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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30
1922



(Publication 2709)



WASHINGTON
GOVERNMENT PRINTING OFFICE
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REPORT
OF THE
SECRETARY OF THE SMITHSONIAN INSTITUTION,
CHARLES D. WALCOTT,
FOR THE YEAR ENDING JUNE 30, 1922.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith the annual report of the activities and condition of the Smithsonian Institution and its branches during the year ending June 30, 1922. The affairs of the Institution proper (together with brief summaries of the operations of the various branches) are given on pages 1 to 25 of this report, and the appendixes contain somewhat detailed accounts of the year's work, written by the head of each of the branches. These include reports on the United States National Museum, the National Gallery of Art, the Freer Gallery of Art, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, the United States Regional Bureau of the International Catalogue of Scientific Literature, the Smithsonian Library, and the publications of the Institution and its branches.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created by act of Congress in 1846, according to the terms of the will of James Smithson, of England, who in 1826 bequeathed his property to the United States of America "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men." In receiving the property and accepting the trust Congress determined that the Federal Government was without authority to administer the trust directly, and therefore constituted an "establishment" whose statutory members are "the President, the Vice President, the Chief Justice, and the heads of the executive departments."

THE BOARD OF REGENTS.

The affairs of the Institution are administered by a Board of Regents whose membership consists of "the Vice President, the Chief Justice, three Members of the Senate, and three Members of the House of Representatives, together with six other persons other than Members of Congress, 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." One of the Regents is elected chancellor by the board; in the past the selection has fallen upon the Vice President or the Chief Justice; and a suitable person is chosen by them as secretary of the Institution, who is also secretary of the Board of Regents and the executive officer directly in charge of the Institution's activities.

In regard to the personnel of the board, the following changes occurred during the year: Chief Justice William H. Taft became a member of the board by virtue of his office; Representative Albert Johnson, of the State of Washington, was appointed to succeed Representative John A. Elston, who died during the year; and Dr. Alexander Graham Bell retired from the board at the expiration of his term.

The roll of the Regents at the close of the fiscal year was as follows: Calvin Coolidge, Vice President of the United States, chancellor; Chief Justice William H. Taft; Henry Cabot Lodge, Member of the Senate; A. Owsley Stanley, Member of the Senate; Medill McCormick, Member of the Senate; Lemuel P. Padgett, Member of the House of Representatives; Frank L. Greene, Member of the House of Representatives; Albert Johnson, Member of the House of Representatives; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, citizen of Washington, D. C.; Henry White, citizen of Washington, D. C., and Robert S. Brookings, citizen of Missouri.

The board held its annual meeting on December 8, 1921. The proceedings of that meeting, as well as 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 description of disbursements from the 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 accordance with the law.

GENERAL CONSIDERATIONS.

Desiring to increase the research output of the Institution, your secretary called a meeting in May of this year of the scientific

staff of the Institution and its branches to consider ways and means of inaugurating and carrying out a program of more extensive original research. At this meeting a committee on research was named, with Dr. George P. Merrill, head curator of geology, as chairman, which will consider the subject this summer and it is expected will be prepared in the fall to offer a definite program.

The great need of the Institution is for a larger endowment to enable it to extend the scope of its activities in the "increase and diffusion of knowledge among men." During the 76 years of its existence, except for several generous contributions for specific objects, the income of the Institution has not been materially increased. With the great increase in its scientific activities and output of publications, it becomes more and more difficult to make the limited income cover the mounting expense, and many opportunities to carry on valuable scientific investigations must be passed by every year. It is hoped that some one, recognizing the advantageous position of the Institution for promoting scientific work in America, will provide a suitable endowment.

FINANCES.

The permanent investments of the Institution consist of the following:

Deposited in the Treasury of the United States..... \$1,000,000

CONSOLIDATED FUND.

Miscellaneous securities carried at a cost of \$177,965.28, either purchased or acquired by gift, and constituting the consolidated fund, namely:

West Shore Railroad Co. guaranteed 4 per cent first mortgage bonds, due in 1931.....	\$42,000
Cleveland Electric Illuminating Co. first mortgage 5 per cent gold bonds, due in 1939.....	10,000
Atchison, Topeka & Santa Fe Railway Co. 4 per cent general mortgage bonds, due in 1995, gift.....	2,000
Chesapeake & Ohio Railroad Co. first consolidated mortgage 5 per cent bonds, due in 1939, gift.....	2,000
Baltimore & Ohio Railroad Co. 5 per cent refunding general mortgage bonds, due in 1995, gift.....	5,000
P. Lorillard Co. 7 per cent gold bonds, due in 1944, gift.....	6,000
Liggett & Myers Tobacco Co. 7 per cent gold bonds, due in 1944, gift.....	6,000
New York Central & Hudson River Railroad Co., 4 per cent gold debenture bonds, due in 1934.....	4,000
City of Youngstown, Ohio, 6 per cent municipal bonds, due in 1928.....	3,000
Real estate 7 per cent trust notes on improved property in the District of Columbia, due in 1925.....	5,000
Northern Pacific—Great Northern joint convertible 6½ per cent gold bonds, due in 1936.....	41,500

New York Central Railroad Co. refunding and improvement 5 per cent bonds, due in 2013.....	\$10,000
Brooklyn Rapid Transit Co. ¹ 5 per cent secured gold notes due in 1918.....	3,500
United States first Liberty loan.....	200
United States second Liberty loan.....	100
United States third Liberty loan.....	10,150
United States fourth Liberty loan.....	50
United States war-savings stamps, series of 1918.....	100
Achison, Topeka & Santa Fe Railway Co. 5 per cent preferred stock, gift..... shares.....	125
American Smelting & Refining Co. 7 per cent preferred stock, gift..... do.....	60
Baltimore & Ohio Railroad Co. 4 per cent preferred stock, gift..... do.....	125
California Electric Generating Co. 6 per cent preferred stock, gift..... do.....	100
Electric Bond & Share Co. 6 per cent preferred stock, gift..... do.....	20

The sums invested for each specific fund or securities acquired by gift are described as follows:

Fund.	United States Treasury.	Consolidated fund.	Total.
Smithson fund.....	\$727,640.00	\$1,429.14	\$729,069.14
Habel fund.....	500.00		500.00
Hodgkins general fund.....	116,000.00	37,275.00	153,275.00
Hodgkins specific fund.....	100,000.00		100,000.00
Rhees fund.....	590.00	199.00	789.00
Avery fund.....	14,000.00	20,489.80	34,489.80
Addison T. Reid fund.....	11,000.00	3,679.00	14,679.00
Lucy T. and George W. Poore fund.....	26,670.00	8,444.00	35,114.00
George K. Sanford fund.....	1,100.00	374.00	1,474.00
Chamberlain fund.....		35,000.00	35,000.00
Bruce Hughes fund.....		9,894.76	9,894.76
Lucy H. Baird fund.....		1,260.58	1,260.58
Virginia Purdy Bacon fund.....		46,900.00	46,900.00
Hamilton fund.....	2,500.00	500.00	3,000.00
Charles D. and Mary Vaux Walcott research fund.....		11,520.00	11,520.00
Caroline Henry fund.....		1,000.00	1,000.00
Total.....	1,000,000.00	177,965.28	1,177,965.28

Mr. B. H. Swales, custodian, section of birds' eggs, continues to favor the Institution with his valuable assistance in the form of contributions for the purchase of specimens for the division of birds. This year his contributions have amounted to \$400.

Dr. William L. Abbott has contributed \$2,000 for the purpose of continuing the collecting of natural history specimens. The Australian expedition, the expense of which was maintained entirely by Doctor Abbott for three years, has been successfully concluded, and work in new fields is contemplated in the near future.

¹The traction problem in New York is still unsolved, and the Brooklyn Rapid Transit Co.'s finances remain in the hands of receivers.

Mr. John A. Roebing has made further gifts to the Institution to the extent of \$15,771.38, to aid in the maintenance of astrophysical stations in Chile and in Arizona and for the publication of scientific papers.

The executors of the Freer estate have transferred to the Institution 6,546 shares of Parke, Davis & Co., to apply to the Freer residuary fund. The shares of this corporation now received for the several specific purposes provided by Mr. Freer are as follows:

	Shares.
Curator's fund, Freer Gallery of Art.....	1,742
Court and grounds fund, Freer Gallery of Art.....	1,742
Court and grounds, maintenance fund, Freer Gallery of Art.....	435
Freer residuary fund.....	16,546
Total.....	20,465

To pay inheritance and Federal taxes, it became necessary, with the approval of the Board of Regents, to place a loan with a local trust company for that purpose. The loan is being gradually reduced and now amounts to \$170,000.

Dividends and interest on securities acquired from the Freer estate have amounted to \$83,127.36. Thirty thousand dollars have been expended to liquidate the above-mentioned obligation, and \$55,034.48 for purposes prescribed by the testator, including the purchase of art objects.

The sum of \$55,823.44, constituting the balance of the building fund, was transferred to the books of the Institution, and \$32,122.78 has been expended. With the addition of a credit transferred from another Freer fund, the balance available for completion and equipment of the building is \$32,074.97.

The Institution's income for general expenses is received periodically and at times is in excess of immediate requirements. A part of this income is deposited on time at the rate of 3 per cent per annum. This year interest acquired principally in this manner amounted to \$2,033.93.

The income during the year for current expenses, consisting of interest on permanent investments and other miscellaneous resources, was \$61,872.14, receipts from Freer bequest \$138,950.80, other revenues for specific purposes, \$50,850.04; which, with cash on hand and subject to check on July 1, 1921, amounting to \$11,229.34, constituted a total of \$262,902.32.

