been devoting his energies for some time. He was especially successful in obtaining accounts of the mythical origin ascribed to the Fox people, given in the form of rituals, and he gave attention also to the phonetics of the Fox language. A noteworthy result of Dr. Michelson's Fox investigations was the acquirement, through Horace Powashiek, of a complete translation of the two most important Fox myths—the Culture Hero and Mother of All the Earth.

At the request of the Davenport Academy of Sciences, Dr. Michelson conducted some archeological excavations for that institution at its own expense, leave of absence having been granted him for that purpose. En route to Washington, he examined the Sauk and Fox collections in the Field Museum of Natural History at Chicago.

In the office Dr. Michelson paid special attention to the observations on the Sauk and Fox by early writers, especially by the authors in the *Annals of the Propaganda Fide*, and by Marston, Long, Carver, Beltrami, and others. With the view of definitely settling the question of the relationship of the Yurok and Wiyot languages of California to the Algonquian linguistic stock, Dr. Michelson devoted further study to the subject, reaching the conclusion that whether or not further material would prove these languages to be divergent members of Algonquian, the existing data do not warrant such a classification. Dr. Michelson also devoted attention to the linguistic classification of Potawatomi, based on certain grammatical treatises by the late Father Gailland in possession of St. Mary's College at St. Marys, Kans., which the bureau was permitted to copy through the courtesy of Rev. George Worpenberg, S. J., librarian of the college. By these studies Dr. Michelson concludes from the verbal pronouns of Potawatomi that it belongs to the Ojibwa division of the central Algonquian languages, but that the language is further removed from Ojibwa, Ottawa, and Algonkin than any of these is from the others.

Mr. John P. Harrington, ethnologist, became a member of the staff of the bureau, with the approval of the Civil Service Commission, on February 20, from which time until the close of May he finished 600 pages of manuscript and more than 3,000 slips of linguistic information regarding the Chumash Indians of California, the result of researches conducted by him before entering the service of the bureau. He also has, in various stages of elaboration, a quantity of other Chumash ethnologic and linguistic material in the preparation of which for publication satisfactory progress is being made. At the end of May Mr. Harrington proceeded to Santa Ines Mission, where, among its documents, he found an old manuscript bearing the title "*Padron que contiene todos las Neofitas de esta Mision de la Purisima Concepcion con expresion de su edad, y partida de Bautismo segun se halla hoy dia 1° de Enero de 1814,*" by Father Mariano Payeras, of the greatest importance to the study of the former Chumash Indians of La Purisima and Santa Ines. A complete copy of this splendid manuscript, which does not seem to have been known to historians, was made by Mr. Harrington, who also extracted a considerable amount of other material from the mission records. While at Santa Ines Mr. Harrington located the site of the former large rancheria of Nojoguá (which had not before been known), and also the site of the rancheria of Itias, mentioned in the records. On June 19 Mr. Harrington visited Arroyo Grande, where he worked for a week with a poor, sick old woman, the sole survivor of the San Luis Obispo Indians, for which reason, to use Mr. Harrington's own expression, "the words of her language are precious

beyond the power of money to buy," especially as her speech is the most archaic of all the Chumashan dialects. For the convenience of his field studies Mr. Harrington has established headquarters at Los Angeles, where he has been granted the facilities of the Southwest Museum by the courtesy of its officials.

SPECIAL RESEARCHES.

The preparation of the second volume of the "Handbook of American Indian Languages," under the editorship of Dr. Franz Boas, honorary philologist, has progressed slowly, on account of the impossibility of sending proofs to Russia, where the author of the section on the Chukchee and Eskimo resides. The chapter on Siuslaw, by Dr. Frachtenberg, has been corrected and made up in pages, forming pages 431 to 605 of the second volume. At the beginning of the year Dr. Boas concluded his collection of Kutenai material, which was studied preliminary to the writing of the grammar of this language. The texts collected by him were written out, and the completed manuscript, consisting of 263 pages of Indian texts and 269 pages of translation, has been submitted and set in type, forming 125 galleys. The texts include some material collected by the late Dr. A. F. Chamberlain, which was acquired by the bureau and was revised by Dr. Boas.

Much time has been spent by Dr. Boas in work on his memoir, "Tsimshian Mythology," to accompany the thirty-first annual report. During the fiscal year 1913-14 the tales themselves had been set up. During the year now under consideration the manuscript of the discussion of this material was completed and put in type; it forms pages 394 to 867 of the annual report. In the mechanical work of preparing the manuscript Dr. Boas was assisted by Miss H. A. Andrews, who, besides the preparation of manuscript and proof reading, did much of the laborious work of extracting and collating material needed for the investigation.

The manuscript on Eskimo mythology, intrusted to Waldemar Bogoras and accepted for publication, together with an introduction by Mr. Ernest Hawkes, is held in abeyance, owing to the impossibility at the present time of communicating with the author in Russia.

Dr. L. J. Frachtenberg, special ethnologist, left Washington on July 6, 1914, going directly to Oregon for the purpose of concluding his investigations of the language, mythology, and culture of the Kalapuya Indians, commenced during the previous fiscal year. After a short trip to the Siletz and Grand Ronde Agencies in north-western Oregon for the purpose of interviewing all available informants, he proceeded to Chemawa, Oreg., where he conducted his Kalapuya investigations until December, and completed them at the Grand Ronde Agency between December 13 and 20, which time was

spent chiefly in the collection of linguistic material for a comparative study of the Kalapuya dialects. Special attention was given to the Yamhill and Yonkalla variations. Dr. Frachtenberg's field work proved highly successful. He obtained 30 myths, tales, historical narratives, and ethnographic descriptions, told in the various Kalapuya dialects, an unusually large amount of grammatical notes, sufficient material for a linguistic map showing the original distribution of the several Kalapuya dialects, and some data on Kalapuya ethnology. A glance at this material reveals some interesting facts: The Kalapuya Indians in former times were the most powerful and numerous family of Oregon. They claimed the whole of the fertile valley of the Willamette, extending from the Coast Range to the Cascade Mountains, their settlements reaching as far north as the present Portland and as far south as the middle course of Umpqua River, an area of approximately 12,000 square miles. These Indians were placed on the Grand Ronde Reservation in 1857, at the close of the Rogue River war. Previous tribal wars and frequent epidemics of smallpox and other infectious diseases have reduced the Kalapuya tribes to such an extent that Dr. Frachtenberg has found but a mere handful of survivors, hence the time is not far off when the stock will become extinct.

The Kalapuya family embraces a large number of tribes, the most important of which are: (1) Atfalati (or Wapato Lake), living formerly on the banks of the Tualatin River; (2) Yamhill, claiming the banks of the river of the same name; (3) Lakmayuk, who obtained their name from the river Luckiamute; (4) Marys River (Calapooia proper), whose settlements were situated along the banks of the Calapooia and Marys Rivers; (5) Yonkalla, the most southerly Kalapuya tribe; (6) Ahantsayuk, also called Pudding River Indians; and (7) Santiam, who formerly lived on the banks of Santiam River. These tribes speak varieties of the Kalapuya language, which show remarkable lexicographic diversities. Morphological differentiations exist also, but are chiefly of a phonetic nature. All differences between the dialects seem to have been caused by a geographic distribution, resulting in the three subdivisions mentioned in the last annual report. Long and continued contact of the Kalapuya Indians with white settlers has resulted in a complete breaking down of the native culture and mode of living; consequently the ethnologic data obtainable were very meager and in most cases were given as information obtained through hearsay.

In the early part of January Dr. Frachtenberg made a short trip to the Siletz Agency for the purpose of settling a few questions pertaining to Alsea phonetics. In view of the fact that the allotment made for his field researches during the fiscal year became exhausted Dr. Frachtenberg was obliged to remain in the field until the close

of June. On January 15 he resumed the work of preparing a grammatical sketch of the Alsea language, which was finished late in May; this consists of 158 sections, approximating 600 manuscript pages. During June he was engaged in typewriting this grammatical sketch, which will be published in part 2 of the "Handbook of American Indian Languages."

In addition to his field investigations Dr. Frachtenberg corrected the proofs of his grammatical sketch of the Siuslaw language, special attention being given to the insertion of the proper references taken from his Lower Umpqua texts, printed in the Columbia University Contributions to Anthropology.

Mr. W. H. Holmes continued the preparation of the "Handbook of American Antiquities" whenever his exacting duties in behalf of the National Museum permitted. Part 1 of this work is well advanced toward completion; much attention has been given to part 2, and the preparation of the numerous illustrations is well in hand.

During the month of July, Mr. Gerard Fowke was engaged, under instructions from the bureau, in making limited archeological investigations in northeastern Kansas and southeastern Nebraska, the purpose of which was to ascertain the value of certain recent determinations regarding the age of the prehistoric aboriginal occupancy of this region. Respecting the large mounds, the age of which has been under discussion, Mr. Fowke reports that three points must be taken into consideration in fixing a definite age for these remains, as follows:

1. The relics found in and around the lodge sites, except for the markings on some of the pottery, are in no wise different from those found on the sites of villages which were occupied when Lewis and Clark came through here.

2. Fairly solid bones of animals, and occasionally human bones, are found in the bottoms of the lodge sites, even where these are damp most of the year. In the pits, where such remains are preserved by ashes, this would not mean much; but where they are found in clayey earth it is evident that "thousands of years" is a meaningless term to apply to them.

3. Persons who claim these "thousands of years" for pretty much everything they find in the ground, must explain why it is that while the bones and implements of these assumed "ancients" are found in such quantities and in such good preservation, those of later Indians should have entirely disappeared.

The only tenable theory of age is the amount of accumulation in the depressions of the lodge sites. Above the clay which formed the roof, and is next to the floor now, is a depth of material sometimes, it is said, as much as 20 or even 22 inches of mingled silt, decayed vegetation, and soil from the surrounding wall. It is used as an argument of age; that as these sites are on hilltops where there can be no inwash, this depth must indicate a very remote period for their construction. But a large amount of the earth thrown out into the surrounding ring or wall will find its way back into the depression. The water will stand in them a good part of the year, and the soil remain damp even in prolonged drought; vegetation is thus more luxuriant than on the outside, and its decay will fill up rather rapidly. In addition, much sand blows

from the prairies as well as from the bottom lands, and whatever finds its way into the pit will stay there; it will not blow away again, as it would in open ground. Weeds also will catch and retain much of this dust, which would pass on over a dry surface. Consequently the allowance of an inch in a century, which is the most that advocates of great age will allow for accumulation, is too small.

The topography of the region was essentially the same when these remains were constructed as it is now. The hills and valleys were as they now exist; the erosion has been very slight as compared with that which has taken place since the loess was brought above the water to which it owes its origin. This statement is fully proved by the position of the mounds and lodge sites. Any estimate of age must be only conjecture at best; but it is safe to say that no earthwork, mound, lodge site, or human bones along this part of the Missouri River has been here as long as 10 centuries.

With regard to the discoveries of human remains at exceptional depths in loess formations on Longs Hill, near Omaha, Mr. Fowke states that excavation of the site has been so exhaustive that further investigations are out of the question, and that determinations of age, therefore, must rest, in the main at least, with the published statements of the original explorers.

During recent years observers have reported the existence of mounds and other evidences of prehistoric occupancy in western Utah; these reports, however, contained little definite information regarding the character of existing ruins and described only briefly the artifacts associated with them. The possible relationship of such remains with those of the ancient pueblo dwellers of Arizona, New Mexico, and Colorado suggested the necessity of a preliminary examination of the western Utah field, with the view of determining the nature and range of former settlements, and also the desirability of more detailed investigations. This work of reconnoissance was commenced by the bureau in May and extended through the close of the fiscal year, the field observations being made by Mr. Neil M. Judd, of the National Museum. A group of small mounds near Willard, on the northeastern shore of Great Salt Lake, were first examined. Many other mounds in this locality have been completely destroyed by cultivation during recent years, and of those remaining all show modifications resulting from recent tillage. Four mounds were selected for special investigation, and from these sufficient information was gathered to indicate the chief characteristics of the primitive dwellings over which the mounds had accumulated.

Following the work at Willard, an examination was made of certain well-defined mounds on the outskirts of Beaver City, in Beaver County, where three house sites of the Willard type were found in close proximity to larger mounds containing groups of dwellings. Two weeks' work resulted in the complete excavation of one house group comprising 16 rooms and the partial examination of a still larger group. The Beaver mounds, like those at Willard,

have resulted from the gradual accumulation of drifting sand and dust over the fallen walls of more or less permanent dwellings. Unlike the isolated structures at Willard, however, the mounds at Beaver City disclosed groups of associated rooms, arranged with some degree of regularity and exhibiting a certain unity of purpose. In each of the two groups studied, small series of contiguous rooms were uncovered, but the majority were single compartments separated from the other dwellings by varying distances. The walls of these primitive dwellings at Beaver were built of adobe, sometimes placed in wide layers but more often forming a solid mass. No openings that could be identified definitely as doors were found in any of these walls; this fact, together with the comparative abundance of circular stone slabs, leads to the belief that entrance to the dwellings was gained through roof openings which could be closed with the stone disks. Post holes in several floors, with charred fragments of cedar logs, and masses of clay bearing impressions of logs, willows, and grass, give a fairly complete indication as to the nature of the roof construction. Large timbers crossed in the direction of the shorter dimensions, their ends resting upon the side walls of the rooms; when necessary these were supported by upright timbers. The roof beams in turn supported lesser timbers with layers of willows and grass. Layers of clay, varying in thickness from 1 inch to 6 inches with the unevenness of roof materials, covered the grass, thus completing a truly substantial shelter.

Four small mounds, similar to those at Beaver City, were excavated at Paragonah, in Iron County. These contained one room only, but there are larger mounds in the vicinity whose superficial indications suggest as many if not more rooms than the group at Beaver. Twenty years ago, it is reported, there were about 100 mounds in this vicinity; to-day more than half of them have disappeared through cultivation of the soil.

A brief examination was made by Mr. Judd of several house sites overlooking the Rio Virgen, near St. George, in the extreme southwestern corner of the State. From this village eastward to Kanab only a few mounds were noted, although cowboys reported the existence of others in the vicinity of Short Creek, on the Utah-Arizona line.

From Kanab as a base, the mounds in Johnson Canyon and the small cliff houses in Cottonwood Canyon were visited and partially examined. From superficial observations the former were judged to contain the remains of house structures similar to those at Beaver and Paragonah, although the availability of suitable stone for building purposes has resulted in its partial substitution for adobe, with certain accompanying structural modifications.

Several caves in Cottonwood Canyon 12 miles westward from Kanab contained evidences of human occupancy. The walls of nearly all bear pictographs of more than ordinary interest, and three of the caves visited sheltered the remains of small dwellings, the most interesting of which is a group of four detached rooms and one circular kiva. The walls of these are of stone with a rather greater proportion of mud plaster than is common in cliff dwellings of the Southwest. The ceremonial room measures 14 feet in diameter, but, except in its lack of recesses, does not differ greatly from similar structures in ruins previously reported throughout the San Juan drainage.

Mr. Judd's preliminary observations among a limited number of ruins in western Utah indicate the former existence of a people whose dwellings developed in natural sequence from single earth-covered shelters, such as those at Willard, to groups of more permanent structures like those at Beaver, Paragonah, and elsewhere, and finally to allied cliff houses similar to those in Cottonwood Canyon. The construction of these several types of houses and the character of the artifacts found in them point to close relationship between their builders and the better-known pre-Puebloan peoples of New Mexico, Arizona, and Colorado. Whether these primitive structures in Utah actually antedate the communal dwellings in the States named or whether they represent an offshoot from the more highly developed Pueblo culture is a point not yet determined. The relationship is certain, however, and future investigation may be expected to determine its limits. It is hoped that the opportunity to continue this investigation may soon be afforded, as the progress of agriculture in most of the areas investigated by Mr. Judd is resulting in the rapid disappearance of all superficial evidences of aboriginal occupancy.

En route to Washington from Utah, Mr. Judd spent a day at the so-called "Spanish diggings," the ancient quarries in Wyoming where generations of western Indians quarried the flint and chert utilized in the manufacture of various weapons and household implements.

Excellent progress has been made in the study and analysis of Indian music, to which subject Miss Frances Densmore has devoted special attention. The principal work in this direction has been the completion of the manuscript on "Teton Sioux Music," consisting of 1,067 pages, in addition to transcriptions of 240 songs and about 100 illustrations. This material was submitted in June for publication. Miss Densmore also made considerable progress in the preparation of a paper on the music of the Ute Indians, 92 pages of manuscript, 28 transcriptions of songs, 11 analyses of songs, and 8 original photographic illustrations being submitted. This work is not yet finished.

Mr. D. I. Bushnell, jr., has continued the preparation of the "Handbook of Aboriginal Remains East of the Mississippi," under a small allotment by the bureau for this purpose, and has made steady progress. During the year circulars were addressed to county officials in those sections from which no information had been received, and good results were obtained. The thanks of the bureau are due Mr. Arthur C. Parker, State archeologist of New York, for a large body of valuable data regarding the archeological sites in New York, and to Mr. Warren K. Moorehead, of Phillips Academy, Andover, Mass., for similar information respecting aboriginal remains in the State of Maine, derived from his personal observations.

Mr. James R. Murie, as opportunity offered, continued his studies of the ceremonies of the Pawnee Indians, under a small allotment by the bureau. During the year Mr. Murie submitted, as a result of these investigations, a manuscript of 266 pages on "The New Fire Ceremony" of the Pawnee.

Dr. A. L. Kroeber, of the University of California, has made good progress in the preparation of the "Handbook of the Indians of California." At the inception of this work it was believed practicable to confine the treatment to a very limited number of pages. By reason of the great diversity in the languages and the culture of the Indians of California, past and present, however, it was found that no adequate treatment of the subject was possible within the limits originally prescribed, consequently the handbook when published will comprise approximately 200 pages. Dr. Kroeber expects to submit the manuscript in readiness for publication in the early part of 1916.

The "List of Works Relating to Hawaii" has been added to from time to time by the surviving compiler, Prof. Howard M. Ballou, of Honolulu. Mr. Felix Neumann has devoted attention to its editorial revision, but it was found at the close of the year that much work of a mechanical nature remained to be done before plans for publication could be completed.

MANUSCRIPTS.

As in the past the valuable collection of manuscripts of the bureau has been in the immediate custody of Mr. J. N. B. Hewitt, whose work in this direction was considerably increased by reason of the necessity of returning the manuscripts to the newly fireproofed room in the north tower of the Smithsonian building and reclassifying them. For the first time the manuscripts of the bureau, which now number about 1,700 items, many of which are of priceless value, are believed to be safe from possible fire, being contained in steel cases or on steel shelves, surrounded by brick, cement, and terra-cotta walls, floor, and ceiling. In addition to manuscripts submitted for imme-

diate publication or elsewhere referred to in this report, the following accessions were made during the year:

Laguna Indian Dictionary. Deposited by the wife and son of the late John B. Dunbar, of Bloomfield, N. J.

Dr. A. L. Kroeber. Forty-nine Arapaho and Gros Ventre notebooks, six packages of slips containing an Arapaho vocabulary, and a carbon copy of a study of Arapaho dialects.

War record of Sitting Bull, depicted in 55 pictographs, with a letter of authentication. Deposited by Dr. D. S. Lamb, of the Army Medical Museum.

J. P. Dunn. The third part of the translation of the anonymous Miami-Peoria Dictionary, the original of which is in the John Carter Brown Library at Providence, R. I.; 36 pages, *Assomer* to *Bercer*.

Photostat copy of "A Grammar of the Pottewatomy Language," by Rev. Maurice Gaillard, the original of which is in possession of St. Mary's College at St. Marys, Kans.; 452 pages.

Note should here be made of the great usefulness of the photostat apparatus acquired by the bureau during the last fiscal year, which has enabled the photographic copying at slight cost of various manuscripts, field notes, and rare books and pamphlets needed for reference in the researches of the bureau. These copies have been made in the photographic laboratory of the bureau by Mr. Albert Sweeney, assistant to Mr. De Lancey Gill, illustrator.

PUBLICATIONS.

The editorial work of the bureau has been continued by Mr. J. G. Gurley, editor, who from time to time has been assisted by Mrs. Frances S. Nichols. The publications issued during the year were:

Bulletin 46. "Byington's Choctaw Dictionary," edited by John R. Swanton and Henry S. Halbert.

Bulletin 58. "List of Publications of the Bureau," which appeared in August, 1914, with a second impression in May, 1915.

Miscellaneous publications:

No. 10. Circular of Information Regarding Indian Popular Names.

No. 11. Map of Linguistic Families of American Indians North of Mexico. This map, which is a revision of the linguistic map published in Bulletin 30 (Handbook of American Indians), was reprinted in advance from the plate in the report on "Indian Population in the United States and Alaska," subsequently published by the Bureau of the Census.

No. 12. List of Indian words denoting "man," prepared in placard form for use in the Smithsonian exhibit at the Panama-Pacific Exposition.

The status of other publications now in press is as follows:

Twenty-ninth annual report. The "accompanying paper" of this report is "The Ethnogeography of the Tewa Indians," by J. P. Harrington, a work presenting many technical difficulties. The solution of these was retarded by the illness of the author, which resulted in his incapacity for several months to deal with the various questions arising in connection with the text. The reading of the proof has been carried forward as rapidly as circumstances would permit, and at this time the entire report is paged with exception of the list of

place names, 2,650 in number, and the index. Considerable progress has been made in the final reading of the page proof. The number of pages in the volume (estimated) will be 660, with 21 plates, 31 maps, and 1 diagram.

Thirtieth annual report. This report, which contains as "accompanying papers" "The Ethnobotany of the Zuni Indians," by Mrs. M. C. Stevenson, and "Animism and Folklore of the Guiana Indians," by Walter E. Roth, has been "made up" and read through three page proofs. At the end of the year the report (453 pages) was practically ready for the bindery.

Thirty-first annual report. With this report is incorporated a memoir on "Tsimshian Mythology," by Dr. Franz Boas. Of this material less than half (365 pages) had been paged at the beginning of the fiscal year. With the progress of the work a large amount of new matter has been inserted, necessitating considerable revision from time to time and the reading of several galley and page proofs of the greater part of the memoir. At this writing the make-up has been carried through page 682, and Dr. Boas looks forward to paging the remaining material at an early day. The memoir will contain in all about 850 pages, with 3 plates and 24 text figures.

Thirty-second annual report. The memoir accompanying this report is entitled "Seneca Fiction, Legends, and Myths," the material of which was collected by the late Jeremiah Curtin and J. N. B. Hewitt and edited by the latter. The manuscript reached the bureau for publication about the middle of October and when the fiscal year closed more than one-fourth (82 galleys) had been set up. The number of pages will approximate 900.

Bulletin 40. "Handbook of American Indian Languages," part 2 (Boas). During the year two sections of the above-named handbook have received attention—the Chukchee (Bogoras) and the Siuslaw (Frachtenberg). After the former had been put into page form to the extent of 50 pages work thereon had to be suspended by reason of the impossibility of communicating with the author of the section, who is in Russia. The Siuslaw section (75 galleys) is now at the Government Printing Office for paging. Two of the "illustrative sketches" of part 2 of this bulletin, namely, Takelma (Sapir), 298 pages, and Coos (Frachtenberg), 133 pages, have already appeared in separate form.

Bulletin 55. "The Ethnobotany of the Tewa Indians" (Robbins, Harrington, and Freire-Marreco). After the manuscript of this bulletin had been prepared by the other authors here named and had passed into galley proof, Miss Freire-Marreco incorporated therewith additional material to the extent of greatly enlarging and practically recasting the memoir. Subsequently, on account of the European war it was found impracticable to get from Miss Freire-Marreco the proof sent to her for correction and in the absence of her revision the task of putting the bulletin into final form has proved difficult. Half of the material, however, has been paged and it will be possible to complete the work in the near future.

Bulletin 57. "An Introduction to the Study of the Maya Hieroglyphs" (Morley). The first proof of this publication bearing the author's corrections reached the bureau the middle of September. Since then two additional proofs have been revised, the character of the material being such as to require great care and exactness in the work. The author is now engaged in a final reading of the pages. Unfortunately the progress of the work has been delayed several months by his absence in Central America. The volume will contain, when completed, about 320 pages, with 32 plates and 85 figures.

Bulletin 59. "Kutenai Tales" (Boas and Chamberlain). The manuscript of this bulletin was received in March and, after being edited, was placed in the hands of the Public Printer. By the middle of June the first proof, complete (125 galleys), had been forwarded to Dr. Boas.

Bulletin 61. "Teton Sioux Music" (Densmore). The material of this bulletin, comprising 1,067 pages of manuscript, and copy for 80 plates, 20 text figures, and 263 folios of music, was approved for publication in June, too late for inclusion by the Printing Office under the bureau's allotment for this fiscal year.

As during the last few years, the correspondence arising from the large demand for the publications of the bureau has been in the immediate charge of Miss Helen Munroe and Mr. E. L. Springer, of the Smithsonian Institution, assisted during part of the year by Mr. Thomas F. Clark, jr., and later by Mr. William A. Humphrey. The distribution has been made, in accordance with law, by the superintendent of documents on order of the bureau. The total number of publications issued during the fiscal year was 10,185, distributed as follows:

Annual reports.....	1, 239
Bulletins.....	8, 515
Contributions to North American Ethnology.....	25
Introductions.....	8
Miscellaneous.....	398
Total.....	10, 185

This total shows a decrease of 2,634 volumes in comparison with the year 1913-14, due largely to the retention in the transmission of certain publications to Europe by reason of the war.

ILLUSTRATIONS.

The preparation of illustrations for the publications of the bureau and of photographic portraits of the members of visiting Indian deputations has continued in charge of Mr. De Lancey Gill, illustrator, assisted by Mr. Albert Sweeney. The photographic work during the year may be classed as follows:

Portrait negatives of visiting delegations (Crow, Osage, Chippewa, and Sioux Tribes).....	10
Negatives of ethnologic subjects to illustrate publications.....	52
Development of negatives exposed by field parties.....	548
Photographic prints for distribution and for office use.....	690
Photographic prints for publication and for office use.....	120
Photographic prints for exhibition purposes.....	115
Small photographic prints distributed chiefly for scientific purposes.....	350
Drawings prepared for illustrations.....	30
Photostat copies (pages) of books and manuscripts.....	1, 452

In addition Mr. Gill gave the usual attention to the critical examination of engraver's proofs of illustrations designed for the publications of the bureau, submitted by the Public Printer.

In the last report mention was made of a series of photographs of Indian subjects that has been exhibited successively by the New York Public Library, the Library Commission of Indiana, and the Providence Public Library. In September, 1914, in response to the

request of the Public Library of Haverhill, Mass., this series of pictures was sent for public exhibition in that library. In addition, collections of photographs of Indian subjects, designed to illustrate in part the work of the bureau, were sent for exhibition at the Panama-Pacific Exposition in San Francisco and at the Panama-California Exposition in San Diego.

LIBRARY.

The reference library of the bureau has been in the continuous charge of Miss Ella Leary, librarian, assisted by Mrs. Ella Slaughter until her death on November 1, 1914, and subsequently by Charles B. Newman, messenger boy. During the year 997 books were accessioned, but of this number only 448 were newly acquired, the remainder being represented by the binding and by entry on the records of serial publications that had been in possession of the bureau for some time. Of these accessions 138 volumes were acquired by purchase and 310 by gift or through exchange. The serial publications currently received number about 700, of which only 17 are obtained by subscription, the remainder being received by exchange of the bureau's reports and bulletins. Of pamphlets, 294 were acquired. The number of volumes bound was 678. The library contained 20,237 volumes, 13,188 pamphlets, and several thousand unbound periodicals at the close of the year. The number of books borrowed from the Library of Congress for the use of the staff of the bureau in prosecuting their researches was about 450.

The new steel bookstacks in the eastern end of the main hall of the Smithsonian building, referred to in the last annual report, were finished and placed at the disposal of the bureau in August, when the work of reinstallation of the library was undertaken by the librarian and promptly carried to completion. The facilities afforded by the new stacks are an improvement over those of the old library equipment, while safety is greatly increased.

COLLECTIONS.

The following collections were acquired by the bureau or by members of its staff and transferred to the National Museum, as required by law:

- Model of Cherokee packing basket from the East Cherokee Reservation, Swain County, N. C. Collected by James Mooney, Bureau of American Ethnology. (57699.)
- 179 archeological objects from the lower Mimbres Valley and an earthenware vase from Casas Grandes, Chihuahua, Mexico. Collected by Dr. J. Walter Fewkes, Bureau of American Ethnology. (57777.)
- Three stone figurines from the Tewa Indians of New Mexico. Collected by Mrs. M. C. Stevenson, Bureau of American Ethnology. (58129.)
- Snipe flute of the Sioux Indians. Received from Rev. A. McG. Beede, of North Dakota. (58254.)

Five archeological objects from Virginia. Gift of Dr. W. B. Barham, of Newsoms, Va.; and a necklace presented by Mrs. J. R. Kello and her daughter, Miss Hattie Kello. (5S177.)

PROPERTY.

The most valuable property of the bureau consists of its library (of which brief statistics have been given), a collection of unpublished manuscripts, and several thousand photographic negatives. Comparatively little of this material could be duplicated. The other property of the bureau is described in general terms in the last annual report. The total cost of furniture, typewriters, and other apparatus acquired during the fiscal year was \$553.35.

MISCELLANEOUS.

QUARTERS.

The quarters of the bureau have been improved by the completion of the library bookstacks, previously referred to, and the installation of additional electric lights in the library and in one of the office rooms.

PERSONNEL.

The personnel of the bureau has been changed by the appointment of Mr. John P. Harrington, ethnologist, on February 20; the death of Mrs. Matilda Coxe Stevenson, ethnologist, on June 24; the death of Mrs. Ella Slaughter, classified laborer, on November 1, 1914; the transfer of Thomas F. Clark, jr., to the National Museum; the appointment of William Humphrey, stenographer and typewriter; and the appointment of Dennis Sullivan, messenger boy. The correspondence of the bureau and other clerical work has been conducted with the assistance of three clerks and a stenographer and typewriter.

Respectfully submitted.

F. W. HODGE,
Ethnologist-in-Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1915:

The system of international exchanges is based on the convention and the resolutions of Congress briefly referred to below:

Convention between the United States and several other countries for the international exchange of official documents and scientific and literary publications, concluded at Brussels in 1886 and proclaimed by the President of the United States in 1889. (Stat., XXV, 1465.) (Since the ratification of this convention, several additional Governments have signified their adherence thereto; while a number of other countries, though they have not officially adhered to the convention, have established international exchange bureaus.)

Resolution providing for the exchange of certain public documents, approved March 2, 1867. (Stat., XIV, 573.) This resolution provides that 50 copies of all documents printed by order of either House of Congress, and also 50 copies of all publications issued by any bureau or department of the Government, shall be placed at the disposal of the Joint Committee on the Library for exchange with foreign countries through the agency of the Smithsonian Institution.

Joint resolution to regulate the distribution of public documents to the Library of Congress for its own use and for international exchange, approved March 2, 1901. (Stat., XXXI, 1464.) By this resolution it is provided that, in lieu of the 50 copies of the publications referred to in the above-mentioned resolution, there shall be placed at the disposal of the Library of Congress for its own use and for international exchange 62 copies of such documents, with the privilege, at the request of the Librarian, of enlarging this number to 100.

Joint resolution for the purpose of more fully carrying into effect the convention concluded at Brussels in 1886 in reference to the immediate exchange of the official journal, approved March 4, 1909. (Stat., XXXV, 1169.) This resolution provides that such number as may be required, not exceeding 100 copies, of the daily issue of

the Congressional Record shall be supplied to the Library of Congress for distribution, through the Smithsonian Institution, to the legislative chambers of such foreign Governments as may agree to send to the United States current copies of their parliamentary record or like publication.

The estimate submitted for the support of the service during 1915 was \$32,200, including the allotment for printing and binding, and this amount was granted by Congress. The repayments from private and departmental sources for the transportation of exchanges aggregated \$4,819.41, making the total available resources for carrying on the Exchange Service \$37,019.41.

During the year 1915 the total number of packages handled was 275,756, a decrease of 65,911, as compared with the preceding year. The weight of these packages was 367,854 pounds, a decrease of 199,131 pounds. These decreases were caused by the suspension of shipments to a number of countries on account of the European war, as explained below.

The number and weight of the packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	135,050	.....	74,126	.....
Publications received in return for parliamentary documents.....		2,305		5,817
United States departmental documents sent abroad.....	73,634	.....	145,549	.....
Publications received in return for departmental documents.....		4,976		9,389
Miscellaneous scientific and literary publications sent abroad.....	39,164	.....	80,448	.....
Miscellaneous scientific and literary publications received from abroad for distribution in the United States.....		20,627		52,525
Total.....	247,848	27,908	300,123	67,731
Grand total.....	275,756		367,854	

It should be added that the disparity between the number of packages dispatched and those received in behalf of the Government is not so great as indicated by these figures. Packages sent abroad usually contain only a single publication each, while those received in return often comprise many volumes. In the case of publications received in exchange for parliamentary documents and some others the term "package" is applied to large boxes containing a hundred or more publications. No lists of these are made in the Exchange Office, as the boxes are forwarded to their destinations unopened. It is also a fact that many returns for publications sent abroad reach their destinations direct by mail and not through the Exchange Service.

Of the 1,653 boxes used in forwarding exchanges to foreign agencies for distribution, 220 contained full sets of United States official documents for authorized depositories and 1,433 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The total number of boxes sent abroad during 1915 was 812 less than the preceding year. This decrease was due to the suspended shipments to certain countries owing to the inability of the Institution to secure transportation facilities for forwarding consignments to the various exchange agencies, which condition has been brought about by the European war.

Owing to the disturbed conditions which existed in Europe and the interruption to transportation facilities, shipments to all European countries were suspended during August and a part of September, 1914. On September 17 transmissions were resumed to Great Britain, and during the month of October to Denmark, Holland, Italy, Norway, Portugal, Spain, and Sweden. Through the courtesy of the minister of the Netherlands at Washington, arrangements were made to send consignments to Switzerland by way of Rotterdam, and transmissions to that country were resumed on November 2. On December 8 shipments were resumed to Greece, and on January 23 to France. At the close of the fiscal year, therefore, the only countries to which shipments were not being made were Austria, Belgium, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Serbia, and Turkey. Steps are being taken through the Department of State to send exchanges for Germany to the American consul general at Rotterdam for reforwarding to the German exchange agency in Berlin, and it is hoped that the exchange of publications with Germany will be resumed at an early date. Through the assistance of the Department of State, arrangements have also been made for the forwarding of exchange consignments from Germany to the United States through the American consul general at Rotterdam.

The Russian Commission of International Exchanges was approached with a view to sending exchange consignments to Petrograd by way of Archangel during the summer months, but the commission replied that, as the route in question presents so many difficulties and is so encumbered, it would prefer not to make use of it, and not to renew the sendings until after the conclusion of peace and the reestablishment of the regular communications.