The disbursements, described more fully in the annual report of the executive committee, were classed as follows: General objects of the Institution, \$62,749.17; investments and expenditures for specific purposes, \$33,553.24; temporary advances in excess of repayments, \$2,578.50; cash deposited on time, \$40,500; disbursed

from revenues of Freer bequest, \$117,157.26; and \$6,364.15 in cash and deposited subject to check.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1922:

International Exchanges	\$50,000.00
American Ethnology	46,000.00
International Catalogue of Scientific Literature.....	7,500.00
Astrophysical Observatory	15,500.00
National Museum:	
Furniture and fixtures.....	\$20,000.00
Heating and lighting.....	70,000.00
Heating and lighting (deficiency).....	4,000.00
Preservation of collections.....	312,620.00
Preservation of collections (deficiency).....	15.84
Building repairs	10,000.00
Books	2,000.00
Books (deficiency)	3.02
Postage	500.00
	419,138.86
National Gallery of Art.....	15,000.00
National Zoological Park.....	125,000.00
Additional land for Zoological Park.....	2,500.00
	680,638.86
Total	680,638.86

There was also appropriated for printing and binding \$91,000, to cover the cost of printing and binding the Smithsonian annual report and reports and miscellaneous printing for Government branches of the Institution.

RESEARCHES AND EXPLORATIONS.

Each year the Institution sends out, as far as its limited funds permit, expeditions for the purpose of exploring scientifically little-known regions of the earth, or to conduct needed field work in more familiar localities, thus furthering one of its principal objects, the "increase of knowledge." It is also able to cooperate advantageously with other institutions by contributing members of its scientific staff to expeditions already organized and financed. The results of the more noteworthy of these expeditions are here described briefly, and the field work of the various branches of the Institution will be found in the appendixes to this report.

GEOLOGICAL EXPLORATIONS IN THE CANADIAN ROCKIES.

During the summer and early fall of 1921 your secretary carried on geological field work in the Canadian Rocky Mountains in continuation of previous years' work in this region. His objects were to secure data on the pre-Devonian strata of the Sawback Range

in Ranger Brook Canyon and to conduct a reconnaissance of the pre-Devonian formations to the Northwest as far as the headwaters of the North Fork of the Saskatchewan River, Alberta.

The field season was an unusually unfavorable one for geological work. During the three months in the field 35 days were stormy, 28 cloudy and cold, and snow fell on 20 days in August and September. As a result, not more than one-third of the work planned was accomplished before the party was driven back to the railroad by heavy snows.

On our way north we crossed over Pipestone Pass and down the Siffleur River. Clearwater River heads in glacial gravels on the east side of the Siffleur about 2 miles north of Pipestone Pass. Twenty-five miles farther to the northwest at the point where the south branch (Mistaya Creek), the middle branch (Howse River), and the north branch unite to form the Saskatchewan River there are some beautiful and instructive views of the surrounding mountains. The Mount Forbes massif on the left is a superb mountain mass and in the distant center is Division Mountain at the head of Glacier Lake Canyon which we visited in 1919, on the right Survey Peak and beyond two unnamed points. The Glacier Lake section of the pre-Devonian and Upper Cambrian formations was studied on the northern slopes of the Mount Forbes massif.

Twelve miles northeast of Mount Forbes the cliffs of Mount Murchison rise high above the dark forested slopes and present a view of the Devonian and pre-Devonian formations that is unequaled in all this region of peaks, cliffs, and broad canyon valleys.

Opposite Mount Murchison on the north side of the Saskatchewan, Mount Wilson presents another section of the pre-Devonian formations, the upper end of which is a massive white quartzite formed of the sands of the beaches over which the Devonian Sea deposited a thick layer of calcareous sediments abounding in the remains of corals and various invertebrates of the time. On the west, Mount Wilson rises directly above the North Fork of the Saskatchewan, which here flows through a narrow picturesque inner canyon.

PALEONTOLOGICAL FIELD WORK IN THE UNITED STATES.

Dr. R. S. Bassler, curator of the division of paleontology in the National Museum, was occupied during the field season in collecting geologic material and in mapping and studying the economic resources of the Franklin quadrangle in Williamson County, Tenn., in cooperation with the Geological Survey of that State. This region is of considerable economic interest on account of the phosphate and oil shale possibilities. The numerous outcrops of Ordovician and later Paleozoic formations contain a great number of fossils,

and Doctor Bassler was able to make a considerable collection of these needed for the Museum study series. He also secured several large exhibition specimens illustrating various geological phenomena, among these being a large mass of limestone composed entirely of the dismembered calices and columns of a large species of crinoid or sea lily in which the individual fragments are perfectly preserved and admirably illustrate the formation of a limestone through the accumulation of this type of animal remains.

An interesting stratigraphic observation was made on the efficacy of the coral reefs of the Ordovician in rock formation. A massive limestone bed about 15 feet thick, representing a middle Ordovician formation, here contains but a single coral reef, but within 10 miles the number of intercalated coral reefs has so increased that the formation attains a thickness of over 250 feet.

In April Mr. C. W. Gilmore, associate curator of vertebrate paleontology, was authorized to undertake a trip into New Mexico "for the purpose of making collections of geological material for the National Museum and determining the advisability of preserving certain lands in northern New Mexico for national monumental purposes." Mr. Gilmore was obliged to report that—

Since the many square miles of "bad lands" surrounding the reserved area are equally fossiliferous and in places present much more favorable territory for the recovery of fossil remains than any observed within the boundaries of the monument, and also since the greater part of these surrounding areas lie within Pueblo grants, over which Federal control has been relinquished, there would be no advantage in retaining governmental control of so small a part of the area as is represented in the proposed monument.

Mr. Gilmore did, however, find a contiguous fossiliferous area in the Santa Clara Pueblo grant and secured for the Museum a well-preserved skull and other bones of a small rhinoceros, and, in an adjoining Pojoaque Pueblo area, remains of an extinct camel. The most promising area for collecting would appear to lie within land grants over which the Government has at present no control.

In January, this same year, Mr. J. W. Gidley, assistant curator of this division, was authorized, in cooperation with the United States Geological Survey, to conduct field explorations in the San Pedro and Sulphur Springs Valleys of southern Arizona, and on the completion of this work to visit the La Brea asphalt deposits of southern California, and from there go to Agate, in Nebraska, for the purpose of securing other exhibition material. The work in Arizona was eminently successful, Mr. Gidley shipping some 24 boxes having an aggregate weight of 5,000 pounds. The bulk of this collection, he reports, represents "a practically new Pliocene fauna containing about 60 vertebrate species, most of which are mammalian."

BOTANICAL EXPEDITION TO THE ORIENT.

As noted in last year's report, Dr. A. S. Hitchcock, custodian of the section of grasses of the National Museum, visited the Orient under the auspices of the Department of Agriculture for the purpose of collecting and studying grasses, especially the bamboos. As the specimens collected come to the National Museum, it will not be out of place to here mention briefly Doctor Hitchcock's work. The trip occupied about eight months, ending in December, 1921, and the regions visited included the Philippines, Japan, China, and Indo-China.

Japan is not very favorable for the collecting of grasses, as it is mostly a forested region and there is comparatively little open country. The bamboos were of interest, as there are many species. In the Lake Hakone region the hills were covered for miles with a single species of bamboo (*Arundinaria chino*), 4 to 8 feet high, often to the exclusion of everything else.

China, on the other hand, was very rich in grasses. One of the surprises of the trip was to find so much open grass land in a country that is said to be very thickly populated. The cities of China are very much crowded and the valley lands are intensively cultivated, but the hills are unoccupied and almost unused. This is in striking contrast to our own western regions where, except in national forests and other protected areas, the grass lands are extensively grazed. The basic reason for this condition in China appears to be the risk from bandits. The valley lands can be protected but the hills are open to the attack of robbers.

The expedition was very successful, and a large and valuable collection of grasses was brought back. The technical results of the work will be published later by the Department of Agriculture or the National Herbarium of the National Museum.

AUSTRALIAN EXPEDITION.

Through the generosity of Dr. W. L. Abbott, Mr. Charles M. Hoy continued his work of collecting for the Museum specimens of the very interesting fauna of Australia. The work was terminated during the winter and Mr. Hoy returned to the United States in May, 1922. The results of this expedition are of especial value for two reasons: First, the Australian fauna has heretofore been but scantily represented in the Museum, and, second, the remarkable fauna of that continent is rapidly being exterminated through various causes. The specimens received during the year bring the total up to 1,179 mammals, including series of skeletal and embryological material; 928 birds, with 41 additional examples in alcohol; and smaller collections of reptiles, amphibians, insects, marine specimens, etc.

For assistance and courtesies extended to Mr. Hoy while in Australia the Smithsonian Institution wishes to make grateful acknowledgment to the authorities of the Australian Museum, Sydney; the Queensland Museum, Brisbane; the South Australian Museum, Adelaide; the West Australian Museum and Art Gallery, Perth; and the Tasmanian Museum and Art Gallery, Hobart; also and particularly to Dr. Charles Hedley and Dr. Charles Anderson, of Sydney; Harry Burrell, Esq., of Kensington, New South Wales; and Capt. S. W. White of Fulham, South Australia.

BIOLOGICAL EXPLORATION IN THE DOMINICAN REPUBLIC.

Dr. W. L. Abbott, whose generosity in years past has enabled the Institution to take advantage of many opportunities in biological and other explorations, himself visited during the year the Dominican Republic, working in both the Samana Peninsula and the region lying between Sanchez (at the head of Samana Bay) and Puerto Plata, on the north coast. Having visited this region before, he was able to select new and interesting localities for collecting.

Doctor Abbott's work included botanical, zoological, and ethnological collecting, and the specimens sent in to the National Museum will go far toward completing the various series representing this region. Some 4,000 plants were collected, of which about 20 per cent were ferns. The ethnological material, including aboriginal Indian pottery and idols, is of great interest and has been described and figured in the annual pamphlet on the explorations and field work of the Institution.