The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Date of transmission.
ARGENTINA.....	44	July 16, Sept. 9, Nov. 17, Dec. 17, 1914; Jan. 27, Feb. 26, Apr. 22, May 20, June 22, 1915.
AUSTRIA.....	10	July 8, 1914. ¹
BELGIUM.....	5	July 11, 1914. ¹
BOLIVIA.....	6	Oct. 8, Dec. 10, 1914; Jan. 28, May 10, June 16, 1915.
BRAZIL.....	33	July 16, 20, Oct. 19, Nov. 18, 20, Dec. 17, 1914; Jan. 27, Feb. 26, Apr. 22, May 20, June 22, 1915.
BRITISH COLONIES.....	24	July 31, Sept. 17, 25, Oct. 26, Nov. 7, Dec. 5, 1914; Jan. 2, 16, 23, Feb. 6, Mar. 8, 20, Apr. 20, May 1, 29, June 12, 19, 1915.
BRITISH GUIANA.....	4	Oct. 31, 1914; Mar. 12, May 7, 1915.
CANADA.....	.....	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
CHILE.....	23	July 16, Oct. 19, Nov. 18, Dec. 17, 1914; Jan. 28, Feb. 26, Apr. 23, May 20, June 22, 1915.
CHINA.....	32	Oct. 28, Nov. 4, 1914; Jan. 2, 30, Mar. 2, Apr. 12, May 13, June 12, 1915.
COLOMBIA.....	15	Oct. 20, Dec. 17, 1914; Jan. 28, Feb. 27, May 15, June 16, 1915.
COSTA RICA.....	12	Oct. 21, Dec. 17, 1914; Jan. 28, Feb. 27, May 5, June 16, 1915.
CUBA.....	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
DENMARK.....	32	July 24, Oct. 10, Nov. 12, Dec. 14, 1914; Jan. 14, Feb. 20, Mar. 30, May 4, June 4, 1915.
ECUADOR.....	6	Oct. 31, Dec. 17, 1914; Jan. 28, Feb. 27, May 5, June 16, 1915.
EGYPT.....	11	July 24, Nov. 16, 1914; Jan. 12, May 22, June 23, 1915.
FRANCE.....	292	July 3, 1914; Jan. 23, Feb. 23, Apr. 30, May 14, 29, June 14, 1915.
GERMANY.....	6	July 7, 1914. ¹
GREAT BRITAIN AND IRELAND.....	347	July 3, 11, 18, 31, Sept. 17, 25, Oct. 26, Nov. 7, 23, Dec. 5, 12, 19, 26, 1914; Jan. 2, 9, 16, 23, 30, Feb. 6, 13, Mar. 12, 27, Apr. 20, 24, May 1, 8, 15, 22, 29, June 5, 12, 19, 26, 1915.
GREECE.....	11	Oct. 9, Dec. 8, 1914; Mar. 13, May 10, June 22, 1915.
GUATEMALA.....	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
HAITI.....	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
HONDURAS.....	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
HUNGARY.....	3	July 8, 1914. ¹
INDIA.....	62	July 3, 16, 31, Sept. 17, 25, Oct. 26, Nov. 7, Dec. 5, 26, 1914; Jan. 16, 30, Feb. 6, 13, Mar. 8, 20, Apr. 10, 24, May 1, 8, 15, 22, 29, June 12, 19, 26, 1915.
ITALY.....	91	July 18, Oct. 7, Nov. 12, Dec. 11, 1914; Jan. 13, Feb. 12, Mar. 11, Apr. 12, May 11, 25, June 11, 25, 1915.
JAMAICA.....	6	Oct. 8, Dec. 8, 1914; Jan. 28, Mar. 12, May 10, June 22, 1915.
JAPAN.....	54	July 15, Nov. 28, Dec. 22, 1914; Jan. 26, Feb. 26, May 4, June 4, 1915.
KOREA.....	5	Jan. 2, Mar. 12, May 12, June 22, 1915.
LIBERIA.....	4	July 24, Nov. 16, 1914; Mar. 12, May 12, 1915.
LOURENÇO MARQUEZ.....	2	Dec. 10, 1914; Mar. 10, 1915.
MANITOBA.....	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
MEXICO.....	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
NETHERLANDS.....	38	Oct. 12, Nov. 3, Dec. 9, 1914; Jan. 6, Feb. 10, Mar. 10, Apr. 13, May 13, 27, June 14, 26, 1915.
NEW SOUTH WALES.....	26	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Feb. 24, Apr. 8, May 8, June 8, 1915.
NEW ZEALAND.....	26	July 14, Oct. 2, Nov. 14, 1914; Feb. 24, Apr. 9, May 8, June 8, 1915.
NICARAGUA.....	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
NORWAY.....	23	July 24, Oct. 10, Nov. 12, Dec. 14, 1914; Jan. 14, Feb. 20, Mar. 30, May 4, June 4, 1915.

¹ Shipments temporarily suspended on account of the European war.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
ONTARIO.....	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
PALESTINE.....	1	June 30, 1915.
PARAGUAY.....	6	Oct. 31, Dec. 4, 1914; Jan. 28, Feb. 27, Mar. 12, May 5, 1915.
PERU.....	19	July 16, Oct. 20, Nov. 18, Dec. 17, 1914; Feb. 27, Apr. 20, May 20, June 22, 1915.
PORTUGAL.....	16	July 24, Oct. 9, Nov. 12, Dec. 14, 1914; Feb. 20, Mar. 30, May 4, June 4, 1915.
QUEBEC.....	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
QUEENSLAND.....	17	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Feb. 24, Apr. 9, May 8, June 8, 1915.
RUSSIA.....	9	July 9, 1914. ¹
SALVADOR.....	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
SIAM.....	4	Dec. 10, 1914; Mar. 12, May 12, June 22, 1915.
SOUTH AUSTRALIA.....	23	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Jan. 20, Feb. 24, Apr. 9, May 8, June 8, 1915.
SPAIN.....	24	Oct. 9, Nov. 16, 1914; Jan. 12, Feb. 17, May 7, June 7, 1915.
SWEDEN.....	59	July 9, Oct. 15, Dec. 1, 1914; Jan. 6, Feb. 10, Mar. 10, 19, Apr. 29, May 26, June 24, 1915.
SWITZERLAND.....	42	July 11, Nov. 2, Dec. 8, 1914; Feb. 9, Mar. 11, Apr. 28, May 14, 28, 1915.
SYRIA.....	2	July 25, Oct. 28, 1914. ¹
TASMANIA.....	14	July 18, 31, Sept. 25, Oct. 26, Nov. 7, Dec. 5, 1914; Jan. 2, 16, Feb. 13, Apr. 20, June 19, 1915.
TRINIDAD.....	5	Oct. 8, Dec. 10, 1914; Jan. 25, May 10, June 22, 1915.
TURKEY.....	3	July 25, Oct. 28, 1914. ¹
UNION OF SOUTH AFRICA.....	30	July 23, Oct. 30, Dec. 10, 1914; Jan. 12, Feb. 16, Apr. 30, May 27, June 25, 1915.
URUGUAY.....	17	July 16, Oct. 20, Nov. 18, Dec. 17, 1914; Jan. 28, Feb. 27, Apr. 23, May 20, June 22, 1915.
VENEZUELA.....	11	Oct. 20, Dec. 17, 1914; Jan. 28, Feb. 29, May 5, June 16, 1915.
VICTORIA.....	25	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Jan. 20, Feb. 24, Apr. 8, May 8, June 8, 1915.
WESTERN AUSTRALIA.....	20	July 3, 31, Sept. 17, 25, Oct. 26, Nov. 7, Dec. 5, 12, 1914; Jan. 16, 23, Feb. 6, 13, Mar. 8, 20, Apr. 20, June 12, 1915.
WINDWARD AND LEEWARD ISLANDS.	3	Dec. 10, 1914; Mar. 12, June 22, 1915.

¹ Shipments temporarily suspended on account of the European war.

With the exception of one package for the chief secretary to the government of Madras, India, and one for the undersecretary to the government of the United Provinces, Allahabad, India—each containing 12 United States governmental documents—no consignments have, so far as the Institution has been informed, been lost during the year, which is considered remarkable in view of the number of ships sunk by war vessels.

A number of boxes have been detained at several ports of debarkation owing to the fact that the vessels on which they were forwarded have been interned. Wherever possible the Institution has obtained the release of these consignments and they have been

sent forward to their destinations. At the close of the year one box for Sofia, one for Serbia, and two for Syria, all forwarded from New York July 2, 1914, per steamship *Barbarossa*, were held at Bremen, Germany, and four boxes for Pretoria, forwarded from New York July 10, 1914, per steamship *Rauenfels*, were held at Bahia, Brazil. With the exception of the latter, these consignments will probably be held until the close of the war. The Institution is endeavoring to have the boxes for the Government Printing Works at Pretoria released and forwarded from Bahia to destination.

During the year the Institution has obtained for the Library of Congress from the Chinese Government, in exchange for the full series of United States official documents sent to China, a set of the Imperial Institutes of the Ching Dynasty and of the Imperial Records Relative to the Suppression of Rebellions. These valuable works comprise a total of 684 volumes. Many other foreign governmental documents have been obtained through the Exchange Service for the Library of Congress. In special instances, when requested to do so, the Institution has used the facilities of the Exchange Service to procure publications for both foreign and domestic governmental and scientific establishments. Quite a number of requests of foreign organizations for publications have been received from American consular officers through the Department of State.

Owing largely to the efforts of Mr. Vittorio Benedetti, recently appointed chief of the Italian office of International Exchanges, the service between Italy and the United States has been very much improved during the year. Mr. Benedetti has presented the Institution with a typewritten copy of an account prepared by him of the origin and development of the International Exchange Service. A translation will be made of this interesting document and placed in the archives of the exchanges for reference.

The act making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1916, included a provision authorizing the Government branches under the direction of the Smithsonian Institution to exchange typewriters, adding machines, and other labor-saving devices in part payment for like articles. This office exchanged four typewriting machines during the year.

The multigraph duplicating machine supplied by the Institution, which has been in use in the Exchange Office since 1908, has been replaced by a new machine. This multigraph, with stand, cost \$283.50, and was purchased from the appropriation for the International Exchanges. It has been found to be very useful in the printing not only of circular letters, but of envelopes, labels, and other forms.

The walls, ceilings, floors, and woodwork of the government and shipping rooms were painted during the year and the government room was provided with a large sorting table 27 feet 3 inches long, 2 feet 10½ inches wide, and 3 feet high, with drop leaf at end and two drawers and shelves. There are only two windows in the government room, and on account of the thickness of the walls of the Smithsonian Building these admitted very little light. The windows in that room have therefore been splayed, with the result that the lighting has been greatly improved.

Another room has been assigned by the Institution for the use of the Exchange Office, which has facilitated the handling of the many packages received for transmission through the service.

The unsatisfactory electric lighting system throughout the Exchange Office has been very much improved by the installation of a semi-indirect lighting system. The washroom provided for the use of the employes has been fitted up with two lavatories.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with foreign countries, there are now sent regularly to depositories abroad 56 full sets of United States official publications and 36 partial sets.

The partial set of publications sent to Ceylon has in the past been forwarded in care of the American consul at Colombo. The consul now informs the Institution that the documents in question are deposited in the Record Department of the Library of the Colonial Secretary's Office, and consignments will therefore be sent direct to that office in the future.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

ARGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.

AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.

AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.

BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)

BAVARIA: Königliche Hof- und Staats-Bibliothek, Munich.

BELGIUM: Bibliothèque Royale, Brussels.

BOMBAY: Secretary to the Government, Bombay.

BRAZIL: Bibliotheca Nacional, Rio de Janeiro.

BUENOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)

- CANADA: Library of Parliament, Ottawa.
- CHILE: Biblioteca del Congreso Nacional, Santiago.
- CHINA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
- COLOMBIA: Biblioteca Nacional, Bogotá.
- COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
- CUBA: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.
- DENMARK: Kongelige Bibliotheket, Copenhagen.
- ENGLAND: British Museum, London.
- FRANCE: Bibliothèque Nationale, Paris.
- GERMANY: Deutsche Reichstags-Bibliothek, Berlin.
- GLASGOW: City Librarian, Mitchell Library, Glasgow.
- GREECE: Bibliothèque Nationale, Athens.
- HAITI: Secrétairerie d'État des Relations Extérieures, Port au Prince.
- HUNGARY: Hungarian House of Delegates, Budapest.
- INDIA: Department of Education (Books), Government of India, Calcutta.
- IRELAND: National Library of Ireland, Dublin.
- ITALY: Biblioteca Nazionale Vittorio Emanuele, Rome.
- JAPAN: Imperial Library of Japan, Tokyo.
- LONDON: London School of Economics and Political Science. (Depository of the London County Council.)
- MANITOBA: Provincial Library, Winnipeg.
- MEXICO: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
- NETHERLANDS: Library of the States General, The Hague.
- NEW SOUTH WALES: Public Library of New South Wales, Sydney.
- NEW ZEALAND: General Assembly Library, Wellington.
- NORWAY: Storthingets Bibliothek, Christiania.
- ONTARIO: Legislative Library, Toronto.
- PARIS: Préfecture de la Seine.
- PERU: Biblioteca Nacional, Lima.
- PORTUGAL: Bibliotheca Nacional, Lisbon.
- PRUSSIA: Königliche Bibliothek, Berlin.
- QUEBEC: Library of the Legislature of the Province of Quebec, Quebec.
- QUEENSLAND: Parliamentary Library, Brisbane.
- RUSSIA: Imperial Public Library, Petrograd.
- SAXONY: Königliche Oeffentliche Bibliothek, Dresden.
- SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
- SOUTH AUSTRALIA: Parliament Library, Adelaide.
- SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- SWEDEN: Kungliga Bibliotheket, Stockholm.
- SWITZERLAND: Bibliothèque Fédérale, Berne.
- TASMANIA: Parliamentary Library, Hobart.
- TURKEY: Department of Public Instruction, Constantinople.
- UNION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
- URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
- VENEZUELA: Biblioteca Nacional, Caracas.
- VICTORIA: Public Library, Melbourne.
- WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
- WÜRTEMBERG: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

- ALBERTA: Provincial Library, Edmonton.
 ALSACE-LORRAINE: K. Ministerium für Elsass-Lothringen, Strassburg.
 BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
 BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
 BRITISH COLUMBIA: Legislative Library, Victoria.
 BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
 BULGARIA: Minister of Foreign Affairs, Sofia.
 CEYLON: Colonial Secretary's Office (Record Department of the Library), Colombo.
 ECUADOR: Biblioteca Nacional, Quito.
 EGYPT: Bibliothéque Khédiviale, Cairo.
 FINLAND: Chancery of Governor, Helsingfors.
 GUATEMALA: Secretary of the Government, Guatemala.
 HAMBURG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
 HESSE: Grossherzogliche Hof Bibliothek, Darmstadt.
 HONDURAS: Secretary of the Government, Tegucigalpa.
 JAMAICA: Colonial Secretary, Kingston.
 LIBERIA: Department of State, Monrovia.
 LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
 LÜBECK: President of the Senate.
 MADRAS, PROVINCE OF: Chief Secretary to the Government of Madras, Public Department, Madras.
 MALTA: Lieutenant Governor, Valetta.
 MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.
 NEW BRUNSWICK: Legislative Library, Fredericton.
 NEWFOUNDLAND: Colonial Secretary, St. John's.
 NICARAGUA: Superintendente de Archivos Nacionales, Managua.
 NORTHWEST TERRITORIES: Government Library, Regina.
 NOVA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
 PANAMA: Secretaria de Relaciones Exteriores, Panama.
 PARAGUAY: Oficina General de Inmigracion, Asuncion.
 PRINCE EDWARD ISLAND: Legislative Library, Charlottetown.
 ROUMANIA: Academia Romana, Bucharest.
 SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
 SIAM: Department of Foreign Affairs, Bangkok.
 STRAITS SETTLEMENTS: Colonial Secretary, Singapore.
 UNITED PROVINCES OF AGRA AND OUDH: Under Secretary to Government, Allahabad.
 VIENNA: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

There are now 33 countries with which the immediate exchange of official journals with the United States is carried on, the Government of Costa Rica having been added during the year. A complete list of the Governments to which the Congressional Record is now sent is given below:

Argentine Republic.	Belgium.
Australia.	Brazil.
Austria.	Buenos Aires, Province of.
Baden.	Canada.

Costa Rica.	Portugal.
Cuba.	Prussia.
Denmark.	Queensland.
France.	Roumania.
Great Britain.	Russia.
Greece.	Serbia.
Guatemala.	Spain.
Honduras.	Switzerland.
Hungary.	Transvaal.
Italy.	Union of South Africa.
Liberia.	Uruguay.
New South Wales.	Western Australia.
New Zealand.	

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of the bureaus or agencies through which exchanges are transmitted :

ALGERIA, *via* France.

ANGOLA, *via* Portugal.

ARGENTINA: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.

AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.

AZORES, *via* Portugal.

BELGIUM: Service Belge des Échanges Internationaux, Rue des Longs-Chariots 46, Brussels.

BOLIVIA: Oficina Nacional de Estadística, La Paz.

BRAZIL: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.

BRITISH COLONIES: Crown Agents for the Colonies, London.

BRITISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.

BRITISH HONDURAS: Colonial Secretary, Belize.

BULGARIA: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

CANARY ISLANDS, *via* Spain.

CHILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

CHINA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.

COLOMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.

COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

DENMARK: Kongelige Danske Videnskabernes Selskab, Copenhagen.

DUTCH GUIANA: Surinaamische Koloniale Bibliotheek, Paramaribo.

ECUADOR: Ministerio de Relaciones Exteriores, Quito.

EGYPT: Government Publications Office, Printing Department, Cairo.

FRANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

GERMANY: Amerika-Institut, Berlin, N. W. 7.

GREAT BRITAIN AND IRELAND: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

GREECE: Bibliothèque Nationale, Athens.

GREENLAND, *via* Denmark.

GUADELOUPE, *via* France.

GUATEMALA: Instituto Nacional de Varones, Guatemala.

GUINEA, *via* Portugal.

HAITI: Secrétaire d'État des Relations Extérieures, Port au Prince.

HONDURAS: Biblioteca Nacional, Tegucigalpa.

HUNGARY: Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.

ICELAND, *via* Denmark.

INDIA: India Store Department, India Office, London.

ITALY: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

JAMAICA: Institute of Jamaica, Kingston.

JAPAN: Imperial Library of Japan, Tokyo.

JAVA, *via* Netherlands.

KOREA: His Imperial Japanese Majesty's Residency-General, Seoul.

LIBERIA: Bureau of Exchanges, Department of State, Monrovia.

LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.

LUXEMBURG, *via* Germany.

MADAGASCAR, *via* France.

MADEIRA, *via* Portugal.

MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.

MOZAMBIQUE, *via* Portugal.

NETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

NEW GUINEA, *via* Netherlands.

NEW SOUTH WALES: Public Library of New South Wales, Sydney.

NEW ZEALAND: Dominion Museum, Wellington.

NICARAGUA: Ministerio de Relaciones Exteriores, Managua.

NORWAY: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

PANAMA: Secretaria de Relaciones Exteriores, Panama.

PARAGUAY: Servicio de Canje Internacional de Publicaciones, Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

PERSIA: Board of Foreign Missions of the Presbyterian Church, New York City.

PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

PORTUGAL: Serviço de Permutações Internacionaes, Inspeção Geral das Bibliothecas e Archivos Publicos, Lisbon.

QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.

ROUMANIA: Academia Romana, Bucharest.

RUSSIA: Commission Russe des Échanges Internationaux, Bibliothèque Impériale Publique, Petrograd.

SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.

SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.

SIAM: Department of Foreign Affairs, Bangkok.

SOUTH AUSTRALIA: Public Library of South Australia, Adelaide.

SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

SUMATRA, *via* Netherlands.

SWEDEN: Kongliga Svenska Vetenskaps Akademien, Stockholm.

SWITZERLAND: Service des Échanges Internationaux Bibliothèque Fédérale Centrale, Berne.

SYRIA: Board of Foreign Missions of the Presbyterian Church, New York.

TASMANIA: Secretary to the Premier, Hobart.

TRINIDAD: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.

TUNIS, *via* France.

TURKEY: American Board of Commissioners for Foreign Missions, Boston.

UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.