ENTOMOLOGICAL EXPEDITION TO ALASKA.

Dr. J. M. Aldrich, associate curator of insects in the National Museum, spent several weeks during the field season collecting insects in Alaska. The Government railroad from the southern coast to Fairbanks, now nearing completion, offered an opportunity for travel not heretofore existing, and it was felt that it was important to know more about the insect fauna of this great region in view of the fact that the population will undoubtedly increase with the completion of the railroad. Regarding his work, Doctor Aldrich says:

The expedition resulted in the accession of about 10,000 specimens of Alaska insects, nearly all from the interior region. As far as they have been studied up to the present time they indicate three somewhat distinct faunal regions in the territory covered.

First, the maritime fauna consisting of the insects living upon the seashore and depending upon the ocean for necessary conditions of existence. Insects of this group extend down the coast, in many cases as far as the

State of Washington and some even so far as San Francisco, while it is presumed that they would also be found more or less in the Asiatic side of Bering Sea.

The second element is that of the humid mountain region along the coast; a considerable part of this fauna extends to Puget Sound, Mount Rainier, and in less degree to other mountains of the Pacific Northwest. The relation of this element to the Asiatic fauna is very little known.

The third element of the Alaska fauna, as far as observed, is that of the dry interior and especially of the Yukon Valley, which has many elements in common with northern Minnesota, Wisconsin, and Michigan, Ontario, the Adirondack Mountains of New York, and the White Mountains of New Hampshire. Many of the insects of this group also occur in the Rocky Mountains of Colorado and no doubt further exploration will show that they occur in other mountains of the western United States. Those which represent a more northern range also reappear in Labrador collections and presumably extend across North America, although we have no collections from intermediate points. This element contains many species known from Finland and the Scandinavian Peninsula in Europe, presumably extending in their distribution across Russia and Siberia.

In most orders of insects Alaska has a comparatively large fauna. There are very numerous species of the two-winged flies, or Diptera; and from Doctor Aldrich's long experience with this group he naturally paid special attention to collecting in this order.

Bumblebees and wasps are conspicuous insects everywhere on flowers; and in the absence of darkness bumblebees were observed to work as late as 10:30 at night in Fairbanks. Grasshoppers were strikingly scarce, only two species being found and in all but half a dozen specimens. Mosquitoes in the interior are exceedingly abundant, as is well known. Especial attention was given to them in collecting, and two species previously undescribed were among the material brought back. It appears, however, that the most troublesome species are the same ones which occur in somewhat less numbers in the Pacific Northwest in occasional favorable localities. Horseflies are very numerous in the region at Fairbanks, where they are commonly called mooseflies, since the moose is more common than the horse.

The exploration of Alaska, especially the interior, from an entomological point of view, is important in itself and also forms a link in the study of a much broader problem—that of the entire Holarctic fauna which extends almost continuously around the globe in the vicinity of the Arctic Circle. It is a matter of great scientific interest to determine how much of this northern fauna is the same in the New World as in the Old, and also to determine how much of the fauna farther south, as, for instance, in the United States, has been derived from this northern region. It is hoped that opportunity will arise to carry this exploration much farther, not only in Alaska, where as yet only a beginning has been made, but also in other northern regions, as, for instance, Labrador, Greenland, and Siberia.

THE INSTITUTE FOR RESEARCH IN TROPICAL AMERICA.

The recently organized Institute for Research in Tropical America, of which the Smithsonian Institution is a member, is hoping to establish a research station in Panama. Such a station when properly equipped will serve as a center for the prosecution of research upon problems in tropical biology and agriculture, and as a center from which biological explorations can be made.

FLORA OF THE PHILIPPINE ISLANDS.

At the request of Gen. Leonard Wood, Governor General of the Philippine Islands, a plan for the preparation of a flora of the Philippine Islands was drawn up by the Institution, together with an estimate of the cost. This work, which it is proposed will be accomplished through cooperation of the Smithsonian Institution with the Philippine Government, will be of the greatest importance to the agricultural interests, and, since the prosperity of the Philippines is primarily dependent on agriculture, to the islands themselves. In addition to these material benefits, such a flora would be of great value to science, and a large number of specimens of rare and valuable plants from the Philippines would come to the National Herbarium as a result of its preparation.

At the close of the fiscal year funds had not been appropriated for beginning the work.

BAIRD MEMORIAL COMMITTEE.

To celebrate the centenary of the birth of Spencer Fullerton Baird, second secretary of the Smithsonian Institution, February 3, 1923, there was formed early in 1922 the Baird Memorial Committee. It was decided at a preliminary meeting that a public meeting should be held in Washington on February 3, 1923, at which addresses will be delivered and announcements made of the form of memorial or memorials that have been decided upon, and that wreaths should be placed on the grave of Baird in Oak Hill Cemetery, the bust of Baird in the American Museum of Natural History in New York City, the Baird memorial boulder of the American Fisheries Society at Woods Hole, and the Baird memorial tablet at the Bureau of Fisheries in Washington.

The form which the memorial to Professor Baird should take was not definitely decided, several plans having been considered. Among these were a bust or tablet to be erected in the Smithsonian grounds, the establishment of a Baird memorial medal to be awarded for specially meritorious work in science, the publication of a memorial volume of original scientific papers by Baird's associates or followers, and a fisheries exhibit, preferably a museum.

DEVELOPMENT OF MULTIPLE-CHARGE ROCKET.

The development of a model multiple-charge rocket, mentioned in previous reports, for the purpose of demonstrating the principle, is being continued by Prof. Robert H. Goddard, of Clark University, under a grant from the Hodgkins fund.

The specific work of the past year has been the development and test of certain new features which will increase considerably the

effectiveness of the apparatus. A discussion of these, in detail, is deferred for a later report. Additional financial support has been granted for the work by Clark University.

PUBLICATIONS.

A total of 164 volumes and pamphlets were issued during the year by the Institution and its branches. Of these publications, there were distributed a total of 165,196 copies, including 251 volumes and separates of the Smithsonian Contributions to Knowledge, 20,777 volumes and separates of the Smithsonian Miscellaneous Collections, 27,263 volumes and separates of the Smithsonian annual reports, 97,806 volumes and separates of the publications of the National Museum, 14,215 publications of the Bureau of American Ethnology, 3,159 special publications, 706 volumes of the Annals of the Astrophysical Observatory, 64 reports on the Harriman Alaska expedition, and 812 reports of the American Historical Association.

The Institution carries out one of its chief functions, the "diffusion of knowledge," by means of its various series of publications. They embrace the results of investigations and systematic studies in nearly every branch of natural science, and are distributed, in most cases free of charge, to important libraries, educational institutions, and scientific establishments throughout the world. In order to assist in creating a greater popular interest in scientific matters, the annual report of the Institution has always contained a general appendix consisting of a large selection of authentic, semipopular articles reviewing recent advances in every branch of scientific activity. There is a widespread and growing demand for this publication, showing an increased appreciation of the value of science and scientific investigations.

Besides the annual report, the Institution issues two series of publications, the Contributions to Knowledge and the Miscellaneous Collections. The publications of the National Museum and the Bureau of American Ethnology are mentioned in the reports of those branches appended hereto.

Of the series of Smithsonian Miscellaneous Collections, 9 papers were issued during the year, among them one paper by your secretary in the series on Cambrian Geology and Paleontology, and the usual annual pamphlet describing and illustrating the various scientific expeditions sent out or cooperated in by the Smithsonian Institution.

Allotments for printing.—The congressional allotments for the printing of the Smithsonian reports and the various publications of the branches of the Institution were practically used up at the

close of the year. The allotments for the coming year ending June 30, 1923, are as follows:

For printing and binding the Annual Reports of the Board of Regents, with general appendixes, the editions of which shall not exceed 10,000 copies.....	\$10,000
Under the Smithsonian Institution: For the annual reports of the National Museum, with general appendixes, 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 the annual report of the National Gallery of Art and for printing catalogues, labels, and blanks.....	1,000
For miscellaneous printing and binding:	
The International Exchanges.....	200
The International Catalogue of Scientific Literature.....	100
The National Zoological Park.....	300
The Astrophysical Observatory.....	300
For the annual report of the American Historical Association.....	7,000
	77,400

Provided, That the expenditure of this sum shall not be restricted to a pro rata amount in any period of the fiscal year.

Committee on printing and publication.—The purpose of the Smithsonian advisory committee on printing and publication is to make recommendations regarding the merit and suitability of all manuscripts submitted for publication by the Smithsonian Institution or its branches and also to consider all other matters relating to printing and binding under the Institution. During the past year eight meetings were held and 100 manuscripts acted upon. The membership of the committee is as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, chairman; Dr. George P. Merrill, head curator of geology, National Museum; Dr. J. Walter Fewkes, chief, Bureau of American Ethnology; Mr. N. Hollister, superintendent, National Zoological Park; and Mr. W. P. True, editor of the Smithsonian Institution, secretary.

LIBRARY.

The facilities of the library have been taxed to the utmost. The number of loans for the fiscal year amounted to 14,436, and as many more books and periodicals were consulted without being taken from the buildings. Interlibrary loans to accredited libraries, where distance permits, are being continued, and in a number of instances arrangements have been made for the photostating of pages from rare volumes not permitted to leave the library.

Each day typewritten lists of original articles appearing in scientific periodicals received for the Smithsonian deposit in the Library of Congress are prepared and circulated among the heads of scientific bureaux under the Institution. These daily bibliographical lists, begun last November at the request of Secretary Walcott, have been well received from the start. Requests have come in for copies from other Government bureaux and research organizations, which it has not been possible to comply with, owing to lack of necessary equipment for the preparation of additional copies. The library now possesses more than a million volumes, pamphlets, manuscripts, and charts, there being 888,128 publications deposited in the Library of Congress, 156,275 belonging to the National Museum, and 35,000 belonging to other branches of the Institution. The number of additions for the fiscal year was 15,796.