URUGUAY: Oficina de Canje Internacional, Montevideo.

VENEZUELA: Biblioteca Nacional, Caracas.

VICTORIA: Public Library of Victoria, Melbourne.

WESTERN AUSTRALIA: Public Library of Western Australia, Perth.

WINDWARD AND LEEWARD ISLANDS: Imperial Department of Agriculture, Bridgetown, Barbados.

Respectfully submitted.

C. W. SHOEMAKER,

Chief Clerk International Exchange Service.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

AUGUST 24, 1915.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit herewith a report concerning the operations of the National Zoological Park during the fiscal year ending June 30, 1915.

The sundry civil act approved August 1, 1914, provided \$100,000 for improvement and maintenance. The cost of food for the animals during the year was about \$23,000, being slightly less than the previous year, when it attained the highest figure yet reached; extensive repairs were required on roads and a considerable amount had to be expended on some of the buildings, all of which reduced the amount available for additional improvements.

ACCESSIONS.

Eighty-eight animals were born and hatched in the park. Among these were a South American tapir, an Arabian camel, 4 otters, 5 bears, a beaver, and various other mammals and birds.

The accessions included altogether 25 species not hitherto represented in the collection, and although considerably greater in number than during the previous year, included few of importance, as the supply of foreign animals was largely cut off by the war. A specimen of Przewalski's horse was secured as were various other animals of less note; a considerable number of waterfowl were also added.

EXCHANGES.

Eighty-two animals were secured through exchange, including 4 pumas, a jaguar, a palm civet and other mammals, a considerable number of birds, and a few reptiles.

GIFTS.

- Mr. H. H. Bailey, Newport News, Va., a whistling swan.
- Mr. H. B. Barber, Washington, D. C., a great horned owl.
- Mr. D. L. Barton, Washington, D. C., an alligator.
- Mrs. O. L. Beardsley, Washington, D. C., three spermophiles.
- Mrs. B. O. Billingsby, Jules Station, Va., a skunk.
- Miss Lillian Birney, Washington, D. C., an alligator.
- Mr. F. D. Bradford, Washington, D. C., four alligators.
- Mr. M. E. Bruce, Philadelphia, Pa., two yellow-naped parrots.

- Mr. John Buckey, Washington, D. C., an alligator.
 Mr. Joseph H. Curtis, Washington, D. C., a woodchuck.
 Mrs. J. B. Dodson, Washington, D. C., an opossum.
 Mr. G. A. Durfee, Washington, D. C., a grass parrakeet.
 Mr. C. C. Estes, Washington, D. C., two cottontail rabbits.
 Mrs. Sheldon Evans, Washington, D. C., a white-fronted parrot.
 Mr. E. Fabre, Washington, D. C., a red-shouldered hawk.
 Mrs. George Fowler, Philadelphia, Pa., a white-throated capuchin.
 Mr. F. A. Frazer, Spotsylvania, Va., a Cooper's hawk.
 Mr. James Frazier, Washington, D. C., a silver pheasant.
 Brother Geraptin, Franciscan Monastery, Washington, D. C., two mocking birds.
- Mr. C. G. Hoffman, Remington, Va., a barn owl.
 Mr. J. M. Johnson, Washington, D. C., a bald eagle.
 Mrs. D. C. Laws, Port Limon, Costa Rica, a white-throated capuchin.
 Mrs. Arthur Lee, Washington, D. C., a silver-blue tanager.
 Mr. Oscar M. Link, Washington, D. C., a sparrow hawk.
 Mr. E. A. McIlhenny, Avery Island, La., six blue-winged teal.
 Mr. Vinson W. McLean, Washington, D. C., a diamond rattlesnake.
 Mr. Lester Martin, Washington, D. C., a raccoon.
 Mr. Fred. Mertens, Washington, D. C., a bald eagle.
 Mr. A. M. Nicholson, Orlando, Fla., a diamond rattlesnake.
 Mr. John M. Pickrell, Washington, D. C., a diamond rattlesnake.
 Mr. Edw. S. Schmid, Washington, D. C., a screech owl, two barn owls, and a spreading adder.
- Mr. Fred. Schnaebeler, Washington, D. C., an alligator.
 Dr. R. W. Shufeldt, Washington, D. C., a black snake and a barred owl.
 Mrs. C. B. Strong, Washington, D. C., a merganser.
 Mrs. Swyhart, Washington, D. C., a horned lizard.
 Mr. E. Thomas, Washington, D. C., an alligator.
 Mr. Samuel G. Walker, Weld, W. Va., a bay lynx.
 Mr. William Whyte, Washington, D. C., an alligator.
 Hon. Woodrow Wilson, Washington, D. C., an opossum.
 Mr. D. E. Winstead, Washington, D. C., an alligator.
 Mr. N. P. Wood, North Mountain, W. Va., a green snake.
 Unknown donor, a red fox.
 Unknown donor, a Gila monster.

LOSSES.

The most noteworthy loss during the year was the death by rupture of the aorta of the largest of the Alaskan brown bears, caught as a small cub in May, 1901. He had attained a weight of 1,160 pounds. A Coke's hartbeest and several monkeys died from tuberculosis, two pronghorn antelopes from necrotic stomatitis, a lion from pericarditis, and a large bison bull (the "ten-dollar buffalo") from the effects of old age. Quail disease was again brought into the collection in a shipment of birds received from the southwestern United States and caused the death of more than half of the quail in the collection. A few waterfowl, also, died from aspergillosis, and there was some loss of birds from attacks by predatory animals

roaming at large in the park, though it was less than during the previous year. Forty-one of the animals that died were transferred to the National Museum. Autopsies were made, as usual, by the Pathological Division of the Bureau of Animal Industry, Department of Agriculture.¹

ANIMALS IN THE COLLECTION JUNE 30, 1915.

MAMMALS.

Green monkey (<i>Cercopithecus callitrichus</i>) -----	1	Common ferret (<i>Putorius putorius</i>)_	1
Mona monkey (<i>Cercopithecus mona</i>)--	3	Black-footed ferret (<i>Putorius nigripes</i>)	1
Diana monkey (<i>Cercopithecus diana</i>)	1	North American otter (<i>Lutra canadensis</i>) -----	5
Bonnet monkey (<i>Macacus sinicus</i>)----	1	Eskimo dog (<i>Canis familiaris</i>)-----	14
Macaque monkey (<i>Macacus cynomolgus</i>) -----	2	Dingo (<i>Canis dingo</i>)-----	1
Pig-tailed monkey (<i>Macacus nemestrinus</i>)-----	3	Gray wolf (<i>Canis occidentalis</i>)-----	4
Rhesus monkey (<i>Macacus rhesus</i>)-----	31	Coyote (<i>Canis latrans</i>)-----	2
Brown macaque (<i>Macacus arctoides</i>)--	2	Woodhouse's coyote (<i>Canis frustror</i>)_	3
Japanese monkey (<i>Macacus fuscatus</i>)--	3	Red fox (<i>Vulpes pennsylvanicus</i>)-----	5
Moor macaque (<i>Macacus maurus</i>)-----	1	Swift fox (<i>Vulpes velox</i>)-----	1
Chacma (<i>Papio porcarius</i>)-----	1	Arctic fox (<i>Vulpes lagopus</i>)-----	1
Hamadryas baboon (<i>Papio hamadryas</i>)--	2	Gray fox (<i>Urocyon cinerco-argenteus</i>)_	4
Mandrill (<i>Papio maimon</i>)-----	1	Spotted hyena (<i>Hyæna crocuta</i>)-----	1
White-throated capuchin (<i>Cebus hypoleucus</i>) -----	4	Indian palm civet (<i>Viverra civettina</i>)_	1
Brown monkey (<i>Cebus fatuellus</i>)-----	3	Common genet (<i>Genetta genetta</i>)-----	2
Mongoose lemur (<i>Lemur mongoz</i>)-----	2	Cheetah (<i>Cynailurus jubatus</i>)-----	2
Ring-tailed lemur (<i>Lemur catta</i>)-----	1	Sudan lion (<i>Felis leo</i>)-----	3
Polar bear (<i>Thalartos maritimus</i>)-----	2	Kilimanjaro lion (<i>Felis leo sabakicnsis</i>)_	1
European brown bear (<i>Ursus arctos</i>)--	2	Tiger (<i>Felis tigris</i>)-----	2
Kadiak bear (<i>Ursus middendorffi</i>)-----	1	Puma (<i>Felis oregonensis hippolestes</i>)--	4
Yakutat bear (<i>Ursus dalli</i>)-----	1	Jaguar (<i>Felis onca</i>)-----	1
Alaskan brown bear (<i>Ursus gyas</i>)-----	2	Leopard (<i>Felis pardus</i>)-----	3
Kidder's bear (<i>Ursus kidderi</i>)-----	2	Black leopard (<i>Felis pardus</i>)-----	1
Hybrid bear (<i>Ursus kidderi-arctos</i>)--	2	Canada lynx (<i>Lynx canadensis</i>)-----	1
Himalayan bear (<i>Ursus thibctanus</i>)-----	1	Bay lynx (<i>Lynx rufus</i>)-----	8
Japanese bear (<i>Ursus japonicus</i>)-----	1	Spotted lynx (<i>Lynx rufus texensis</i>)--	2
Grizzly bear (<i>Ursus horribilis</i>)-----	3	California lynx (<i>Lynx rufus californicus</i>)-----	1
Black bear (<i>Ursus americanus</i>)-----	9	Steller's sea lion (<i>Eumetopias stelleri</i>)--	1
Cinnamon bear (<i>Ursus americanus</i>)--	2	California sea lion (<i>Zalophus californianus</i>)-----	2
Sloth bear (<i>Melursus ursinus</i>)-----	1	Northern fur seal (<i>Callotaria alascana</i>)_	1
Kinkajou (<i>Cerculeptes caudivolvulus</i>)_	1	Harbor seal (<i>Phoca vitulina</i>)-----	1
Cacomistle (<i>Bassariscus astuta</i>)-----	1	Fox squirrel (<i>Sciurus niger</i>)-----	9
Gray coatimundi (<i>Nasua narica</i>)-----	4	Western fox squirrel (<i>Sciurus ludovicianus</i>)-----	8
Raccoon (<i>Procyon lotor</i>)-----	11	Gray squirrel (<i>Sciurus carolinensis</i>)--	40
American badger (<i>Taxidea taxus</i>)-----	3	Black squirrel (<i>Sciurus carolinensis</i>)--	20
European badger (<i>Meles taxus</i>)-----	2	Albino squirrel (<i>Sciurus carolinensis</i>)_	1
Common skunk (<i>Mephitis putida</i>)-----	3	Thirteen-lined spermophile (<i>Spermophilus tridecemlineatus</i>)-----	2
Tayra (<i>Galiictis barbara</i>)-----	1	Prairie dog (<i>Cynomys ludovicianus</i>)-----	60
American marten (<i>Mustela americana</i>)_	4	Woodchuck (<i>Marmota monax</i>)-----	2
Fisher (<i>Mustela pennantii</i>)-----	1	Alpine marmot (<i>Marmota marmotta</i>)--	1
Mink (<i>Putorius vison</i>)-----	16		

¹ The causes of death were reported to be as follows: Enteritis, 20; gastritis, 2; gastroenteritis, 1; quail disease, 20; pneumonia, 8; tuberculosis, 10; congestion of lungs, 4; pleurisy, 1; aspergilliosis, 4; congestion of liver, 5; rupture of liver, 1; nephritis, 1; peritonitis, 1; septicæmia, 2; pyæmia, 1; septic endometritis, 1; pericarditis, 3; rupture of aorta, 1; hemorrhage on spinal cord, 1; visceral gout, 2; chronic arthritis, 1; impaction of intestine, 1; necrotic stomatitis, 2; anemia, 3; wound infection, 1; accident, 2; undetermined, 7.

American beaver (<i>Castor canadensis</i>)	5	Sambar deer (<i>Cervus unicolor</i>)	3
Coypu (<i>Myocastor coypus</i>)	2	Philippine deer (<i>Cervus philippinus</i>)	1
European porcupine (<i>Hystrix cristata</i>)	4	Hog deer (<i>Cervus porcinus</i>)	9
Indian porcupine (<i>Hystrix leucura</i>)	1	Barasingha deer (<i>Cervus duvaucelii</i>)	15
Canada porcupine (<i>Erethizon dorsatus</i>)	1	Axis deer (<i>Cervus axis</i>)	8
Canada porcupine (<i>Erethizon dorsatus</i>), albino	1	Japanese deer (<i>Cervus sika</i>)	12
Viscacha (<i>Lagostomus trichodactylus</i>)	1	Red deer (<i>Cervus elaphus</i>)	8
Mexican agouti (<i>Dasyprocta mexicana</i>)	1	American elk (<i>Cervus canadensis</i>)	10
Azara's agouti (<i>Dasyprocta azarae</i>)	1	Fallow deer (<i>Cervus dama</i>)	5
Crested agouti (<i>Dasyprocta cristata</i>)	2	Virginia deer (<i>Odocoileus virginianus</i>)	15
Hairy-rumped agouti (<i>Dasyprocta prymnolopha</i>)	2	Mule deer (<i>Odocoileus hemionus</i>)	1
Paca (<i>Calogenys paca</i>)	2	Columbian black-tailed deer (<i>Odocoileus columbianus</i>)	1
Guinea pig (<i>Cavia cutleri</i>)	13	Cuban deer (<i>Odocoileus sp.</i>)	1
Patagonian cavy (<i>Dolichotis patagonica</i>)	2	Blessbok (<i>Damaliscus albifrons</i>)	1
Capybara (<i>Hydrochærus capybara</i>)	1	White-tailed gnu (<i>Connochates gnu</i>)	1
Domestic rabbit (<i>Lepus cuniculus</i>)	15	Defassa water buck (<i>Cobus defassa</i>)	1
African elephant (<i>Elephas oxyotis</i>)	2	Indian antelope (<i>Antelope cervicapra</i>)	4
Indian elephant (<i>Elephas maximus</i>)	1	Arabian gazelle (<i>Gazella arabica</i>)	2
Brazilian tapir (<i>Tapirus americanus</i>)	4	Sable antelope (<i>Hippotragus niger</i>)	1
Wild horse (<i>Equus przewalskii</i>)	1	Nilgai (<i>Boselaphus tragocamelus</i>)	3
Grey's zebra (<i>Equus grevyi</i>)	2	Congo harnessed antelope (<i>Tragelaphus gratus</i>)	2
Zebra-horse hybrid (<i>Equus grevyi-caballus</i>)	1	Tahr (<i>Hemitragus jemlaicus</i>)	4
Zebra-donkey hybrid (<i>Equus grevyi-asinus</i>)	1	Common goat (<i>Capra hircus</i>)	2
Grant's zebra (<i>Equus burchelli granti</i>)	1	Angora goat (<i>Capra hircus</i>)	1
Collared peccary (<i>Dicotyles angulatus</i>)	3	Circassian goat (<i>Capra hircus</i>)	5
Wild boar (<i>Sus scrofa</i>)	1	Barbary sheep (<i>Ovis tragelaphus</i>)	13
Northern wart hog (<i>Phacochærus africanus</i>)	2	Barbados sheep (<i>Ovis aries-tragelaphus</i>)	8
Hippopotamus (<i>Hippopotamus amphibius</i>)	2	Anoa (<i>Anoa depressicornis</i>)	1
Guanaco (<i>Lama huanachus</i>)	2	Zebu (<i>Bibos indicus</i>)	3
Llama (<i>Lama glama</i>)	7	Yak (<i>Poëphagus grunnicus</i>)	5
Alpaca (<i>Lama pacos</i>)	3	American bison (<i>Bison americanus</i>)	17
Vicugna (<i>Lama vicugna</i>)	1	Hairy armadillo (<i>Dasyppus villosus</i>)	3
Bactrian camel (<i>Camelus bactrianus</i>)	2	Wallaroo (<i>Macropus robustus</i>)	4
Arabian camel (<i>Camelus dromedarius</i>)	4	Red kangaroo (<i>Macropus rufus</i>)	1
		Bennett's wallaby (<i>Macropus ruficollis bennetti</i>)	1
		Virginia opossum (<i>Didelphys marsupialis</i>)	2

BIRDS.

Mocking bird (<i>Mimus polyglottos</i>)	2	Napolean weaver (<i>Pyromelana afra</i>)	4
Catbird (<i>Dumetella carolinensis</i>)	1	Madagascar weaver (<i>Foudia madagascariensis</i>)	4
Japanese robin (<i>Liothrix luteus</i>)	2	Red-billed weaver (<i>Quelca quelca</i>)	8
Laughing thrush (<i>Garrulax leucolophus</i>)	2	Paradise weaver (<i>Vidua paradisica</i>)	7
Australian gray jumper (<i>Struthidea cinerea</i>)	4	Red-crested cardinal (<i>Paroaria cucullata</i>)	2
Bishop finch (<i>Tanagra episcopus</i>)	4	Common cardinal (<i>Cardinalis cardinalis</i>)	2
Cut-throat finch (<i>Amadina fasciata</i>)	8	Siskin (<i>Spinus spinus</i>)	5
Zebra finch (<i>Amadina castanotis</i>)	4	Saffron finch (<i>Sycalis flavicola</i>)	13
Black-headed finch (<i>Munia atricapilla</i>)	5	Yellow hammer (<i>Emberiza citrinella</i>)	1
Three-colored finch (<i>Munia malacca</i>)	6	Common canary (<i>Serinus canarius</i>)	5
White-headed finch (<i>Munia maja</i>)	9	Linnet (<i>Linota cannabina</i>)	4
Nutmeg finch (<i>Munia punctularia</i>)	6	Cowbird (<i>Molothrus ater</i>)	1
Java sparrow (<i>Munia oryzivora</i>)	13	Glossy starling (<i>Lamprotornis caudatus</i>)	1
White Java sparrow (<i>Munia oryzivora</i>)	12	Malabar mynah (<i>Poliopsar malabariensis</i>)	2
Sharp-tailed grass finch (<i>Poëphila acuticauda</i>)	1	European raven (<i>Corvus corax</i>)	1
Silver-bill finch (<i>Aidemosyne cantans</i>)	2	American raven (<i>Corvus corax sinuatus</i>)	1
Chestnut-breasted finch (<i>Donacola castaneothorax</i>)	6		

Rocky Mountain jay (<i>Perisoreus canadensis capitalis</i>)-----	3	Lammergeyer (<i>Gypaëtus barbatus</i>)---	1
White-throated jay (<i>Garrulus leucotis</i>)--	1	South American condor (<i>Sarcorhamphus gryphus</i>)-----	1
Blue jay (<i>Cyanocitta cristata</i>)-----	3	California condor (<i>Gymnogyps californianus</i>)-----	3
American magpie (<i>Pica pica hudsonica</i>)--	3	Griffon vulture (<i>Gyps fulvus</i>)-----	2
Red-billed magpie (<i>Urocissa occipitalis</i>)--	1	Cinereous vulture (<i>Vultur monachus</i>)--	2
Yellow tyrant (<i>Pitangus sulphuratus rufipennis</i>)-----	1	Egyptian vulture (<i>Neophron percopterus</i>)-----	1
Giant kingfisher (<i>Dacelo gigas</i>)-----	2	Turkey vulture (<i>Cathartes aura</i>)-----	4
Concave-casqued hornbill (<i>Dichoceros bicornis</i>)-----	1	Black vulture (<i>Catharista urubi</i>)-----	2
Reddish motmot (<i>Momotus subrufescens</i>)-----	1	King vulture (<i>Gypagus papa</i>)-----	2
Sulphur-crested cockatoo (<i>Cacatua galerita</i>)-----	3	Snow pigeon (<i>Columba leucozona</i>)-----	2
White cockatoo (<i>Cacatua alba</i>)-----	5	Red-billed pigeon (<i>Columba flavirostris</i>)-----	4
Leadbeater's cockatoo (<i>Cacatua leadbeateri</i>)-----	2	White-crowned pigeon (<i>Columba leucocephala</i>)-----	2
Bare-eyed cockatoo (<i>Cacatua gymnopsis</i>)-----	3	Band-tailed pigeon (<i>Columba fasciata</i>)--	4
Roseate cockatoo (<i>Cacatua roseicapilla</i>)-----	13	Mourning dove (<i>Zenaidura macroura</i>)--	7
Yellow and blue macaw (<i>Ara ararauna</i>)--	2	Peaceful dove (<i>Copelia tranquilla</i>)---	2
Red and yellow and blue macaw (<i>Ara macao</i>)-----	7	Zebra dove (<i>Copelia striata</i>)-----	12
Red and blue macaw (<i>Ara chloroptera</i>)-----	2	Collared turtle dove (<i>Turtur risorius</i>)--	17
Great green macaw (<i>Ara militaris</i>)-----	1	Cape masked dove (<i>Ena capensis</i>)---	4
Cuban parrot (<i>Amazona leucocephala</i>)---	1	Australian crested pigeon (<i>Ocyphaps lophotes</i>)-----	6
Orange-winged amazon (<i>Amazona amazonica</i>)-----	1	Wonga-wonga pigeon (<i>Leucosarcia picata</i>)-----	4
Festive amazon (<i>Amazona festiva</i>)---	1	Nicobar pigeon (<i>Catnas nicobarica</i>)--	2
Porto Rican amazon (<i>Amazona vittata</i>)-----	1	Red-billed curassow (<i>Crao carunculata</i>)--	1
Yellow-shouldered amazon (<i>Amazona ochroptera</i>)-----	2	Wild turkey (<i>Meleagris gallopavo silvestris</i>)-----	5
Yellow-fronted amazon (<i>Amazona ochrocephala</i>)-----	2	Peafowl (<i>Pavo cristata</i>)-----	60
Yellow-naped amazon (<i>Amazona auri-palliata</i>)-----	2	Peacock pheasant (<i>Polyplectron chinquais</i>)-----	1
Yellow-headed amazon (<i>Amazona leucivallanti</i>)-----	2	Silver pheasant (<i>Euplocamus nycthemerus</i>)-----	1
Blue-fronted amazon (<i>Amazona aestiva</i>)--	2	European quail (<i>Coturnix communis</i>)--	1
Lesser vasa parrot (<i>Coracopsis nigra</i>)---	1	Bobwhite (<i>Colinus virginianus</i>)-----	3
Banded parakeet (<i>Palæornis fasciata</i>)-----	2	Curaçoa crested quail (<i>Eupsychothyx cristatus</i>)-----	4
Love bird (<i>Agapornis pullaria</i>)-----	1	Scaled quail (<i>Callipepla squamata</i>)---	1
Shell parakeet (<i>Melopsittacus undulatus</i>)-----	4	Valley quail (<i>Lophortyx californica vallicola</i>)-----	3
Great horned owl (<i>Bubo virginianus</i>)--	10	Gambel's quail (<i>Lophortyx gambeli</i>)---	1
Arctic horned owl (<i>Bubo virginianus subarcticus</i>)-----	1	Massena quail (<i>Cyrtonyx montezumæ</i>)--	1
Barred owl (<i>Strix varia</i>)-----	4	American coot (<i>Fulica americana</i>)-----	5
Sparrow hawk (<i>Falco sparverius</i>)-----	3	Great bustard (<i>Otis tarda</i>)-----	1
Bald eagle (<i>Haliaëtus leucocephalus</i>)--	12	Common carliama (<i>Cariama cristata</i>)---	1
Alaskan bald eagle (<i>Haliaëtus leucocephalus alaskanus</i>)-----	1	Demoiselle crane (<i>Anthropoides virgo</i>)--	7
Golden eagle (<i>Aquila chrysaëtos</i>)-----	2	Crowned crane (<i>Balearia pavonina</i>)--	2
Harpy eagle (<i>Thrasaëtus harpyia</i>)-----	1	Whooping crane (<i>Grus americana</i>)-----	1
Crowned hawk eagle (<i>Spizaëtus coronatus</i>)-----	1	Sand-hill crane (<i>Grus mexicana</i>)-----	6
Rough-legged hawk (<i>Archibuteo lagopus sancti-johannis</i>)-----	1	Australian crane (<i>Grus australasiana</i>)--	1
Cooper's hawk (<i>Accipiter cooperi</i>)-----	1	European crane (<i>Grus cinerea</i>)-----	1
Venezuelan hawk-----	1	Indian white crane (<i>Grus leucogeranus</i>)-----	1
Caracara (<i>Polyborus cheriway</i>)-----	3	Ruff (<i>Machetes pugnax</i>)-----	1
		Black-crowned night heron (<i>Nycticorax nycticorax nævius</i>)-----	10
		Snowy egret (<i>Egretta candidissima</i>)---	3
		Great white heron (<i>Herodias egretta</i>)--	1
		Great blue heron (<i>Ardea herodias</i>)-----	2
		Great black-crowned heron (<i>Ardea cocoi</i>)-----	1
		Boatbill (<i>Caucroma cochlearia</i>)-----	2
		Black stork (<i>Ciconia nigra</i>)-----	1

Marabou stork (<i>Leptoptilus dubius</i>)-----	1	Fulvous tree duck (<i>Dendrocygna bicolor</i>)-----	2
Wood ibis (<i>Mycteria americana</i>)-----	2	Wandering tree duck (<i>Dendrocygna arcuata</i>)-----	6
Sacred ibis (<i>Ibis aethiops</i>)-----	3	Ruddy sheldrake (<i>Casarca ferruginea</i>)_	1
White ibis (<i>Guara alba</i>)-----	13	Mallard (<i>Anas platyrhynchos</i>)-----	19
Roseate spoonbill (<i>Ajaja ajaja</i>)-----	2	East Indian black duck (<i>Anas sp.</i>)-----	2
European flamingo (<i>Phaenicopterus roseus</i>)-----	2	Black duck (<i>Anas rubripes</i>)-----	6
Whistling swan (<i>Olor columbianus</i>)---	6	European widgeon (<i>Mareca penelope</i>)_	2
Mute swan (<i>Cygnus gibbus</i>)-----	6	Chilean widgeon (<i>Marca sibiratrix</i>)_	2
Black-necked swan (<i>Cygnus melancoryphus</i>)-----	2	Pintail (<i>Dafila acuta</i>)-----	2
Black swan (<i>Chenopsis atrata</i>)-----	3	Blue-winged teal (<i>Querquedula discors</i>)_	5
Spur-winged goose (<i>Plectropterus gambensis</i>)-----	1	Rosy-billed pochard (<i>Metopiana pepasaca</i>)-----	2
Muscovy duck (<i>Cairina moschata</i>)-----	2	Red-headed duck (<i>Marila americana</i>)_	9
White muscovy duck (<i>Cairina moschata</i>)-----	1	American white pelican (<i>Pelecanus erythrorhynchos</i>)-----	9
Wood duck (<i>Aix sponsa</i>)-----	13	European white pelican (<i>Pelecanus onocrotalus</i>)-----	2
Mandarin duck (<i>Dendroessa galericulata</i>)-----	10	Roseate pelican (<i>Pelecanus roseus</i>)---	2
Cape Barren goose (<i>Crotopsis novæ-hollandiæ</i>)-----	2	Brown pelican (<i>Pelecanus occidentalis</i>)_	5
Lesser snow goose (<i>Chen hyperboreus</i>)_	3	Australian pelican (<i>Pelecanus conspicillatus</i>)-----	2
Greater snow goose (<i>Chen hyperboreus nivalis</i>)-----	1	Florida cormorant (<i>Phalacrocorax auritus floridanus</i>)-----	15
Ross's goose (<i>Chen rossi</i>)-----	2	Water turkey (<i>Anhinga anhinga</i>)-----	3
American white-fronted goose (<i>Anser albifrons gambeli</i>)-----	5	Great black-backed gull (<i>Larus marinus</i>)-----	1
Barred-head goose (<i>Anser indicus</i>)---	2	American herring gull (<i>Larus argentatus smithsonianus</i>)-----	3
Chinese goose (<i>Anser cygnoides</i>)-----	2	Laughing gull (<i>Larus atricilla</i>)-----	2
Canada goose (<i>Branta canadensis</i>)---	12	South African ostrich (<i>Struthio australis</i>)-----	6
Hutchins's goose (<i>Branta canadensis hutchinsii</i>)-----	3	Somali ostrich (<i>Struthio molybdophanes</i>)-----	1
Cackling goose (<i>Branta canadensis minima</i>)-----	2	Common cassowary (<i>Casuarus galeatus</i>)-----	1
Upland goose (<i>Chloëphaga magellantica</i>)-----	1	Common rhea (<i>Rhea americana</i>)-----	2
White-faced tree duck (<i>Dendrocygna viduata</i>)-----	2	Emu (<i>Dromæus novæ hollandiæ</i>)-----	2

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)---	22	Black snake (<i>Zamenis constrictor</i>)---	1
Painted box tortoise (<i>Cistudo ornata</i>)_	2	Coach-whip snake (<i>Zamenis flagellum</i>)_	1
Duncan Island tortoise (<i>Testudo cphippium</i>)-----	2	Water snake (<i>Natrix sipedon</i>)-----	3
Albemarle Island tortoise (<i>Testudo vicina</i>)-----	1	Common garter snake (<i>Eutania sirtalis</i>)-----	3
Horned lizard (<i>Phrynosoma cornutum</i>)_	1	Texas water snake (<i>Eutania proxima</i>)_	2
Gila monster (<i>Heloderma suspectum</i>)---	2	Pine snake (<i>Pituophis melanoleucus</i>)_	5
Regal python (<i>Python reticulatus</i>)---	3	King snake (<i>Ophibolus getulus</i>)-----	2
Common boa (<i>Boa constrictor</i>)-----	5	Water moccasin (<i>Ancistrodon piscivorus</i>)-----	6
Cook's tree boa (<i>Corallus cookii</i>)-----	1	Copperhead (<i>Ancistrodon contortrix</i>)_	1
Anaconda (<i>Eunectes murinus</i>)-----	1	Diamond rattlesnake (<i>Crotalus adamanteus</i>)-----	5
Velvet snake (<i>Epicrates cenchrus</i>)-----	2		
Spreading adder (<i>Heterodon platyrhinus</i>)-----	1		

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented -----	60
Purchased -----	225
Born and hatched in the National Zoological Park-----	88
Received in exchange-----	82
Deposited in National Zoological Park-----	43
Total -----	498

SUMMARY.

Animals on hand July 1, 1914.....	1,362
Accessions during the year.....	498
	1,860
Deduct loss (by exchange, death, return of animals, etc.).....	463
On hand June 30, 1915.....	1,397

Class.	Species.	Individuals.
Mammals.....	151	629
Birds.....	185	696
Reptiles.....	22	72
Total.....	358	1,397

VISITORS.

The number of visitors to the park during the year, as determined by count and estimate, was 794,530, a daily average of 2,176. This was the largest year's attendance in the history of the park. The greatest number in any one month was 153,452 in April, 1915, an average per day of 5,115.

Sixty-two schools, classes, etc., visited the park, with a total of 3,485 individuals.

IMPROVEMENTS.

A cage for pumas was built near the lion house. The cage is 22 by 28 feet, 10 feet high, and attached to it is a well-built shelter house, which provides four compartments for the animals and ample space for the keeper in caring for them.

In order to provide for keeping a band of rhesus monkeys out of doors throughout the year, a small shelter house with thick wooden walls was built and connected with it a yard 25 feet square. Twenty-five monkeys were placed there in October; all came through the winter in good shape except one, which was taken out as it appeared to suffer from the cold.

A new machine lathe was added to the shop equipment, replacing one of inferior type which had been in use since the early years of the park. A tool grinder and power hack saw were also installed and overhead equipment of shafting and pulleys arranged for the several machines. A food chopper and bone grinder, with motor for driving them, were put in at the food house.

For the convenience of the increasing number of people who enter at the south end of the park, a foot bridge was constructed there across the creek. A small rustic shelter was also built near the new stone bridge.

The most important improvement undertaken was a building for hospital and laboratory. The construction of this was begun near the end of the year, part of the cost being met from this year's appropriation and the balance to come from the appropriation for the following year. The total cost is expected to be about \$5,000. The building will be of stone, 30 by 56 feet, and one story high. There will be a room at each end fitted up for the accommodation of animals, and between these a laboratory room, 16 by 27 feet. Each room will be provided with four skylights. The location selected for the building is entirely separate from all other animal quarters, but yet easy of access for those who will have charge of the animals that are kept in it.

The cost of these improvements was as follows:

Hospital and laboratory (1915 appropriation).....	\$2, 300
Cage and house for pumas.....	1, 325
Outdoor cage and house for monkeys.....	250
Additional machine-shop equipment.....	700
Additional equipment for food house.....	250
Footbridge.....	325
Rustic shelter at new stone bridge.....	210

MAINTENANCE OF BUILDINGS, INCLOSURES, ETC.

The roads and walks in the park had received almost no repair since 1910, when a special appropriation was made for that purpose. Their condition had become so bad that repairs had to be made early in the year. The roads were extensively patched and given a general surfacing throughout with tar and crushed stone, over 2 miles of roadway being thus treated. Portions of the walks were repaired in the same manner. The total area of roads and walks repaired was 8,330 square yards. The ford near Klinge Road also had to be thoroughly repaired, and toward the close of the year it became necessary to pave with concrete the ford on the driveway to Cathedral Avenue, which, from the effects of high water and heavy ice in the creek, had become impassable. The total cost of this road work was \$4,075 (upper ford \$325, lower ford \$615).

It was also necessary to clean out and repair the larger pond for waterfowl, in which an extensive bank of sand and mud had been deposited at time of flood by the water supply from the creek; this cost \$850.

Progressive deterioration of the temporary bird house again made repairs necessary there. The wooden floor, which had already been rebuilt twice, was replaced with concrete, as was also a part of the wooden foundation. The cost of this work was \$700. This building is an example of the ultimate costliness of cheap temporary construction.

The roof of the office building had to be resingled and some other repairs made at a cost of \$400.

The section of the heating main between the temporary bird house and the antelope and elephant houses was repaired and a considerable part of the pipe replaced. A new hot-water boiler, for auxiliary heating of snake cases, was also put in at a total cost of \$500.

ALTERATION OF THE WEST BOUNDARY OF THE PARK.

The acquisition of the land required to extend the park to Connecticut Avenue from Cathedral Avenue to Klinge Road, for which an appropriation of \$107,200 was made in the sundry civil act for the fiscal year ending June 30, 1914, has not yet been accomplished.

There was great delay at several stages in the proceedings for the condemnation of the land. A special survey and map of the property involved was required; the preliminary proceedings were then postponed from time to time in order that the property owners interested might submit arguments regarding the instructions to be given to the jury of condemnation; the work of the jury in arriving at the value of the land to be taken and the amount of benefits which should be assessed against neighboring property occupied several months; the hearing by the court of objections on the part of property owners to the verdict further delayed the matter, especially as the time of that court from November, 1914, to May, 1915, was almost entirely occupied by the contest in an important will case. Changes in the personnel of the court and of the Government attorneys also operated to delay and complicate the matter. The court finally, on June 28, 1915, confirmed the verdict of the jury as regards the awards of damages for land to be taken and a portion of the benefits assessed against neighboring property, but set aside the verdict as to benefits in all cases where the owners of the property had filed exceptions to the verdict. The amount awarded for the land to be taken was \$194,438.08, and to this is to be added the cost of the proceedings, \$2,203.35, making a total of \$196,641.43. The benefits were assessed at \$66,013.50, but a considerable part was set aside by the court. The exact amount that is involved in this decision of the court has yet to be determined by the Government attorneys upon examination of the land records.

The total amount required to purchase the land and meet the costs of condemnation will therefore be considerably greater than the sum that was appropriated, so that an additional appropriation will have to be obtained in order to secure all of the land for which the act provides.

ROCK CREEK INTERCEPTING SEWERS.

The District of Columbia completed the construction of the main intercepting sewer through the park in October, 1914, and shortly thereafter built a large connecting sewer to this from the intercepting sewer that had been constructed through the park some years before. In accomplishing this work there was necessarily a considerable amount of destruction and defacement of natural features along the line of the work. The District authorities and the contractor have removed the excavated material and restored the ground to its original condition so far as that is practicable, but some expenditure on the part of the park and considerable time will be required to bring it again into satisfactory condition.

PLAYGROUND PRIVILEGE.

At its request, the playground department of the District of Columbia was allowed to install several pieces of apparatus on a meadow near which is a favorite resort of picnic parties. The apparatus has been quite largely used. Objectionable features thus far have been some temporary disfigurement of an attractive part of the park and the tendency to extend playground operations beyond the area that was allotted for that purpose.

IMPORTANT NEEDS.

BUILDINGS.

The importance of providing certain permanent buildings for housing the collection and for other purposes has been urged for several years past, but, with the scanty means available, all that could be done was to provide, from two yearly appropriations, a small building to meet the bare necessities of a hospital and laboratory. An aviary building is still a most urgent need, and repeated efforts have been made to secure an appropriation for this purpose. A building to accommodate elephants, hippopotami, and certain other animals whose requirements as to housing and care are similar will soon be a necessity, as the present temporary quarters are already too small and insecure for the young animals, which are rapidly growing and acquiring formidable strength.