As noteworthy additions to the various branch libraries might be mentioned that of the *Göttingische Gelehrte Anzeigen* for 1758, 1760, 1808, 1813, and 1814 to the Smithsonian deposit, by gift of the *Gesellschaft für Wissenschaften zu Göttingen*; *Serindia*, by Sir Aurel Stein, to the office library, at present deposited in the Freer Building, the gift of the Secretary of State for India; and the second and third volumes of Beebe's *Monograph of the Pheasants*, added to the library of the National Zoological Park.

NATIONAL MUSEUM.

The year has been an unusually busy one for the Museum, but although of late years its activities have greatly increased and its scope widely extended, the appropriation for its maintenance has remained practically the same for the past 11 years. Much credit is due the members of the Museum's staff for the fine results recorded from year to year. Undoubtedly the most important event of the year was the receipt and installation of the Herbert Ward collection of African ethnologica and sculptures. This collection, one of the most important ethnological units in the world, was brought together by Herbert Ward, an Englishman, who was with Stanley on his famous exploring expedition through Africa. It consists of 2,700 ethnological specimens and 19 superb sculptures in bronze of African natives by Mr. Ward.

An actual beginning was made during the year toward establishing the Loeb collection of chemical types, noted in last year's report. Two specially constructed cabinets were received from the Chemists' Club of New York, and a portion of each of seven new chemical compounds discovered in the Department of Agriculture were deposited in the collection. It is planned to solicit all available new chemical material, with the view of eventually making of the Loeb collection a complete series for the use of investigators in chemistry.

The Museum acquired during the year a total of 359,677 specimens. These are described somewhat in detail in the report on the Museum, appended hereto, but it will be of interest to mention here a few of the more important accessions. In anthropology the most important addition was the Herbert Ward African collection mentioned above. A large collection of the brilliant ancient pottery from the ruins of Casas Grandes, Chihuahua, Mexico, was received through the Archeological Society of Washington, and a remarkable series of aboriginal pottery collected by Dr. J. Walter Fewkes in the neighboring Mimbres Valley, N. Mex., was also placed on exhibition. A number of pianos were added by Mr. Hugo Worch to his notable collection, among them a magnificent gilt harpsichord made by Pleyel, Paris.

In the department of biology the outstanding feature of the year's accessions is the collection of about 100,000 insects collected by Dr. William Mann in South America, especially eastern Bolivia. Another important collection of insects was that made by Dr. J. M. Aldrich in Alaska, which numbered around 10,000 specimens. A considerable consignment of biological material, mostly vertebrates, was received from Mr. Hoy, who has been working in Australia under the auspices of Dr. W. L. Abbott. This material brings the important Australian expedition to a most successful termination.

In geology a number of valuable additions were made to the collections, among them specimens of Bolivian tin and tungsten ores from Mr. F. L. Hess; rich examples of carnotite and hewittite presented by the Standard Chemical Co., Naturita, Colo.; eight gold nuggets donated by Mr. Frank Springer; a large mass of meteoric iron from Owen Valley, Calif., the gift of Mr. Lincoln Ellsworth, of New York; a number of beautiful and valuable gems purchased for the Isaac Lea collection through its endowment fund; and a considerable amount of paleontological material, both vertebrate and invertebrate.

The divisions of mineral and mechanical technology have devoted their time largely to a more perfect and permanent arrangement of the great amount of exhibition material already on hand, while the divisions of history, textiles, and graphic arts report many valuable and interesting additions to their collections.

In addition to the explorations and field work mentioned earlier in this report, the Museum sent out or cooperated in various other expeditions. Mr. Arthur de C. Sowerby continued his work in China under the auspices of Mr. Robert Sterling Clark, who generously contributed all the material collected to the Museum. A shipment of vertebrates and other biological material was received from this expedition during the year. Mr. Paul C. Standley,

through the cooperation of various agencies, spent five months in botanical collecting in El Salvador and Guatemala, bringing back over 6,000 specimens. Another botanical expedition, consisting of Dr. F. W. Pennell and Mr. E. P. Killip, was in western Colombia at the close of the year under the auspices of various scientific organizations. The purpose of the exploration was to study the flora and secure botanical specimens in this region, as one of a series leading up to a complete study of the flora of northern South America.

The auditorium and adjacent rooms of the Museum were used by numerous societies and organizations for meetings, congresses, and lectures. The Museum published during the year 9 volumes and 78 separate papers. These are described somewhat in detail in the "Report on publications," Appendix 10 of this report. The number of visitors to the National History Building during the year was 441,604; to the Arts and Industries Building, 262,151; and to the Aircraft Building, 46,380.

NATIONAL GALLERY OF ART.

Although the number of art works accessioned by the National Gallery during the year falls short of the average of recent years, nevertheless progress in the gallery's activities has been satisfactory. The greatest handicap to its work continues to be lack of exhibition space. It is believed that the falling off in number of accessions noted above is in part due to this shortage of space, as owners of valuable art works very naturally desire to see them adequately housed and exhibited. The urgent need of a suitable gallery for the national collections, already valued in the millions, will be readily understood when it is considered that until the past year the accessions to the collections were estimated at hundreds of thousands annually. If accessions are turned elsewhere on account of the lack of space to exhibit them, it is evident that in a few years the loss will amount to more than the cost of a building.

Among the accessions received during the year was a portrait of President Grant, by Thomas Le Clear, presented by Mrs. U. S. Grant, jr.; an oil painting entitled "The Signing of the Treaty of Ghent," by Sir A. Forestier, presented to the Smithsonian Institution by the Sulgrave Institution; a painting entitled "Tohickon," by Daniel Garber, provided through the Henry Ward Ranger bequest; and a portrait of Edwin H. Harriman, an artist's proof etching, one of 21 from the copper. A number of interesting art works were loaned to the gallery during the year, among them being 71 portraits in pastel, in a series of 22 life-size groups of Union and Confederate veterans of the Civil war, painted from life by Walter Beck, of Brooklyn, N. Y., 50 years after the Battle of Appomattox,

loaned by the artist through Mr. Walter M. Grant, of New York City.

Preliminary steps had been taken at the end of the year toward the acceptance of a rich collection of British masterpieces brought together by the late John H. McFadden, of Philadelphia. The collection comprises 44 notable examples of the work of nineteen British artists, and the acceptance of this valuable loan is regarded with much favor.

A number of paintings were acquired from the income of the Henry Ward Ranger bequest and assigned to various art institutions throughout the country. The terms of this bequest stipulate that any of the art works so acquired may be claimed during a certain period after the artist's death by the National Gallery of Art, remaining thereafter the property of the National Gallery. The selection and distribution of these purchases is entrusted to the National Academy of Design.

The income from the Bruce Hughes bequest is to be used to establish and maintain a section of the library of the National Gallery for reference works of art, to be known as the Hughes alcove. During the year the first purchases were made from this fund. An illustrated catalogue of the art works of the gallery was prepared and submitted to the printer during the year, but on June 30, 1922, had not been published. A lecture on the National Gallery, illustrated by 75 slides mostly in color, was prepared, and is to be placed at the disposal of persons throughout the country who desire to present it.

The first annual meeting of the National Gallery of Art Commission was held on December 6, 1921. Reports of the committees were presented and many important matters relating to the gallery were discussed, among them the urgent need of a National Gallery Building and the problem of the acceptance of proffered works of art.

FREER GALLERY OF ART.

Work during the year on the collections of the Freer Gallery of Art included chiefly the classification and cataloguing of Chinese, Japanese, and Tibetan paintings, Chinese tapestries, and Chinese and Japanese pottery; the preliminary classification of Korean pottery and Chinese and Japanese stone sculptures and jades; and the cataloguing of American paintings, drawings, and prints.

Progress has been made also on completing certain portions of the interior of the building and on the installation of the collections. Miss Grace Dunham Guest was appointed assistant curator on January 1, 1922, and Mr. Carl W. Bishop associate curator, April 9, 1922. Miss Guest sailed for Europe on June 24, 1922, to represent the Freer Gallery at the double centennial meeting of the Société Asia-

tique de Paris, and to study European collections of oriental art, especially ceramics.

BUREAU OF AMERICAN ETHNOLOGY.

The material culture and ceremonials of the American Indian are being modified so rapidly through contact with the white race that it is imperative for the bureau to make every effort to record all possible data bearing on the aboriginal Indian culture. The desirability of preserving this material so that accurate knowledge of this interesting and vanishing race may be available for future generations is evident. Another important line of endeavor is the excavating and repairing of prehistoric Indian dwellings. These ancient ruins are the object of great popular as well as scientific interest, and it is the aim of the chief of the bureau to continue this archeological phase of the work in so far as funds will permit.

A new line of investigation has opened up for the bureau during the year, namely, the study of the material culture, and especially the architecture of the houses, of the aborigines of Alaska. The early villages of the Alaskan Indians have in many cases been deserted in the exodus to the canning factories, and the totem poles and villages which are rapidly being destroyed by the elements should be preserved in the immediate future so that they will not be lost forever. During the spring of 1922, Dr. T. T. Waterman conducted for the bureau an extended reconnaissance of the situation, bringing back many interesting data and photographs. It is intended to continue the work next year with a larger appropriation.

The work in the field and in the office of the individual members of the staff is reviewed somewhat in detail in Appendix 4 of this report, so that it will be necessary here only to give an idea of the scope of the work. The chief continued his successful archeological field work on the Mesa Verde National Park, Colo., bringing to light a most interesting and instructive ruin which he has named "Pipe Shrine House" on account of the numerous tobacco pipes found on a shrine in the kiva of this ruin. He also excavated and repaired Far View Tower, a round structure 10 feet high, which was probably used for observations of the position of the sun on the horizon at sunrise and sunset, in order to determine the time for planting and other dates important for an agricultural people.

The chief also visited the three groups of towers in Utah which he has recommended for the Hovenweep National Monument, and determined the exact situation of these ruins as a preliminary to a presidential proclamation setting aside this area as a national monument.

Dr. John R. Swanton continued work on his dictionaries of the Hitchiti and Alabama languages. Mr. J. N. B. Hewitt devoted his time to a number of Chippewa and Ottawa texts, and in continuing the preparation of the second part of his work on Iroquoian Cosmology, the first part of which has already been published by the bureau. Mr. Francis La Flesche completed and turned in during the year the manuscript of the second volume of his publication on The Osage Tribe. Dr. Truman Michelson carried on field work among the Fox Indians of Iowa, paying special attention to the linguistic relations of this and neighboring tribes. Mr. J. P. Harrington completed his bulletin on the Kiowa language and conducted field work among the Indians of the Chumashan area of California, laying special emphasis on the place names, material culture, and language.

Under the head of special researches, the chief of the bureau describes the work of Miss Frances Densmore on Indian music. During the year she recorded songs among the Yuma, Cocopa, and Yaqui tribes, making a total of nine tribes among whom this work has been done. Mr. W. E. Myer investigated Indian sites in South Dakota and western Missouri known to have been occupied by the Omahas and Osages in early historic times after they had come in contact with the whites but before they had been changed thereby to any considerable extent.

Several other interesting special researches are reviewed in the appendix on the bureau, among them field work by Mr. D. I. Bushnell, Jr., on the Cahokia mounds in Illinois; by Mr. B. S. Guha, among the Utes and the Navaho at Towaoc, Colo., and Shiprock, N. Mex.; and by Mr. John L. Baer on pictographic rocks in the Susquehanna River.

INTERNATIONAL EXCHANGES.

During the year the number of packages of scientific and governmental publications sent abroad and received from foreign countries totaled 592,600 pounds. Although these figures show a decrease from the previous year, on account of the fact that shipments to Germany were resumed during that year and most of the material accumulated during the war was sent out, nevertheless there is an increase of 41,490 packages over the number sent out in 1914, the last year before the World War, showing that there is a steady growth in the work of the International Exchange service.

Exchange relations were reopened during the year with Rumania and Yugoslavia, the agencies in these countries being, respectively, the Institutul Meteorological Central at Bukharest, and the Académie Royale Serbe des Sciences et des Arts, Belgrade.

Relations were established also with the newly formed Governments of Esthonia, Far Eastern Republic, Latvia, Lithuania, and Ukrainia. Conditions in Russia and Turkey are not yet sufficiently settled to warrant the exchange of publications previously carried on between the United States and these countries.

The number of boxes shipped abroad during the year was larger than ever before, due largely to the opening of exchange relations with Yugoslavia and certain of the independent Russian States, the material for these countries having accumulated here for several years.

The regular schedule of shipments to foreign countries was resumed during the year. To Great Britain and Germany, shipments are made weekly; to France and Italy, semimonthly; and to other countries, monthly.

NATIONAL ZOOLOGICAL PARK.

The past year has been one of the most successful since the establishment of the park. The number of visitors exceeded 2,000,000; the collection of animals is larger and more important than ever before; a number of minor improvements have been completed and progress made on certain larger projects; and the reservation itself has been maintained in excellent condition. That the popularity of the park as a source of recreation and instruction continues unabated is shown by the fact that for the third consecutive year the attendance has exceeded 2,000,000, and its increasing value as a supplement to school-room instruction in natural history is demonstrated by the 205 schools and classes visiting the park during the year, with a total of 13,585 individuals.

The total number of animals on exhibition at the close of the year was 1,681, representing 482 species of mammals, birds, and reptiles. This is not only a larger number of individual animals than ever shown before, but also a larger number of different species. Among the 656 accessions received during the year, 217 were gifts. Among these may be mentioned two important collections from South America, one made by Dr. William M. Mann on the Mulford Biological Explorations of the Amazon Basin and presented by the H. K. Mulford Co. of Philadelphia, the other made by Mr. W. J. La Varre, jr., and presented by him. These two collections contain several species of South American monkeys and birds never before shown at the park. One hundred and fifty mammals, birds, and reptiles were born in the park during the year.

Under the heading of improvements the report of the superintendent mentions a large project of grading, leveling, and filling in the west central part of the park, which was practically completed

during the year. This work makes available for the exhibition of hoofed animals a large area of comparatively level ground. Also it will be possible to greatly improve the main automobile road through the park. Extensive repairs were completed on the antelope house and the older bear dens. Three large outdoor cages were built for certain birds, and many minor repairs were completed during the year. The most urgent need of the park is now a suitable restaurant building to accommodate the greatly increased crowds of visitors. The present small building is in bad condition and is entirely inadequate to meet the needs of the public. A suitable building could be erected, using lumber in the possession of the park and employing the regular park force, for about \$20,000. Another urgent need is for a new bird house, the old building, erected many years ago as a temporary relief, being in a very bad state of repair. Moreover, there is not sufficient space for the very valuable and interesting collection of birds and there is far too little room for visitors in the public aisles.

ASTROPHYSICAL OBSERVATORY.

The outstanding feature of the year's work was the publication of Volume IV of the *Annals of the Astrophysical Observatory*, a quarto volume of 390 pages, which covers in detail the work of the years 1912 to 1920. New instruments and methods of observing are described and a mass of solar observations is presented and discussed. Many kinds of evidence are given to show the solar variability, and reference is made to applications of the results which have been made by several meteorologists.

The observing station erected on Mount Harqua Hala, Ariz., through the generosity of Mr. John A. Roebing, has been much improved, owing to the zeal of Mr. A. F. Moore, in charge of the station. Solar constant observations were made on upward of 70 per cent of the days of the year. Comparisons made during and after a visit by the director show no change in the scale of pyrheliometry, so that the results from this station are comparable with those at Montezuma, Chile. Earlier in the year the director visited the station at Montezuma, where he revised all the adjustments of apparatus and some of the methods employed there.

In June the director and Mr. L. B. Aldrich proceeded to the Smithsonian station on Mount Wilson, Calif., where a beginning was made toward installing new "solar constant" apparatus to replace that removed to the new Arizona station in 1920. By anticipation it may be said that later results were secured on the distribution of energy in the spectra of 11 of the brighter stars by bolometric work in connection with the hundred-inch telescope, and

also that the solar-energy curve was traced bolometrically with both glass and rock-salt prisms. The solar cooking apparatus on Mount Wilson referred to in previous reports suffered the loss of the cover of the oil reservoir through a high wind, and snow having gotten in, much water had leaked into the oil reservoir. It proved impossible to remedy this condition soon enough to undertake the proposed new experiments before the expedition returned to Washington in September.

In order to get the opinions of competent critics as to the value of the Smithsonian solar radiation measurements, the director wrote to the American representatives of the International Astronomical Union as follows:

It is the intention of the Smithsonian Institution to continue daily observations at Mount Harqua Hala and Montezuma certainly until July, 1923, at which time it is proposed to consider the state of the work and the results reached with a view to deciding whether it is worth while to continue daily observations of the variability of the sun indefinitely or whether the usefulness of that work is unequal to the trouble and expense involved.

An expression of opinion on the part of those interested in the subject would be of great value to the Smithsonian Institution in making this decision.

At a meeting in Washington the American representatives unanimously indorsed the work of the observatory, and later at Rome the international representatives passed a resolution expressing the same opinion. In view of these impartial indorsements of the work, it is a pleasure to announce that Mr. John A. Roebing has made it possible to assure the continuation of the solar constant stations at Harqua Hala and Montezuma until July, 1925. By that time it will doubtless be evident from the data obtained whether they should be continued longer.

A movement is under way in Australia to establish a solar observing station there similar to the Smithsonian stations. The Meteorological Service of Argentina is also proposing to equip its station at La Quiaca for solar observations, and it is expected that during the next fiscal year two sets of solar constant apparatus will be prepared for the Australian and Argentine stations.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

In the statement last year regarding the International Catalogue of Scientific Literature reference was made to the very apparent need of cooperation between organizations publishing abstracts of scientific literature and the International Catalogue. This year in the annual report of the United States regional bureau suggestions are made for an even greater consolidation of bibliographical interests. Although the combination of interests suggested would make

a very large organization, there is nothing new or radical in the proposed move; it is simply an attempt to harmonize numerous plans and suggestions, all of which aim to supply aids to investigators and students in the at present difficult task of finding the published records of what has been done in the various fields of research.

The need of prompt and reliable aid is keenly apparent, and while in some subjects satisfactory aids are available in others they do not exist.

It now appears that the organization of the International Catalogue of Scientific Literature may be kept in working condition, although it is not yet possible to resume publication on account of financial conditions. Pending the resumption of publication it is felt that through the large number of regional agencies much constructive work may be done by using their influence and efforts in bringing about cooperation among similar organizations dealing with any of the subjects embraced within the scope of the International Catalogue.

NECROLOGY.

JOHN A. ELSTON.

John A. Elston, Representative in the Congress from California and Regent of the Smithsonian Institution since January 9, 1920, died in December, 1921. Although a member of the Board of Regents for such a brief period, Mr. Elston took a real and active interest in the affairs of the Institution.

JOSEPH B. LEAVY.

Joseph B. Leavy, philatelist in the National Museum since 1913, died July 25, 1921, after a lingering illness. Mr. Leavy was educated at Columbia University, and later entered into business, in which he continued for several years. He served in the Army during the Spanish War.