The need of a public-comfort and restaurant building has been stated repeatedly and attention called to the fact that the facilities which it has been possible thus far to provide are altogether inadequate and not befitting a public institution of this character.

Gatehouses should be provided at the principal entrances, all of which are at considerable distance from the exhibition buildings, and

they should include a small room for watchmen and limited toilet facilities for visitors.

PREPARATION OF SITES FOR BUILDINGS.

The park includes but little ground that is even comparatively level, and in order to provide a building site of any considerable extent it is usually necessary to grade off a hill or fill up a valley. This involves the destruction of the trees and shrubs on the area and their replacement after the grading is completed by others required about the building for shade and ornament. Early preparation of such sites is highly desirable, in order that the planting may be done in advance and as much time as possible utilized for growth, especially of trees for shade. The site that has been selected for the aviary will require grading over practically the entire area needed for the building, the attached outdoor cages, and the walks about them. This would involve the excavation and removal of some 14,000 cubic yards of earth. The location is indicated at *A* on the accompanying map, which also shows where the excavated material could be used to fill a deep, narrow valley adjoining the bear yards at *B*. Nearly 70,000 square feet of ground would thus be made available at the aviary site and some 34,000 square feet would be added to the usable area where the fill is made. It is estimated that the cost of this work would be about \$4,000, and it is recommended that Congress be asked to appropriate that sum for the purpose.

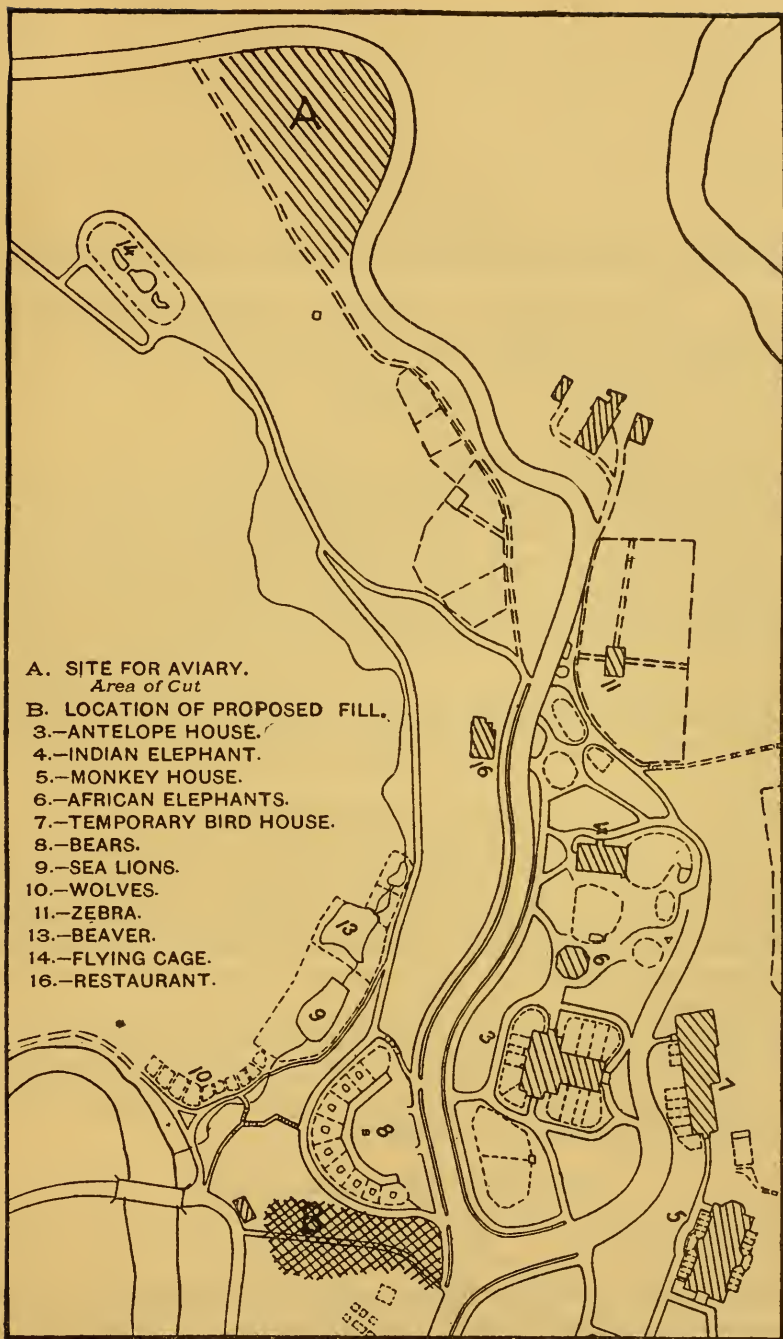
ADDITIONS TO THE COLLECTION.

Attention is again called to the desirability of adding to the exhibit some of the more important animals which it still lacks, such as anthropoid apes, rhinoceros, giraffe, African buffalo and antelopes, and the mountain sheep and goat of our own country.

Respectfully submitted.

FRANK BAKER,
Superintendent.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.



APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1915:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, Cal., upon a leased plat of ground 100 feet square, in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

Upon the observing shelter at Mount Wilson there is a tower 40 feet high above the 12-foot piers which had been prepared in the original construction of the building. This tower is being equipped with a tower telescope for use when observing (with the spectrolometer) the distribution of radiation over the sun's disk. This has been made possible by an appropriation by Congress of \$2,000 for this purpose.

During the year apparatus for research has been purchased or constructed at the observatory shop. The value of these additions to the instrumental equipment, not counting the tower equipment above mentioned, is estimated at about \$500.

WORK OF THE OBSERVATORY.

AT WASHINGTON.

Observations were made for the testing of pyrhelimeters. As in former years several silver-disk pyrhelimeters were prepared and sent abroad by the Institution after standardization at the Astrophysical Observatory.

Several automatic recording pyrhelimeters were raised to great heights in sounding balloon experiments at Omaha early in July, 1914. These instruments were all recovered, and the one which made the most successful flight was received back entirely uninjured. A great many experiments were made with it at Washington to investigate certain peculiarities of its record, and to more thoroughly standardize its pyrhelimetric and barometric elements. These experiments consumed much time of the director and Mr. Aldrich. The results reached from these balloon pyrhelimeter records will be summarized below.

Further experiments were made with sky-radiation apparatus.

As in former years the major portion of the time of Mr. Fowle and Miss Graves, and a considerable part of that of Mr. Aldrich and Mr. Carrington, has been used in measuring and reducing the Mount Wilson bolographic data. This work is heavier than formerly, as it now includes the tower-telescope observations on the distribution of brightness along the sun's diameter. These are now made at seven different wave lengths of the spectrum on each day that solar-constant measurements are secured. Owing to the demands of the Mount Wilson work, Mr. Fowle has devoted but little time to his research on the transmission of long-wave rays in air containing water vapor.

The instrument maker, Mr. Kramer, was occupied mainly on the construction of sky-radiation apparatus, and on many improvements for the Mount Wilson tower telescope.

AT MOUNT WILSON.

Observations by Messrs. Abbot and Aldrich were continued at Mount Wilson from July to about November 1, 1914, and were begun again about June 1, 1915. As in former years measurements of solar radiation were made on every favorable day, with the purpose of following the course of the solar variation. On each day of observation the distribution of brightness along the diameter of the solar image of the tower telescope was also observed at seven different wave lengths.

AT OMAHA.

As stated in last year's report, Mr. Aldrich, in cooperation with Dr. Blair and other representatives of the United States Weather Bureau, made sounding-balloon experiments at Omaha early in July, 1914. Three flights with automatic recording pyrhelimeters were made on July 1, 9, and 11, respectively. The first was made at night, with electric lamps for recording, as a test of certain anticipated sources of error. In the second flight the instrument was

much damaged when landing and remained a great while undiscovered, so that the record was quite spoiled. Apparently, too, the clockwork had stopped before reaching a very great elevation. The third flight was highly successful.

RESULTS OF BALLOON PYRHELIOMETRY.

A complete account of the balloon pyrhelimeters, the circumstances of the flights, and the results obtained has been published in a paper by Messrs. Abbot, Fowle, and Aldrich, entitled, "New Evidence on the Intensity of Solar Radiation Outside the Atmosphere" (Smithsonian Miscellaneous Collections, vol. 65, No. 4, 1915). The following is a summary of the principal results:

In the flight of July 11, 1915, the balloons reached an elevation of approximately 25,000 meters, or 81,000 feet. The pressure of the air remaining above the instrument was approximately 3 centimeters, or 1.25 inches of mercury, about one twenty-fifth of the barometric pressure at sea level. Seven readable measurements of solar radiation were recorded at various levels. Of these the three near highest elevation were the best. Their mean gives a value of 1.84 calories per square centimeter per minute, as the intensity of solar radiation at mean solar distance, at noon on July 11, at the altitude of about 22,000 meters, or 72,000 feet. It appears reasonable to add about 2 per cent for the quantity of solar radiation absorbed and scattered by the air above the instrument. This gives 1.88 calories as a value of the solar radiation outside the atmosphere, on this day, according to the balloon pyrhelometry. Unfortunately no solar-radiation measurements were secured on Mount Wilson on July 11, but the result falls well within the range of values for the solar constant of radiation which have been obtained by the bolometric method at various stations, and compares well with the mean of these values, 1.93 calories.

UNIFORMITY OF ATMOSPHERIC TRANSMISSION AT MOUNT WILSON.

In solar-constant measurements on Mount Wilson the atmospheric transmission for vertical rays is determined in the following manner for numerous spectrum wave lengths:

Spectro-bolographic observations are made at different zenith distances of the sun, usually between 75° and 30° . Between these limits the length of the path of the rays within the atmosphere is proportional to the secant of the zenith distance. Knowing the length of path and the intensity of the transmitted rays, the coefficient of transmission for any ray is readily computed. In this determination it is assumed that the atmosphere remains unchanged in transparency during the whole period of observation. Several

critics have objected against the Mount Wilson measurements that a progressive decrease of transparency occurs during the morning hours, and especially during the period ordinarily used in our observations, so that our estimates of atmospheric transmission are in their view too high, and our solar-constant values too low in consequence. It has been suggested by one critic that the period during which the zenith distance of the sun changes from 85° to 75° would be more suitable for the work.

To test this matter, observations were begun at sunrise on September 20 and 21, 1914, and continued until 10 o'clock, the usual closing time. These days were exceptionally clear and very dry, and seemed well suited to give excellent solar-constant values. The conditions of experiment, discussion of observations, and results are given in full in the paper by Abbot, Fowle, and Aldrich above cited. The principal results are these: No considerable difference in transmission coefficients appeared whether these were based on the whole morning's observations, on the range of air masses usually employed, or on the range recommended by the critic above mentioned. Six solar-constant values were derived for the two days, based on these three different treatments of the data. All six values fall between 1.90 and 1.95 calories per square centimeter per minute, in good agreement with values obtained as usual on other days. The experiments confirm the view that the atmospheric transparency above Mount Wilson is sufficiently uniform for the purposes of solar-constant investigations.

LONG-PERIOD VARIATION OF THE SUN.

In the year 1913 the solar activity, as judged by the prevalence of sun spots, was less than at any time for about a century. The mean of all solar-constant values obtained at Mount Wilson from July to October, 1913, inclusive, was 1.885 calories per square centimeter per minute. This value falls 2.5 per cent below the mean value for the years 1905 to 1912, which was 1.933 calories.

Beginning September 9, 1913, observations of the distribution of radiation along the diameter of the solar disk were secured on about 45 days of September, October, and November. These showed that the increase (or contrast) of brightness of the center of the sun's disk over that which prevails near the edge was less than that which was found from Washington observations of the years 1905 to 1907.

In the year 1914 the solar activity became distinctly greater than in 1913. The number of spots, to be sure, was not great, but other phenomena joined in showing that the period of maximum sun spots was about to come. The mean of all solar-constant values obtained at Mount Wilson from June to October, inclusive, was 1.950 calories.

This value is 3.5 per cent above that of 1913 and 1 per cent above the mean for former years. Indications are that the value for 1915 will also fall very high.

The contrast of brightness between the center and edges of the solar disk was greater in 1914 than in 1913, and, in fact, almost as great as was found from Washington work of 1905 to 1907.

These facts confirm the result derived from earlier observations, namely, the solar emission of radiation varies along with the solar activity as revealed by sun spots and other phenomena. Higher values of solar radiation prevail at times of greater solar activity, as expressed by sun spots. The connection does not, however, appear to be a strictly numerical one between solar radiation and sun spot numbers. In the return of solar activity presaged in 1914 the solar radiation rose almost to its maximum value before the number of sun spots had greatly increased. Associated with these changes, greater contrast of brightness between the center and edges of the solar disk prevails when the solar activity is greater.

SHORT-PERIOD VARIATION OF THE SUN.

In the year 1913, as in former years, considerable fluctuations of the solar-constant values occurred from day to day. The values found ranged over nearly 10 per cent between the extreme limits 1.81 and 1.99 calories, but seldom more than 3 per cent in any 10-day interval. The periods of fluctuation were irregular, as heretofore. Associated with these fluctuations, though perhaps not strictly connected numerically, the contrast of brightness between center and edges of the solar disk also varied. Curiously enough, however, the correlation between solar-constant values and contrast values proves to be of opposite sign for these short irregular fluctuations to that which attends the long-period changes which are associated with the general solar activity. In other words, in the progress of the sun spot cycle *high* solar-constant values and *increased* contrast between center and edges of the solar disk are associated together with numerous sun spots, but for the *short* irregular period fluctuations of solar radiation, *higher* solar-constant values are associated with *diminished* contrast of brightness along the diameter of the solar disk. The year 1914 was singularly free from large fluctuations of solar radiation. The extreme range of solar-constant values was only 4 per cent between limits 1.91 and 1.99 calories. Accordingly the year was not very favorable for testing the relation just described. Nevertheless, the results tend to confirm rather than disprove the conclusion reached that for short, irregular fluctuations of the solar radiation high values are associated with less contrast of brightness between the center and edges of the sun.

The somewhat paradoxical conclusions above stated seem capable of explanation as follows: Associated with the great increase of solar activity attending the maximum of the sun spot cycle, increased convection is continually bringing fresh hot material to the sun's surface, so that the effective solar temperature is then higher, and greater emission of radiation prevails. At such a time the contrast, which would be zero if the solar temperature were zero, is naturally also increased. As for the quick, irregular fluctuations, it must be supposed that the sun's outer envelope hinders somewhat the passage of radiation from within outward. This hindrance is greater at the edges of the sun's disk, where the path of the rays in the line of sight is oblique, than it is at the center of the sun's disk. Suppose now that the obstructive property of these layers varies from day to day. When their transparency is increased the solar radiation must *increase*; but as the effect will be most conspicuous at the edge of the solar disk, where the path of the rays is longest, the *contrast* of brightness between center and limb must thereby *decrease*.

Two kinds of causes may, therefore, contribute to the sun's variability. The one, a change of effective temperature attending the general march of solar activity, may cause the variability of long period. The other, a change of opacity of the outer solar layers, may cause the variability of short irregular period.

SUMMARY.

Successful records of the intensity of solar radiation up to 25,000 meters were secured by means of automatic recording pyrheliometers attached to sounding balloons. The mean of the three highest values reduced to mean solar distance is 1.84 calories per square centimeter per minute. Making 2 per cent allowance for scattering and absorption in the air above (which gave a barometric pressure only about one twenty-fifth of that at sea level), the value 1.88 calories is obtained as the probable intensity of solar radiation outside the atmosphere at mean solar distance on this day. This value falls near the mean of numerous values obtained by spectrobolometric observations on Mount Wilson.

Experiments begun at sunrise and continued until 10 o'clock on September 20 and 21, 1914, indicate great constancy of transparency of the atmosphere above Mount Wilson, and yield solar-constant values independent of the altitude of the sun. These results confirm the substantial accuracy of the Mount Wilson observations of the solar constant of radiation.

The radiation of the sun was 2.5 per cent below the mean, according to the average of observations extending from July to October,

1913, inclusive, and 1 per cent above the mean from similar studies extending from June to October, 1914, inclusive. A high average value for 1915 is indicated.

The contrast of brightness between the center and edges of the solar disk was less in 1913 than in 1905 to 1907, but was restored to the earlier condition in 1914.

Short-period fluctuations of solar radiation were large in 1913, but small in 1914. Associated with these quick, irregular fluctuations are found variations of contrast of brightness between the center and edges of the solar disk. Curiously enough, while greater contrast is associated with greater solar radiation and with numerous sun spots in the general march of the sun's activity, lesser contrast is associated with greater solar radiation in the march of the quick, irregular fluctuations of the sun's emission.

This paradox points to two causes of solar variation—the long-period changes may probably be caused by changes of the sun's effective temperature attending the march of solar activity; the quick fluctuations may be ascribed to changes of the transparency of the outer solar envelopes.

Respectfully submitted.

C. G. ABBOT,

Director Astrophysical Observatory.

Dr. C. D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report upon the operations of the library of the Smithsonian Institution and its branches for the fiscal year ending June 30, 1915:

In common with other libraries of the world, the Smithsonian library has had to confront a serious situation during the last year. This was the difficulty experienced in the securing of current parts and the completing of sets of the publications of learned institutions and scientific societies that have been received from European sources for many years. Some of these series have ceased publication, others have been published with fewer pages and in smaller editions, while still others have been issued but not forwarded, all due largely to the military service required of the contributors and publishers at this time at the front and the risk involved in transportation. Notwithstanding these conditions, the efforts to keep the library exchanges alive have been continued with marked success.

ACCESSIONS.

During the fiscal year a total of 26,928 packages of publications were received, of which 25,097 came through the mails and 1,831 through the International Exchange Service. The correspondence necessary in connection with these receipts numbered about 1,400 letters, requesting publications and acknowledging them, and 5,148 acknowledgments on the regular form.

The publications for the Smithsonian library were entered, accessioned, and forwarded to the Smithsonian deposit in the Library of Congress each day as received, numbering in all 24,713 publications, as follows: 3,043 volumes, 1,179 parts of volumes, 1,763 pamphlets, 17,410 periodicals, 594 charts, and 724 parts of serials to complete sets. The numbers in the accession record run from 517,777 to 521,616. There were catalogued during the year 3,451 publications, of which 1,000 were charts. Four thousand one hundred and twenty-two volumes were recatalogued from the old records and entered in the new catalogue. The cards typewritten and filed in the catalogue numbered 4,038.