To him is due the credit for the excellent installation of the large collection of stamps in the Museum, which includes specimens of all new issues sent to the Post Office Department from various foreign Governments.

JAMES MOONEY.

James Mooney, ethnologist in the Bureau of American Ethnology, died on December 22, 1921. Mr. Mooney was born in Indiana in 1861, and became associated with the bureau in 1885, shortly after its organization by Major Powell. He remained a member of the staff from that time until his death.

Mr. Mooney was very widely read regarding the history of the aborigines north of Mexico, being equaled by few perhaps in this particular field. His information was most extensive, however, regarding the Indians of the southeastern woodlands and the Great Plains, and he was the leading authority on one tribe in each area, the Cherokee and the Kiowa. Several of Mr. Mooney's investigations published by the bureau are standard works in their special field.

He was one of the founders of the American Anthropological Association, a member and ex-president of the Anthropological Society of Washington, and a member of the Mississippi Valley Historical Association. Mr. Mooney's death brings to a premature close a notable scientific career.

THOMAS F. HANEY.

Thomas F. Haney, preparator in the National Museum for over 28 years, died October 8, 1921. During his service for the Museum, Mr. Haney constructed many difficult large-size models illustrating the occurrence, mining, and manufacture of various mineral resources. His skill and minutely detailed work in this field of educational exhibits will be greatly missed.

ANDREW L. FANT.

Andrew L. Fant, watchman, a faithful and efficient employee in the National Museum since 1893 and lieutenant of the watch force since 1903, died on October 6, 1921.

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, 1922.

The year, a busy one, was marked by the multiplicity of activities, and advancement is shown in a number of directions. As set forth in the last report, the Museum is receiving practically the same appropriation that it did 11 years ago, in spite of increased scope, additional collections, and advanced cost of all material and labor necessary to its maintenance. That the Museum attains the fine results recorded from year to year is owing, in large measure, to the personal qualities of the members of its staff, to whom much credit is due.

The organization and staff of the Museum have undergone no noteworthy changes; policy and plans have remained opportunistic in the absence of funds to enable them to be considered in advance.

Of prime importance this year was the receipt and installation of the Herbert Ward collection of sculptures of African natives and of African ethnological specimens. Like the bequest of James Smithson to the United States, this gift from a British subject to the American people is unique and deserves mention also as a wonderful representation of the native dignity of an aboriginal race, typical of all aborigines. Its installation is noteworthy as marking an advance in the display of such objects.

A beginning was made under the terms of the will of Dr. Morris Loeb for the establishment of the Loeb collection of chemical types in the National Museum. This collection forms a separate entity in the department of arts and industries. An advisory committee cooperates in its management, consisting of Dr. C. L. Alsberg, chairman; Dr. Victor Lenher, Mr. James K. Senior, Dr. G. C. Spencer, representing the Bureau of Chemistry of the Department of Agriculture; and Mr. F. L. Lewton, representing the Museum and in charge of the collection.

The two specially constructed storage cabinets were received from the Chemists' Club of New York City, and a portion of the original material of each of seven new chemical compounds, discovered and prepared in the Department of Agriculture, were transferred to the

Loeb collection. The members of the committee have offered to solicit additional original chemical material for the series. Arrangements were made with trade journals for advance notice of the publication of new chemical compounds, in order to facilitate prompt solicitation.

Steps were taken to have greater use made of the facilities afforded Washington by the National Museum. Through arrangements with the authorities of the public schools of the District of Columbia the Museum, when notified in advance, furnishes expert guidance by a member of its staff to scholars and teachers visiting its halls. In some instances such visits have resulted in further work along similar lines after the return to their school buildings and on several occasions have been followed by talks to the students in their classrooms by members of the staff of the Museum. Through cooperation with the Wild Flower Preservation Society of America, the Audubon Society of the District of Columbia, and the American Forestry Association, the Museum arranged a series of six Saturday morning lectures in the auditorium of the Museum for honor pupils of the seventh and eighth grades of the public schools, and the American Forestry Association awarded blue ribbons for the best bird houses submitted by the pupils.

The schools of Washington, in common with the higher educational establishments of the country, have long shared the benefits of the duplicate specimens distributed by the Museum for educational purposes, and this year was no exception.

The value of the Museum to the commercial interests of the National Capital, as well as to its educational interests, was demonstrated by a series of lectures by the curator of textiles given to several groups of employees handling textiles in one of the large department stores of the city, who, at the solicitation of their firm, came to the Museum during business hours for the purpose.

The influence of the Museum in education is being felt outside its immediate vicinity, through the large delegations of students visiting it annually, often as part of their courses of instruction, and also through its assistance in the preparation of textbooks. Photographs and essential data of the exhibits pertaining to the mineral industries were supplied to the Pennsylvania State Board of Education, and to other inquirers.

President Harding, on October 24, 1921, under authority of the legislative, executive, and judicial appropriation bill for the fiscal year ending June 30, 1913, directed the Bureau of Efficiency to prescribe a uniform system of employee ratings for all departments, and requested the heads of the departments to put the system into effect. Ratings were first to be established for employees engaged

in clerical or routine work, such as clerks, stenographers, bookkeepers, messengers, and skilled laborers, and afterwards to be extended to employees engaged in professional, scientific, technical, administrative, or executive work, or any other work involving for the most part original or constructive effort. This was inaugurated by a survey of all the positions existing in the Museum on November 15, 1921, carefully prepared and submitted to the Bureau of Efficiency. An initial report on the efficiency of each employee was made dating May 15, 1922, and similar reports are to be made every six months hereafter. The installation of this system added considerably to the duties of the officials of the Museum.

The changing of the system of keeping Government accounts, to make the items of expenditure identical in all Government offices, whether large or small, likewise, temporarily at least, added to the work this year in the administrative office. Efforts were also made toward unifying other business methods of the Government offices generally, as to the handling of supplies, traffic matters, etc.

BUILDINGS AND EQUIPMENT.

The National Museum completely occupies two large and two small buildings, besides considerable space in two other structures. The combined floor space is approximately 670,000 square feet. To keep these buildings in repair requires all the available appropriation, so that radical changes in arrangements, however much needed, are almost impossible. This year by the removal of one partition and the erection of another, two small exhibition halls were added to the floor space for the display of specimens in the Arts and Industries Building, though the storage space was correspondingly diminished. Other repairs consisted, as usual, of repainting of walls and ceilings in places where most needed, the replacing of certain worn-out floors, and repairs to roofs, gutters, etc. The hot-water heating system was extended to the concrete building in the east court of the Natural History Building, replacing the temporary heating arrangements installed there when the structure was erected during the World War.

In the Natural History Building a thorough investigation was made of the dome and the great piers supporting it. The slight displacement of the stone arches which span the piers, the opening of joints at the end of the balustrades under these arches and in the fourth-story floor at the ends of the piers, have been brought about by a movement at the upper end of the piers, doubtless caused by the eccentric application of the weight of the dome. The piers are fully braced by a large number of steel beams to the walls of the building and, since the walls are successfully resisting the pressure from the piers, the movement of the latter, it is believed, will

probably not proceed much farther. Careful observations and measurements will, however, be made at intervals of a few months to determine if any further displacement occurs.

By the acquisition of 37 exhibition cases and 116 pieces of storage, laboratory, and office furniture, there were on hand at the close of the year 3,679 exhibition cases and 11,572 pieces of storage, laboratory, office, and other furniture, besides 83,500 drawers, trays, boxes, and wing frames.

COLLECTIONS.

The total number of specimens acquired by the Museum during the year was approximately 359,676. Additional material to the extent of 995 lots, chiefly geological, was received for special examination and report. Nearly 20,000 specimens were lent to specialists for study, mainly on behalf of the Museum, and about 33,000 specimens were sent out in exchange, for which the Museum received valuable material. Over 10,000 duplicate specimens were used as gifts to educational establishments. Of these nearly half were contained in regular sets of labeled material previously prepared for shipment, and the remainder comprised specially selected lots to meet particular cases. The duplicates were chiefly fossil invertebrates, minerals, and ores, material illustrating rock weathering and soil formation, miscellaneous geological material, mollusks, and marine invertebrates, with smaller lots of specimens from the collections of insects, mammals, fishes, birds, archeology, ethnology, textiles, physical anthropology, and wood technology.

Anthropology.—Collections in unusual number and of scientific value were received by the department of anthropology. Especially worthy of praise is the Herbert Ward African collection, heretofore mentioned, given to the Museum by Mrs. Herbert Ward. This collection, forming one of the most important ethnological units in the world, was begun by Herbert Ward in Africa during the first great period of exploitation by Livingstone and Stanley. It consists of 2,700 specimens of African ethnologica and is illustrated by 19 superb sculptures in bronze by Mr. Ward. The whole collection is displayed to advantage in the halls of ethnology in the Natural History Building.

Through the friendly offices of the Archæological Society of Washington, the division of American archeology received a large collection of the brilliant ancient pottery from the ruins of Casas Grandes, Chihuahua, Mexico. The remarkable aboriginal ceramics collected by Dr. J. Walter Fewkes in the neighboring region, the Mimbres Valley, N. Mex., were placed on public view. From the National Geographic Society's expedition in Chaco Canyon, N.

Mex., conducted by Mr. Neil M. Judd, considerable material was forwarded.

An ornate gilt bronze statue of Buddha from the Imperial Palace at Peking, containing rolls of inscribed prayers, was received by the division of Old World archeology from Maj. Murray Warner through Mrs. Gertrude Bass Warner, of Eugene, Oreg.

Mr. Hugo Worch has added a number of pianos to his collection, and especially noteworthy is a magnificent gilt harpischord made by Pleyel, Paris, France. The collection of violins bequeathed to the Museum under the terms of the will of Dwight J. Partello was lost to the Museum, as it was found that through a previous bill of sale the collection belonged to one of his daughters.

In art textiles mention should be made of a collection of specimens of lace of high class, a permanent deposit by Miss Emily G. Storrow. In ceramics a selection of American art pottery was supplied for the exhibit of the National Gallery of Art.

A special exhibit of tiles made in the United States and assembled by the Associated Tile Manufacturers to illustrate the result of 44 years' development of an American industry was shown from May 16 to June 20, 1922, in two rooms off the foyer in the Natural History Building.

Biology.—From the numerical standpoint the collections of the department of biology show less uniform and healthy growth than during the fiscal year 1921. The actual number of specimens received, 318,950, represents, it is true, an increase over the previous year, but this increase is only 67,437, while the year 1921 showed an increase of no less than 114,720 over its predecessor.

Together with the decrease in relative increment has gone a general decrease in the scientific importance of the new accessions. Three curators regard this importance as increased over that of the previous year's accessions, but only one of these (insects) feels called upon to express enthusiasm. Of the six others five report essentially stationary conditions and one (fishes) a falling off.

The great outstanding feature among this year's accessions is the collection of about 100,000 insects of all orders, made by Dr. William M. Mann in South America, chiefly in eastern Bolivia. In Alaska another unusually important collection of insects was obtained by Dr. John M. Aldrich. The final consignment of Mr. Hoy's Australian material (mostly vertebrates) presented by Dr. William L. Abbott, brings the important and successful Australian expedition to a close.

The National Herbarium through cooperation with the Department of Agriculture acquired the very large private herbarium of Dr. Otto Buchtien of over 45,000 specimens, rich in material from

Bolivia, Chile, and Paraguay, the Bolivian flora being particularly well represented.

Many other smaller collections were received, including mammals from Alberta and plants from British Columbia collected by Secretary and Mrs. Walcott.

The work of remedying defects in the biological exhibition has been practically confined to the mammal halls. Good progress has been made in routine curatorial and preparatorial work in the various collections, but everywhere this work is suffering from the insufficiency of space and of personnel.

Geology.—A satisfactory increase in the geological collections is noted, although the accessions number slightly less than last year, 217, with an aggregate of 23,504 specimens being recorded.

Valuable additions were made to the collections of Bolivian tin and tungsten ores by Mr. F. L. Hess; rich examples of carnotite and hewettite, the best thus far found in the United States, were acquired through the generosity of the Standard Chemical Co., Naturita, Colo.; and large uranophane-bearing sandstone specimens were presented by Mr. John J. Bonner, Lusk, Wyo. Gold nuggets, eight in number, the largest weighing $4\frac{1}{2}$ ounces, from the Maxwell Land Grant, N. Mex., were donated by Dr. Frank Springer, and Hon. Holm O. Bursum presented examples of torbernite, a radium-bearing mineral from White Signal, N. Mex. Other gifts to the economic collections include examples of diamond-bearing rock from Pike County, Ark., and slabs of building stones supplied by various dealers.

The most notable addition to the meteorite collection is the magnificent mass of iron from Owens Valley, Calif., gift of Mr. Lincoln Ellsworth, New York City. Examples of other falls and finds, 10 in number, either new to the collection or hitherto poorly represented, were acquired chiefly through exchanges.

The mineral collections were benefited through gifts which include at least three exhibition specimens. Large fine crystals of colemanite, donated by Mr. W. S. Russell, Los Angeles, an attractive specimen of cuprite showing deep red crystals on native copper, by Dr. R. O. Hall, San Jose, Calif., and a zoned rhodenite of unusual form, by Col. Washington A. Roebling, Trenton, N. J., are notable among these. Valuable foreign minerals were acquired through exchange; type materials were transferred by the United States Geological Survey; a series showing the effect of radium rays on the color of minerals, beryl crystals from Brazil, and examples of nesquehonite, demantoid garnet, and other forms from Italy were acquired by purchase; and interesting collections were made in the field by the assistant curator. Gems of beauty and value have been added to the Isaac Lea collection through its endowment fund,

including a series of uncut diamonds from the mines of the Arkansas Diamond Corporation, Murfreesboro, Ark.; a unique cut gem of orthoclase from Madagascar; a blue zircon from Australia; and a series of fresh-water pearls from the rivers of the Mississippi Valley. A number of individual gifts are also recorded.

Paleontological material was received from Mexico, Central and South America, India, and several European localities, these being chiefly Mesozoic and Cenozoic, while numerous collections from Paleozoic rocks of the United States and Canada were made by the curator or presented by interested friends. Unusually well preserved cetacean remains obtained in the Miocene deposits along Chesapeake Bay; valuable reptilian material acquired by exchanges; skulls and bones of extinct buffaloes, presented by the John A. Savage Co., Crosby, Minn.; and remains of the Beresovka mammoth, are among the notable accessions of vertebrate material.

Mineral and mechanical technology.—In the division of mineral technology attention was confined entirely to a more permanent and complete arrangement of the exhibits already on hand, and new material consisted chiefly of photographic transparencies which were installed in the respective exhibits to which they referred. Apart from this work, the division was chiefly engaged in cooperative educational work with the Pennsylvania State Board of Education through Mr. Samuel S. Wyer, of Columbus, Ohio. The plans of the State Educational Board call for revision of the seventh-grade geography course to include the study of the State's mineral resources. The extent of the division's cooperation may be judged from the fact that it has supplied a considerable amount of the data for text and illustrations from the models of the many mineral industries exhibited in the Museum.

The division of mechanical technology was extremely busy, primarily, in regrouping its collections and rearranging objects in the collections so as to tell a story rather than merely represent a period in development, in an endeavor to impress the student with the significance of the material rather than its mere existence; and, secondarily, through the receipt of over 100 per cent more objects than were received the preceding year. In the line of special investigations, those inaugurated last year, particularly with regard to the developments in aeronautical engineering, were continued.

Textiles, wood technology, foods, and medicine.—The collections under the supervision of the curator of textiles, which, besides textiles, embrace wood technology, food, medicine, and miscellaneous organic products, were increased by many gifts and by transfer and loan of property from other Government bureaus amounting to nearly 3,000 objects. The most important of these are as follows:

From the Department of Commerce, several hundred specimens of industrial raw materials not heretofore represented in the collections, which had been sent to the department by American consular offices and trade commissioners for the purpose of encouraging foreign commerce. There were added by gift beautiful specimens of silks, fur fabrics, and drapery textiles contributed by American manufacturers to show the progress of textile industries in this country.

To the collections arranged to show the importance of wood and the industries based upon the use of that raw material, there were added two series of specimens illustrating the manufacture and use of sulphite wood pulp for writing papers, one showing in detail the steps in the process, and the other the exact quantities of each ingredient entering into 100 pounds of finished paper; also exhibits showing the importance and uses of American walnut, many examples of articles turned from wood, and specimens of laminated wood wheels for motor vehicles.

The collections in the division of medicine were enlarged by extensive series of specimens showing the manufacture of surgical dressings, pills, plasters, surgical ligatures, and clinical thermometers; specimens of essential oils and related aromatic substances; important alkaloids and alkaloidal salts used in medicine; and a series of charts showing the treatment of rabies, typhoid fever, and whooping cough.

Graphic arts.—The specimens acquired in the division, while less than half in number, are still fully as important, artistically and technically, as the 1920-21 specimens. The most important individual gift was that of the sixteenth century methods of making type, in which all the specimens were made by or prepared by Mr. Dard Hunter, Chillicothe, Ohio. Mr. Hunter himself made the punches, struck the matrices, and cast the type. This is one of a series consisting of printer's ink, paper, and type making, which, with the promised modern methods of type making, will be about complete. Several gifts combined have greatly improved both the technical and historical series of collotype. The Campbell Art Co., of Elizabeth, N. J., gave a valuable and instructive technical exhibit of color printing, and beautiful examples of the process were also furnished by Foster Bros., of Boston, the Medici Society of America (Inc.), and by Rudolf Lesch, of New York City. These are examples of the finest collotype work being produced to-day, and make an excellent showing of this process of photomechanical reproduction. A new process for reprinting books has been developed by the Polygraphic Co., of Berne, Switzerland, who donated a complete exhibit. In this so-called Manul process the negative is ob-

tained upon a sheet of very thin paper without the use of a camera or lens.

The series of pictorial photographs collected this year, over 100 in number, is a very important collection of artistic photography representing 17 of the foremost pictorial photographers of the world. The successful collection of this material was largely due to efforts and suggestions of Mr. Floyd Vail, of the New York Camera Club. The gift by Maj. Murray Warner through Mrs. Gertrude Bass Warner of 42 autochromes, the work of Major Warner, deserves mention, as they preserve the wonderful color schemes of the Panama-Pacific Exposition, as well as being fine specimens. A loan from Mr. Earle W. Huckel, of Philadelphia, of several printed books contains one dated 1497, *Theology*, by Lockmayer, which is the earliest book in the division; also a beautiful book from the famous Moretus Press dated 1696. The most beautiful example of presswork and typography shown is a copy of *The Well at the World's End*, printed by William Morris at the Kelm-scott Press in 1896:

Many small and individual objects have augmented various series, adding to their extent and beauty, as, for example, two beautiful water colors by Mr. W. H. Holmes, Director of the National Gallery of Art, and a black and white original, loaned by Franklin Booth.

One hundred photographs of snow crystals, by Mr. W. A. Bentley, form a valuable addition to the technical collections. A notable loan exhibit of artistic photography, the work of Mr. Floyd Vail, was shown for two months and attracted much attention.