The sending to the Library of Congress of public documents presented to the Smithsonian Institution, without stamping and recording, has been continued, and 4,675 were forwarded in this way.

The accessions for the office library, which includes the Astrophysical Observatory and the National Zoological Park, numbered 561 publications, distributed as follows: 351 volumes, 35 parts of volumes, and 40 pamphlets, for the office library; 72 volumes, 11 parts of volumes and 25 pamphlets for the Astrophysical Observatory, and 21 volumes and 6 pamphlets for the National Zoological Park.

Complete sets of inaugural dissertations and technological publications from 12 universities and technical high schools were received from the following places: Baltimore, Basel, Copenhagen, Delft, Ithaca, Lund, Paris, Philadelphia, Toulouse, and Zürich.

EXCHANGES.

The sendings from Europe have been restricted compared with those of former years, but there has been no cessation in the efforts to secure new exchanges and missing parts in the series, and many have been received. The new series added to the library numbered 48, and all of the 387 want cards for the series searched in the Library of Congress were considered and some action taken on each at the Smithsonian Institution, with the result that 82 sets of publications of learned institutions and scientific societies in the Smithsonian division were entirely or partially completed by the supplying of 460 parts; in the same way 254 parts of 48 sets were supplied to the periodical division, and for the part of the deposit in the general classification 10 parts of 4 sets.

Among the more important of these series secured for the Smithsonian library may be cited the following:

Australia:

Sydney, New South Wales.—Royal Anthropological Society of Australasia. Science of Man.

Belgium:

Brussels.—Académie Royale de Belgique. Bulletin, Classe des lettres. Association des industriels de Belgique pour l'étude et la propagation des engins et mesures propres à préserver les ouvriers des accidents du travail. Rapport.

St. Nicholas.—Cercle archéologique du pays de Waes. Annales.

England:

London.—Agricultural Economist and Horticultural Review.

Royal Geographical Society. Geographical Journal.

Birmingham.—Birmingham Natural History and Microscopical Society. Report.

France:

Nice.—Association Provinciales des architectes français. Bulletin.

Paris.—Société Française de Physique. Résumé des communications.

Germany :

- Berlin.—Berliner Missionsgesellschaft. Berliner Missions-Berichte.
 Deutscher Fischerei-Verein. Zeitschrift fuer Fischerei.
 Darmstadt.—Historischer Verein fuer das Grossherzogthum Hessen.
 Quartalblätter.
 Dresden.—K. Oeffentliche Bibliothek. Papyrus-Fragment aus der Kgl.
 Oeff. Bibliothek zu Dresden.
 Munich.—K. Bayerische Akademie der Wissenschaften. Abhandlungen,
 Denkschriften Gelehrte Anzeiger Sitzungsberichte.

India :

- Calcutta.—Medical and Sanitary Departments of India. Scientific Memoirs
 by the Officers of the Medical and Sanitary Departments.

Italy :

- Florence.—Societa Botanica Italiana. Bullettino.

Siam :

- Bangkok.—Siam Society. Journal.

The exchange of publications with historical societies in this country and abroad has been continued, resulting in many additions both in the form of new exchanges and the supplying of missing parts.

READING ROOM.

In the reading room the current foreign and domestic scientific periodicals have been in constant use by the staff and the members of the scientific bureaus of the governmental establishments in Washington, and there are now 294 titles on the shelves. Three thousand five hundred and three publications from the reading and reference rooms were circulated during the year. Of these 3,161 were single numbers of periodicals, and 342 were bound volumes.

THE AERONAUTICAL LIBRARY.

One of the important collections of reference works at the Institution is that relating to aeronautics, and is, in all probability, the most complete series on this subject in the United States. The collection had its origin with Secretary Langley when he was carrying on his aeronautical experiments, at which time he was able to secure many early works that can not now be purchased.

One of the chief contributors during the year was Dr. Alexander Graham Bell, a Regent of the Institution, whose gift consists of his working library on the subject, numbering 46 volumes, and another series of 153 volumes of newspaper clippings relating to the important period when the Wright brothers were making their initial flights.

The additions to the collection during the year, including those from Dr. Bell, were 256.

ART ROOM.

Mrs. Charles D. Walcott has added to the collection of works on art an exceptionally valuable loan, consisting of nine magnificent volumes on Japanese art, fully illustrated in color. Mrs. Walcott has also deposited the architectural publications, numbering 394 volumes, and parts of serial publications which formed the library of her brother, George Vaux, an architect of prominence in the city of Philadelphia.

EMPLOYEES' LIBRARY.

The employees' library has also received a contribution from Mrs. Walcott by the deposit of a collection of popular works, numbering 145 volumes.

NEW STEEL STACKS.

The work on the new steel stacks for the books belonging to the libraries of the Government bureaus under the Smithsonian Institution has been continued, and at the close of the year this work is nearly completed. With the passage of the appropriation bills in August, 1914, the additional sum of \$10,000 became available, and immediately an order was issued for the erection of as much of the second half of the stacks in the west end of the main hall as the money available would permit. Those in the east end were completed in August, and the moving of the library of the Bureau of American Ethnology to its new quarters was accomplished within a very short time. The old wooden galleries in the west end were then removed, and this part of the hall was turned over to the contractors for the erection of stacks. Congress having appropriated an additional sum of \$6,500 during the last session, the steel stacks were practically finished at the close of the year.

The libraries of the Government bureaus under the Institution have heretofore been cared for in the bureau offices and wherever there was space for shelving. Proper classification and arrangement were impossible, owing to lack of space, and much time was lost in looking for references. The new stacks have a capacity of 100,000 volumes, and make it possible for the first time to bring all publications relating to one subject together, so that each is available for consultation.

UNITED STATES NATIONAL MUSEUM.

It seems desirable, after a period of a third of a century, to briefly review the growth and progress that have been made in the Museum library. The formation of a working library in the National Museum in 1881 was largely due to the increased activity in investi-

gations and the need of reference works for the curators in their study of the collections which were moved from the Smithsonian Building to the separate building erected for the Museum.

A nucleus was begun in the northwest corner of the Museum building with a collection of publications for the most part made up of standard zoological and industrial works and bound pamphlets, composing the library of Spencer Fullerton Baird, second Secretary of the Smithsonian Institution, which he had presented to the Museum. The Library has grown steadily until it now occupies not only the old rooms, but additional larger quarters in the new building as well as space for the special libraries in the various sections. Within a year after the first books had been brought together there were 5,450 volumes and 4,750 pamphlets; in all, 10,200 publications. Now, in the thirty-fifth year of its existence, there are 45,818 bound volumes, 76,295 pamphlets, forming a collection of 122,113 titles, from which the duplicates have been removed.

The system of arrangement has been modified to some extent, but the plan upon which the Museum library was organized has been continued, in that the general library has retained all books treating of more than one subject, such as periodicals, proceedings of societies, dictionaries, and encyclopedias, together with such monographs as are not constantly needed in the sectional libraries; and the sectional libraries have had assigned to them only those publications which relate to the work of the department or division. A little more than a year ago the general library and works relating to anthropology, biology, and geology were moved to new quarters in the new building, where up-to-date facilities for the consultation of publications have been provided.

This left the old rooms where the library had had its inception free, and the space thus made vacant is now being used for the accumulation of another collection of works of reference of equal importance relating to history and the collections of arts and industries of a technical nature, which are being developed in the older Museum Building. While this library has but recently been started, the indications are that it will have a growth equal to that of the parent library, and it promises to become one of the most important technical series of publications in the country.

The establishment of sectional libraries of special reference works bearing on the collections has been of importance to the curators, and the number has been increased in proportion to the growth of the Museum. Beginning with 8 in 1881, there are now 33 collections of publications on special subjects.

Considering the ways and means for adding to the library in the early days, its growth has been remarkable. The library for the first 18 years was dependent largely for its increase upon the exchange

of the publications of the Museum descriptive of its collections in the various fields of science. This plan for increasing the library was very successful, but it did not provide books of reference, in part published at a loss, which could only be secured by purchase. In 1898 an appropriation of \$2,000 was made by Congress for the purchase of such books, but this sum was barely adequate then, and while the appropriation has been continued, it has not been increased. This lack of sufficient funds will be more keenly felt in the very near future, owing to the present conditions in Europe and the inability of the scientific societies and institutions abroad to supply even exchange copies.

ACCESSIONS.

The Museum library now contains 45,818 volumes, 76,295 pamphlets and unbound papers, and 124 manuscripts. The accessions during the year covered by this report number 2,209 volumes, 2,530 pamphlets, and 183 parts of volumes.

CATALOGUING.

The books catalogued number 1,550, pamphlets 2,530, and the total number of cards made 4,664; completed volumes of periodicals catalogued, 756; parts of publications, 183; parts of periodicals, 9,805; new periodical cards made, 389.

The old catalogue of the Museum library was entered on cards of about twice the size of the standard card now in use without sufficient information for the proper identification of the publication. For a number of years the recataloguing of these publications on standard cards has been carried on as the other work permitted until at the present time only the publications in the sectional libraries remain. With the continued increase in the work it is hardly possible to do more than recatalogue 100 volumes in a year, but with additional help this work could be completed at once, and would be of great value to the Museum in connection with reference work.

EXCHANGES.

The existing conditions in Europe have interfered to some extent with the securing of new exchanges as well as with the receipt of publications which have been coming for many years. In the matter of exchanges and the securing of publications needed to complete the series 297 letters were written, with the result that many new titles of publications issued in series were added to those already coming. The receipts of publications from abroad have been delayed, and in many cases the institutions and societies are holding the

sets and series until it will be safe to transmit them. Also, for economic reasons, only limited editions with fewer pages are issued, which gives a special value to those received.

LOANS.

The use of the library has been largely by the scientific staff of the Museum, but other departments of the Government, particularly the Department of Agriculture, have availed themselves of the opportunity of consulting the publications relating to the various branches of science. During the year the loans from the general library numbered 12,492 publications, which includes 5,272 books assigned to the sectional libraries, 3,020 books borrowed from the Library of Congress, 111 from the Department of Agriculture library, 72 from the United States Geological Survey, 44 from the Army Medical Museum and Library, and 13 from other places. From the Museum shelves there were borrowed 3,960 volumes.

One of the important matters considered during the latter part of the year was the return of books that had been borrowed from the Library of Congress on the older records, and while only the charges for books coming under the first three letters of the alphabet were acted upon, the indications are that those running back as far as 1876 will be cleared up. During the year 3,437 books were returned to the Library of Congress and 294 to other libraries.

BINDING.

The binding of volumes received in separate parts is still a serious matter, and it is hoped that some provision can be made at an early date, so that all of them may be bound. To cite an instance, there are now in the technical series of recently catalogued works over 100 volumes that should be bound at once, in order that they may be preserved intact.

There were 812 volumes prepared for binding and sent to the Government bindery.

GIFTS.

Gifts of importance have been received from the following persons: Dr. Charles Doolittle Walcott, Mrs. Richard Rathbun, Dr. William Healey Dall, Dr. Oliver Perry Hay, Dr. Charles W. Richmond, Mr. George C. Maynard, Dr. Robert W. Shufeldt, Mr. Austin Hobart Clark, Mr. Robert Ridgway, Dr. Joseph Nelson Rose, Dr. I. M. Casanowicz, Mr. William R. Maxon, and also the library of the late Dr. Theodore Nicholas Gill has been presented by Mr. Herbert A. Gill.

DALL COLLECTION.

Dr. William Healey Dall contributed 162 titles, at a cost of about \$60, as additions to the collection of books relating to mollusks which has been brought together by him as curator of that division, as a reference library. These and the publications previously received now number approximately 7,662 titles.

BOTANICAL LIBRARY.

A large collection of botanical books, the property of Dr. Edward L. Greene, which had been on deposit in the United States National Museum since 1904, was withdrawn during the year as it was impracticable to secure the sum of \$20,000 required for their purchase.

TECHNOLOGICAL SERIES.

In this branch of the library, which has only recently been formed, and which is cared for in the older Museum Building, special efforts have been made to put the classes of publications in more convenient places and to make them more accessible for consultation. Those relating to music, ceramics, photography, and botany have been critically examined, recatalogued, and put in order on the shelves. Those of the following classes have not as yet been considered: Art and architecture, physics, chemistry, history, literature, sociology and economy, and political science.

This branch of the library is very deficient in general reference books, such as an exhaustive encyclopedic work, technical dictionaries, and dictionaries of some of the foreign languages, and while a few of these works can be purchased during the present year, there will not be money available to secure them all.

The additions to this part of the library numbered 1,061 volumes, 3,573 parts of volumes, and 2,631 pamphlets and 4 maps.

The cataloguing for the year numbered 660 volumes, 1,131 pamphlets, and 4 maps, requiring 1,406 cards. The number of periodicals entered on the records were 801 volumes and 6,253 parts of volumes. Special efforts have been made to catalogue the entire collection in the library, and until this is completed the record for cataloguing will not cover the receipts. Books and pamphlets loaned during the year, in addition to those from the general library, numbered 258 volumes and 346 pamphlets, while there were consulted in the reading room about 520 publications. In addition to the work on the catalogue, about 800 volumes and 7,000 pamphlets and parts of volumes were filed on the shelves, to be added to the records later.

In the scientific depository set of printed cards from the Library of Congress about 30,000 were filed alphabetically by authors. This index will be of great value when the subject cards are included, as

it will then contain a complete reference list of publications available on all subjects considered in the Museum.

SECTIONAL LIBRARIES.

While progress has been made in the revision of the records for reference publications which are permanently deposited in the sectional libraries it has not been possible to carry the systematic checking very far, and my recommendation of last year that a competent cataloguer be employed to do this special work is renewed. While this condition is largely due to the overcrowded condition of the library for so many years, it is essential to the work of the Museum that the sectional libraries should be in perfect order and that the records in the main library should be complete.

The following is a complete list of the sectional libraries:

Administration.	Materia medica.
Administrative assistant's office.	Mechanical technology.
Anthropology.	Mesozoic fossils.
Biology.	Mineralogy.
Birds.	Mineral technology.
Botany.	Mollusks.
Comparative anatomy.	Oriental archeology.
Editor's office.	Paleobotany.
Ethnology.	Parasites.
Fishes.	Photography.
Geology.	Physical anthropology.
Graphic arts.	Prehistoric archeology.
History.	Reptiles and batrachians.
Insects.	Superintendent's office.
Invertebrate paleontology.	Taxidermy.
Mammals.	Textiles.
Marine invertebrates.	Vertebrate paleontology.

BUREAU OF AMERICAN ETHNOLOGY.

This library is administered under the direct care of the ethnologist-in-charge, and an account of its operations will be found in the report of that bureau.

ASTROPHYSICAL OBSERVATORY.

Publications relating to astrophysics have been assembled in the bookcases just completed in the east end of the main hall of the Smithsonian Building. This situation is convenient to the observatory, and the new facilities make it possible for the first time to properly classify this library. During the year there were added 72 volumes, 11 parts of volumes, and 25 pamphlets. Fifty-five volumes were bound.

NATIONAL ZOOLOGICAL PARK.

This library contains publications relating to the work of the park in the care of the animals, reports of other zoological parks, and a few works on landscape gardening. The number of publications received was very small as compared with the previous year, and this may be due to the fact that none of the parks abroad, except that at Gizeh, Egypt, issued any publications. During the year there were received 21 volumes and 6 pamphlets.

SUMMARY OF ACCESSIONS.

The following statement summarizes the accessions during the year, with the exception of the library of the Bureau of American Ethnology:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets.....	7,303
To the Smithsonian office, Astrophysical Observatory, and National Zoological Park.....	560
To the United States National Museum.....	4,922
Total	<u>12,785</u>

Respectfully submitted.

PAUL BROCKETT,
Assistant Librarian.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the fiscal year ending June 30, 1915:

This international cooperative enterprise has since 1901 published annual classified index catalogues of the current scientific literature of the world. The following-named branches of science are represented each year by a separate volume: Mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, anthropology, physiology, and bacteriology.

All of the first 10 annual issues of 17 volumes each have been published, together with 15 volumes of the eleventh issue, 9 volumes of the twelfth issue, and 2 volumes of the thirteenth issue; a total of 196 regular volumes in addition to several special volumes of schedules, list of journals, etc.

The 15 volumes of the eleventh issue published are mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, and anthropology.

The nine volumes of the twelfth issue published are mathematics, mechanics, physics, chemistry, astronomy, geography, paleontology, general biology, and zoology.

The two volumes of the thirteenth issue published are mathematics and zoology.

During the year there were 26,413 classified references to American scientific literature prepared by this bureau, as follows:

Literature of—	
1906	10
1907	19
1908	192
1909	195
1910	348
1911	1, 358
1912	3, 511
1913	8, 394
1914	12, 386
Total	26, 413

The object of the catalogue is not only to publish references by authors to current scientific literature, but also to supply practically a digest of the subject contents of each paper by means of minutely classified subject catalogues. The elaborate classification schedules used render it possible to refer to all subjects treated in each paper indexed.

It is the duty of this Bureau of the International Catalogue to analyze and classify the contents of all scientific papers published in the United States. An idea of the extent of the work may be gained from the fact that between 25,000 and 30,000 citations are sent each year to the London central bureau for publication, the subjects classified covering all branches of science. In this day of specialization it is not possible for one or two individuals to have a thorough knowledge of all the sciences, and as economy of administration would not warrant the employment of, say, a dozen specialists, it was the practice for a number of years to refer some of the more technical papers to specialists for classification. These specialists, being employees of the various scientific branches of the Government in Washington, have, while not engaged in their official duties, aided the catalogue by furnishing the classification data required. Payments averaged approximately \$600 per year, divided among five or six individuals. It may be said that while the specialists were willing to aid in this important international undertaking for a comparatively nominal compensation, the catalogue was benefited to a very great extent, for each citation furnished was the equivalent of a specialist's decision as to the value and application of the scientific subject of each paper classified. This method of compensating employees of other scientific bureaus of the Government was decided on in 1905 after a conference between the disbursing agent of the Smithsonian Institution and the then Comptroller of the Treasury.

The present Comptroller of the Treasury does not agree on this subject with the former comptroller, and in a letter dated February 4, 1914, referring to a number of similar payments stated:

I am of the opinion that the payments in question come within the prohibition of sections 1764 and 1765, Revised Statutes, and were not authorized by law. In view of the fact that this office, in letters dated October 24, 1905, and February 15, 1906, sanctioned the payments to employees of other bureaus and departments, which seems to have been construed to sanction the payment for both classes, no disallowance will be made in the present settlement, but payments made subsequent to the date of this decision will not be allowed.

This decision has greatly embarrassed the work of the bureau, and it is hoped that Congress will so change the wording of future appropriations for the maintenance of the bureau as to authorize payments of this character being made.

The general organization of the International Catalogue of Scientific Literature consists of a central bureau in London whose duty it is to assemble, edit, and publish classified references to current scientific literature supplied by the various regional bureaus representing the cooperating countries. The following named countries have established regional bureaus, supported in most cases by direct Government grants: Argentine Republic, Austria, Belgium, Canada, Chili, Cuba, Denmark, Egypt, Finland, France, Germany, Greece, Holland, Hungary, India and Ceylon, Italy, Japan, Mexico, New South Wales, New Zealand, Norway, Poland, Portugal, Queensland, Russia, South Africa, South Australia, Spain, Straits Settlements, Sweden, Switzerland, United States of America, Victoria and Tasmania, and Western Australia.

The present war in Europe has seriously interfered not only with the finances but with the general work of the catalogue. Before hostilities began the receipts and expenditures of the London central bureau just balanced. These receipts are derived from the sale of the catalogue to the various subscribers throughout the world and are used entirely to defray the cost of printing and publishing.

Subscriptions aggregating almost \$6,000 a year, due from five of the countries engaged in hostilities, have been either delayed or stopped by the war. The Royal Society of London, realizing that it would be impossible for the central bureau to continue publishing the catalogue in the face of this deficit, has very generously made a grant of a sum almost sufficient to cover the deficit caused by the first year of the war: It may be said that the Royal Society has not only stood sponsor for the catalogue since its inception, but it was through the good offices of this society that the enterprise was begun. It is greatly to be hoped that this action of the Royal Society will stimulate similar institutions in the United States to aid in making up the annual deficit until a readjustment of the affairs of the bureaus affected can be made after peace has been declared.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1915:

The Institution proper published during the year 14 papers in the series of "Smithsonian Miscellaneous Collections," two annual reports, pamphlet copies of 68 papers from the general appendices of these reports, and 8 special publications. The Bureau of American Ethnology published 2 bulletins and 3 miscellaneous publications, and the United States National Museum issued 1 annual report, 1 volume of the Proceedings, and 41 separate papers forming parts of this and other volumes, 6 bulletins, and 1 volume pertaining to the National Herbarium.

The total number of copies of publications distributed by the Institution proper during the year was 77,710. This number includes 620 volumes and separate memoirs of Smithsonian Contributions to Knowledge, 30,058 volumes and separate pamphlets of Smithsonian Miscellaneous Collections, 30,909 volumes and separate pamphlets of Smithsonian annual reports, 10,185 publications of the Bureau of American Ethnology, 5,424 special publications, 36 volumes of the Annals of the Astrophysical Observatory, 121 reports of the Harri-man Alaska Expedition, 245 reports of the American Historical Association, 5 publications of the United States National Museum, and 108 publications not of the Smithsonian or its branches. There were distributed by the National Museum 54,300 copies of its several series of publications, making a total of 132,010 publications distributed by the Institution and its branches during the year.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

No publications of this series were issued during the year.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

Of the Miscellaneous Collections, volume 57, the title-page and table of contents was published; of volume 62, 1 paper; of volume 63,

4 papers and title-page and table of contents; of volume 64, 1 paper; and of volume 65, 8 papers; in all, 14 papers, as follows:

Volume 57.

Title-page and table of contents. July 31, 1914. (Publ. 2270.)

Volume 62.

No. 3. Report on European aeronautical laboratories. By A. F. Zahm. July 27, 1914. 23 pp., 11 pls. (Publ. 2273.)

Volume 63.

No. 6. Smithsonian Physical Tables. Sixth revised edition. By F. E. Fowle. November 10, 1914. xxxvi+355 pp. (Publ. 2269.)

No. 8. Explorations and field-work of the Smithsonian Institution in 1913. November 27, 1914. 88 pp. (Publ. 2275.)

No. 9. The olfactory sense of insects. By N. E. McIndoo. November 21, 1914. 63 pp. (Publ. 2315.)

No. 10. Archeology of the lower Mimbres Valley, N. Mex. By J. Walter Fewkes. December 18, 1914. 53 pp., 8 pls. (Publ. 2316.)

Title-page and table of contents. January 30, 1915. v pp. (Publ. 2320.)

Volume 64.

No. 2. Cambrian geology and paleontology. III. Pre-Cambrian Algonkian algal flora. By Charles D. Walcott. July 22, 1914. Pp. 77-156, pls. 4-23. (Publ. 2271.)

Volume 65.

No. 1. The present distribution of the Onychophora, a group of terrestrial invertebrates. By Austin H. Clark. January 4, 1915. 25 pp. (Publ. 2319.)

No. 2. The development of the lungs of the alligator. By A. M. Reese. March 3, 1915. 11 pp., 9 pls. (Publ. 2356.)

No. 3. A study of the radiation of the atmosphere. By Anders K. Ångström. Hodgkins fund. 159 pp. (Publ. 2354.) In press.

No. 4. New evidence on the intensity of the solar radiation outside the atmosphere. By C. G. Abbot, F. E. Fowle, and L. B. Aldrich. Hodgkins fund. June 19, 1915. 55 pp. (Publ. 2361.)

No. 5. The microspectroscope in mineralogy. By Edgar T. Wherry. April 7, 1915. 16 pp. (Publ. 2362.)

No. 6. Explorations and field-work of the Smithsonian Institution in 1914. June 30, 1915. 95 pp., 1 pl. (Publ. 2363.)

No. 7. Two new sedges from the southwestern United States. By Kenneth K. Mackenzie. April 9, 1915. 3 pp. (Publ. 2364.)

No. 8. Report upon a collection of ferns from western South America. By William R. Maxon. May 3, 1915. 12 pp. (Publ. 2366.)

SMITHSONIAN ANNUAL REPORTS.

Report for 1913.

The Annual Report of the Board of Regents for 1913 was received from the Public Printer in completed form in December, 1914.

Annual Report of the Board of Regents of the Smithsonian Institution showing operations, expenditures, and condition of the Institution for the year ending June 30, 1913. xi+804 pp., 169 pls. (Publ. 2277.)

Small editions of the following papers, forming the general appendix of the annual report for 1913, were issued in pamphlet form:

- The earth and sun as magnets, by George E. Hale. 14 pp., 8 pls. (Publ. 2278.)
- The reaction of the planets upon the sun, by P. Puiseux. 16 pp. (Publ. 2279.)
- Recent progress in astrophysics, by C. G. Abbot. 20 pp., 3 pls. (Publ. 2280.)
- The earth's magnetism, by L. A. Bauer. 18 pp., 9 pls. (Publ. 2281.)
- Modern ideas on the end of the world, by Gustav Jaumann. 9 pp. (Publ. 2282.)
- Recent developments in electromagnetism, by Eugene Bloch. 19 pp. (Publ. 2283.)
- Wireless transmission of energy, by Elihu Thomson. 18 pp. (Publ. 2284.)
- Oil films on water and on mercury, by Henri Devaux. 13 pp., 7 pls. (Publ. 2285.)
- Water and volcanic activity, by Arthur L. Day and E. S. Shepherd. 31 pp., 11 pls. (Publ. 2286.)
- Ripple marks, by Ch. Epry. 11 pp., 10 pls. (Publ. 2287.)
- Notes on the geological history of the walnuts and hickories, by Edward W. Berry. 13 pp. (Publ. 2288.)
- The formation of leaf mold, by Frederick V. Coville. 11 pp. (Publ. 2289.)
- The development of orchid cultivation and its bearing upon evolutionary theories, by J. Costantin. 14 pp. (Publ. 2290.)
- The manufacture of nitrates from the atmosphere, by Ernest Kilburn Scott. 26 pp., 3 pls. (Publ. 2291.)
- The geologic history of China and its influence upon the Chinese people, by Eliot Blackwelder. 12 pp., 9 pls. (Publ. 2292.)
- The problems of heredity, by E. Apert. 17 pp. (Publ. 2293.)
- Habits of fiddler-crabs, by A. S. Pearse. 14 pp. (Publ. 2294.)
- The abalones of California, by Charles L. Edwards. 10 pp., 10 pls. (Publ. 2295.)
- The value of birds to man, by James Buckland. 20 pp. (Publ. 2296.)
- Experiments in feeding hummingbirds during seven summers, by Althea R. Sherman. 10 pp. (Publ. 2297.)
- What the American Bird Banding Association has accomplished during 1912, by Howard H. Cleaves. 11 pp., 2 pls. (Publ. 2298.)
- The whale fisheries of the world, by Charles Rabot. 9 pp., 3 pls. (Publ. 2299.)
- The most ancient skeletal remains of man, by Aleš Hrdlička. 62 pp., 41 pls. (Publ. 2300.)
- The redistribution of mankind, by H. N. Dickson. 17 pp. (Publ. 2301.)
- The earliest forms of human habitation, and their relation to the general development of civilization, by M. Hoernes. 8 pp. (Publ. 2302.)
- Feudalism in Persia; its origin, development, and present condition, by Jacques de Morgan. 28 pp. (Publ. 2303.)
- Shintoism and its significance, by K. Kanokogi. 9 pp. (Publ. 2304.)
- The Minoan and Mycenaean element in Hellenic life, by A. J. Evans. 21 pp., 3 pls. (Publ. 2305.)
- Flameless combustion, by Carleton Ellis. 14 pp., 1 pl. (Publ. 2306.)
- Problems in smoke, fume, and dust abatement, by F. G. Cottrell. 33 pp., 37 pls. (Publ. 2307.)
- Twenty years' progress in marine construction, by Alexander Gracie. 21 pp. (Publ. 2308.)
- Creating a subterranean river and supplying a metropolis with mountain water, by J. Bernard Walker and A. Russell Bond. 14 pp., 11 pls. (Publ. 2309.)

- The application of the physiology of color vision in modern art, by Henry G. Keller and J. J. R. Macleod. 17 pp. (Publ. 2310.)
 Fundamentals of housing reform, by James Ford. 14 pp. (Publ. 2311.)
 The economic and social rôle of fashion, by Pierre Clerget. 11 pp. (Publ. 2312.)
 The work of J. van't Hoff, by G. Bruni. 23 pp. (Publ. 2313.)

Report for 1914.

The report of the executive committee and proceedings of the Board of Regents of the Institution, as well as the report of the Secretary, for the fiscal year ending June 30, 1914, both forming part of the Annual Report of the Board of Regents to Congress, were published in pamphlet form in December, 1914, as follows:

- Report of the executive committee and proceedings of the Board of Regents for the year ending June 30, 1914. 17 pp. (Publ. 2318.)
 Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1914. iii, 117 pp., 4 pls. (Publ. 2317.)

Small editions of the following papers, forming the general appendix of the report, were issued in June, and the complete volume was received from the printer shortly after the close of the fiscal year:

- The radiation of the sun. By C. G. Abbot. 16 pp., 4 pls. (Publ. 2322.)
 Modern theories of the sun. By Jean Bosler. 8 pp., 2 pls. (Publ. 2323.)
 The form and constitution of the earth. By Louis B. Stewart. 14 pp. (Publ. 2324.)
 Some remarks on logarithms apropos to their tercentenary. By M. d'Ocagne. 7 pp., 2 pls. (Publ. 2325.)
 Modern views on the constitution of the atom. By A. S. Eve. 9 pp. (Publ. 2326.)
 Gyrostats and gyrostatic action. By Andrew Gray. 16 pp., 10 pls. (Publ. 2327.)
 Stability of aeroplanes. By Orville Wright. 8 pp. (Publ. 2328.)
 The first man-carrying aeroplane capable of sustained free flight—Langley's success as a pioneer in aviation. By A. F. Zahm. 6 pp., 8 pls. (Publ. 2329.)
 Some aspects of industrial chemistry. By L. H. Baekeland. 25 pp. (Publ. 2330.)
 Explosives. By Edward P. O'Hern. 27 pp., 7 pls. (Publ. 2331.)
 Climates of geologic time. By Charles Schuchert. 35 pp. (Publ. 2332.)
 Pleochroic haloes. By J. Joly. 15 pp., 3 pls. (Publ. 2333.)
 The geology of the bottom of the seas. By L. de Launay. 24 pp. (Publ. 2334.)
 Recent oceanographic researches. By Ch. Gravier. 10 pp. (Publ. 2335.)
 The Klondike and Yukon goldfield in 1913. By H. M. Cadell. 20 pp., 6 pls. (Publ. 2336.)
 The history of the discovery of sexuality in plants. By Duncan S. Johnson. 24 pp. (Publ. 2337.)
 Problems and progress in plant pathology. By L. R. Jones. 13 pp. (Publ. 2338.)
 Plant autographs and their revelations. By Jagadis Chunder Bose. 23 pp. (Publ. 2339.)
 The National Zoological Park and its inhabitants. By Frank Baker. 34 pp., 41 pls. (Publ. 2340.)

- On the habits and behavior of the herring gull. By R. M. Strong. 31 pp., 10 pls. (Publ. 2341.)
- Notes on some effects of extreme drought in Waterberg, South Africa. By Eugène N. Marais. 12 pp. (Publ. 2342.)
- Homœotic regeneration of the antennæ in a Phasmid or walking-stick. By H. O. Schmit-Jensen. 14 pp., 2 pls. (Publ. 2343.)
- Latent life: Its nature and its relations to certain theories of contemporary biology. By Paul Becquerel. 15 pp. (Publ. 2344.)
- The early inhabitants of western Asia. By Felix V. Luschan. 25 pp., 12 pls. (Publ. 2345.)
- Excavations at Abydos. By Edouard Naville. 7 pp., 3 pls. (Publ. 2346.)
- An examination of Chinese bronzes. By John C. Ferguson. 6 pp., 14 pls. (Publ. 2347.)
- The rôle of depopulation, deforestation, and malaria in the decadence of certain nations. By Felix Regnault. 5 pp. (Publ. 2348.)
- The story of the chin. By Louis Robinson. 11 pp., 12 pls. (Publ. 2349.)
- Recent developments in the art of illumination. By Preston S. Millar. 18 pp., 3 pls. (Publ. 2350.)
- The loom and spindle: Past, present, and future. By Luther Hooper. 49 pp., 11 pls. (Publ. 2351.)
- The demonstration play school of 1913. By Clark W. Hetherington. 29 pp. (Publ. 2352.)
- Sketch of the life of Eduard Suess (1831-1914). By Pierre Termier. 10 pp. (Publ. 2353.)

SPECIAL PUBLICATIONS.

The following special publications were issued in octavo form:

- Publications of the Smithsonian Institution issued between January 1 and June 30, 1914. Published August 8, 1914. 2 pp. (Publ. 2274.)
- Publications of the Smithsonian Institution issued between January 1 and September 30, 1914. October 7, 1914. 2 pp. (Publ. 2314.)
- Publications of the Smithsonian Institution issued between January 1 and December 31, 1914. January 23, 1915. 3 pp. (Publ. 2355.)
- Publications of the Smithsonian Institution issued between January 1 and March 31, 1915. April 17, 1915. 1 p. (Publ. 2365.)
- Biographical sketch of James Smithson. October 30, 1914. 17 pp., 4 pls. (Publ. 2276.)
- Opinions rendered by the International Commission on Zoological Nomenclature, Opinion 66. March 3, 1915. Pp. 171-176. (Publ. 2359.)
- An index to the Museum Boltenianum. By William H. Dall. March 29, 1915. 64 pp. (Publ. 2360.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual report to Congress; (*b*) the Proceedings of the United States National Museum; and (*c*) the Bulletin of the United States National Museum, which includes the contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

During the year the Museum published an annual report, one volume of the Proceedings and 41 separate papers forming parts of

this and other volumes, 6 bulletins, and one volume of Contributions from the National Herbarium.

The issues of the proceedings were as follows: Volume 47, papers 2052 to 2063, and the complete volume; volume 48, papers 2064 to 2091; volume 49, paper 2093; Annual Report of the United States National Museum for 1914.

The bulletins were as follows:

Bulletin 71, A monograph of the Foraminifera of the North Pacific Ocean, Part V, Rotallidae. By Joseph Augustine Cushman.

Bulletin 82, A monograph of the existing Crinoids, Vol. 1, The Comatulids, Part 1. By Austin Hobart Clark.

Bulletin 88, Revision of Paleozoic Stelleroidea, with special reference to North American Asteroidea. By Charles Schuchert.

Bulletin 89, Osteology of the Armored Dinosauria in the United States National Museum, with special reference to the genus *Stegosaurus*. By Charles Whitney Gilmore.

Bulletin 90, A monograph of the molluscan fauna of the Orthaulax Pugnax Zone of the Oligocene of Tampa, Florida. By William Healey Dall.

Special Bulletin, American hydroids, Part III, The Campanularidae and the Bonneviellidae. By Charles Cleveland Nutting.

In the series of Contributions from the National Herbarium there appeared volume 19, Flora of New Mexico, by E. O. Wooten and Paul C. Standley.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in Appendix 2 of the Secretary's report. The editorial work of the bureau has been continued by Mr. J. G. Gurley, editor, who has been assisted from time to time by Mrs. Frances S. Nichols.

Two bulletins and three miscellaneous publications were issued during the year, as follows:

Bulletin 46. Byington's Choctaw Dictionary. Edited by John R. Swanton and Henry S. Halbert.

Bulletin 58. List of publications of the bureau.

No. 10. Circular of information regarding Indian popular names.

No. 11. Map of linguistic families of American Indians north of Mexico.

No. 12. List of Indian words denoting "man," prepared in placard form for use in the Smithsonian exhibit at the Panama-Pacific Exposition.

Four annual reports and five bulletins were in press at the close of the year.

PUBLICATIONS OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution and are communicated to Congress under the provisions of the act of incorporation of the association.

The annual report for 1912 was published in August, 1914. In September, 1914, the manuscript of the 1913 report was sent to the printer, but it was not completed at the close of the year.

PUBLICATIONS OF THE SOCIETY OF THE DAUGHTERS OF THE
AMERICAN REVOLUTION.

The manuscript of the Seventeenth Annual Report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1914, was communicated to Congress March 3, 1915.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND
PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution, as well as those offered for printing in the Smithsonian series. The committee also considered forms of routine, blanks, and various matters pertaining to printing and publication. Eighteen meetings were held and 109 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.





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