History.—During the past fiscal year, the historical collections have received a number of additions of more than usual interest and importance. These include the following: The American flag, which, after receiving military honors in the Sorbonne in the presence of President Poincaré, was flown with a French flag at the summit of the Eiffel Tower and saluted with 101 guns, April 22, 1917, in celebration of the entry of the United States into the World War on the side of the Allies. This flag was presented by the French ambassador, M. Jusserand, to President Harding at the White House on Decoration Day, May 30, 1922, and deposited in the Museum by the President. A series of very handsome silk American flags, presented to Gen. John J. Pershing in recognition of his services as commander-in-chief of the American Expeditionary Forces in France during the World War and loaned to the Museum by him. Two sectional relief maps of northern France, one made of papier-mâché and one of plaster, presented by Marshal Haig and Marshal Petain, respectively, to the Hon. Medill

McCormick, and by him presented to the Museum. The first of these consists of eight sections, 22 by 27 inches in size, showing when united the territory bordering the British battle front from Dunkirk to Amiens. The second consists of 111 sections, each 19 by 25 inches, and shows the region of the French front from Vermand to Courgenay, in great detail. Another relief map of much importance is one received from the United States Marine Corps, showing the region about Belleau Wood. The numismatic collections relative to the World War have been increased by a number of examples of the medals and decorations issued in the United States and European countries during the war.

The original historical collections have been increased by a sword carried during the War of the Revolution by General Washington, a cane bequeathed to him by Benjamin Franklin, and a sword owned by Gen. Andrew Jackson. These three objects were transferred to the Museum from the Department of State by joint resolution of Congress approved February 28, 1922. From the same department by transfer was received the small writing desk used by Thomas Jefferson when he drafted the Declaration of Independence in Philadelphia in 1776, which bears a memorandum in his own hand attesting to its history. A single addition was made during the year to the collection of costumes worn by the mistresses of the White House. This was the dress worn by Mrs. Andrew Jackson, jr., on the occasion of a reception given at the White House in her honor in 1831, and lent to the Museum by Mrs. Rachel Jackson Lawrence, of the Hermitage Association.

Work on the collections.—The care and preservation of the collections require a large proportion of the energies and time of the scientific staff and present many difficulties to be surmounted. In ethnology, the installation of the Herbert Ward collection led to a recasting of the African collection generally. The conditions hampering the development of the biological exhibition since the later years of the World War have continued, making it impossible to do more than remedy special defects as opportunity presented. A general overhauling of the unmounted larger cetacean material has placed this series in a condition to be used for the first time in many years. Commendable progress is reported in the care of the geological collections, though comparatively few new exhibits were installed.

The assignment of the entire east gallery of the Arts and Industries Building for the use of the division of medicine necessitated a complete rearrangement of all the cases and the installation of a number of new exhibits. In the division of mechanical technology a complete inventory was made of the collections, the Museum catalogues as far back as 1876 being carefully examined and checked

with the specimens. The collections of graphic arts on display in the Smithsonian Building were rearranged so that exhibits of a kind, both historical and technical, are located near together for easy examination.

The classification of the collections by members of the staff has produced the usual amount of research work on the material intrusted to their care; and the usual generous cooperation of outsiders has been of the utmost assistance in enhancing the scientific value of the collections. The total number of papers by members of the staff, or based partly or wholly on National Museum material by outsiders, published during the year is 332.

EXPLORATIONS AND FIELD WORK.

From the standpoint of exploration and expeditions, the year just completed shows very little improvement over 1920-21. The work carried on by various other governmental agencies, particularly by the United States Geological Survey, the Bureau of Fisheries, the Biological Survey of the Department of Agriculture, and the Bureau of American Ethnology has, as usual, resulted in important material for the national collections.

The number of expeditions contributing material to the department of biology, according to the reports of curators, was 18, of which no less than 10 were both financed and directed by outside friends and correspondents, 7 were financed by others and partly or wholly directed by members of the staff of the Museum, while only 1 was entirely controlled by the Museum. In the department of geology, extensive field work was confined entirely to the division of paleontology.

Besides the field work described here, a number of other expeditions in which the Museum was interested are mentioned in the first part of this report under the heading "Explorations and researches."

The work of Mr. Arthur de C. Sowerby in China, interrupted by the World War, was resumed, a shipment of specimens from the Province of Fukien being received. The expenses of this work are met by Mr. Robert Sterling Clark, who generously contributes all the material to the Museum. Special effort is being directed to securing vertebrates from southern and other parts of China not hitherto represented in the national collections.

Dr. William M. Mann, while attached to the Mulford Biological Exploration of the Amazon Basin, collected a large number of insects and some miscellaneous material of other kinds. This expedition was organized by the H. K. Mulford Co., of Philadelphia, under the direction of Dr. H. H. Rusby, chiefly for the purpose of studying drug plants, but also for making general biological collections. By invitation, Doctor Mann was attached as entomologist and assistant

director and during the last 3 of the 10 months of the expedition was in charge, on account of the illness of Doctor Rusby.

Dr. Paul Bartsch continued his experiments in heredity on land mollusks of the genus *Cerion*, under the joint auspices of the Smithsonian Institution and the Carnegie Institution of Washington. He has been working upon a survey of the distribution of the native species in the Florida Keys. By the use of a seaplane, detailed for the purpose by the Navy Department, Doctor Bartsch was able in four days to fly at low altitude over the entire region and note on charts all the visible grass plots—the habitat of the *Cerions*. It will now be possible by means of the charts to examine the native colonies without loss of time in locating them. Mr. John B. Henderson, Regent of the Smithsonian Institution, made a rather hurried trip to Jamaica to personally collect living specimens of the Helicid genus *Thysanophora* for anatomical study toward a proposed monograph of the group. This little expedition proved unusually successful and of great benefit to the work in hand, as well as to the mollusk collections.

Mr. Paul C. Standley carried on botanical exploration in Central America, through cooperation with the Gray Herbarium, the New York Botanical Garden, the Bureau of Plant Industry of the Department of Agriculture, and Mr. Oakes Ames, the latter being interested in the orchids of this region. About five months were spent in El Salvador, and nearly a month in Guatemala. The collections, over 6,000 botanical specimens, will be divided among the contributing institutions.

Another botanical expedition was in the field at the close of the year. Dr. F. W. Pennell, of the Philadelphia Academy of Natural Sciences, accompanied by Mrs. Pennell, and Mr. E. P. Killip, of the Museum, is conducting a six months' exploration of western Colombia, on behalf of the Gray Herbarium, the New York Botanical Garden, the Philadelphia Academy of Natural Sciences, and the Museum. Mr. Oakes Ames is contributing also to the expense of the expedition. This is one of a series toward a complete study of the flora of northern South America.

The biological expedition alluded to as the only one under the exclusive control of the Museum was a trip to the interior of Alaska undertaken by Dr. John M. Aldrich, associate curator of insects. The Alaska Engineering Commission of the Department of the Interior furnished Doctor Aldrich with horses and their subsistence and with transportation on the Alaskan Railroad. About 10,000 specimens were collected, consisting mainly of Diptera and Hymenoptera, with a fair number of Hemiptera.

The expedition of the Museum of the American Indian (Heye Foundation) to New Mexico under Mr. F. W. Hodge furnished

valuable skeletal material, as has been the case for several years past. The exploration of Pueblo Bonito in the Chaco Canyon, N. Mex., by the National Geographic Society under the direction of Mr. Neil M. Judd during the summer of 1921 was largely preliminary. The exploration will be continued through a number of seasons and the collections are to become the property of the National Museum.

Early in the year Mr. F. W. Foshag collected minerals from interesting cave deposits in the Grand Canyon, near Supai, Ariz., a project made possible through the courtesy of Mr. C. A. Heberlein, operating in the region. Mr. Foshag also made field trips to southern California and Nevada in connection with research work at the University of California, the results of which were likewise added to the national collections.

Doctor Bassler spent his vacation in July, 1921, in geological field-work in the central basin of Tennessee, under the auspices of the Geological Survey of that State. The field offered such opportunities that arrangements were made for another summer's work in the same general area. During the greater part of June, 1922, therefore Doctor Bassler, in company with Dr. E. O. Ulrich and Mr. R. D. Messler, of the United States Geological Survey, was occupied in making stratigraphic sections and collecting fossils over the entire central basin, an area of about 8,000 square miles. The ultimate object of this work is the preparation of a monograph on the stratigraphy and paleontology of Tennessee. On the completion of his work in Tennessee, in 1921, Doctor Bassler proceeded to Springfield, Ill., where casts of type specimens in the State museum collections were made, in accordance with the department's plan to complete so far as possible the representation of type specimens in the national collections. Through the courtesy of Mr. E. J. Armstrong, of Erie, Pa., Doctor Bassler visited all the classical Silurian and Devonian localities in northwestern Pennsylvania and western New York during the latter part of September to obtain field knowledge of the detailed geology and to collect carefully selected sets of fossils illustrating the numerous formations of the region. The work was highly successful, and the large collections of Devonian fossils in the Museum concerning which exact stratigraphic data have been lacking can now be determined and arranged in necessary detail.

Dr. E. O. Ulrich, of the United States Geological Survey, spent the summer of 1921 in continuation of his field researches on the early Paleozoic rocks of eastern North America, and previous to joining Doctor Bassler in Tennessee, as noted above, studied the Silurian stratigraphy of Pennsylvania and Maryland. Mr. N. H. Boss made several short trips collecting in the Miocene deposits

along the Chesapeake Bay, all of which were under the auspices of the National Museum. These trips were unusually productive in the recovery of well-preserved cetacean remains.

Dr. George P. Merrill did a little work on his own initiative while in Maine on a vacation, and Mr. Shannon on a two-day trip to Port Deposit and Conowingo, Md., and Peach Bottom, Pa., visited a number of commercial granite, feldspar, talc, and slate mines and quarries.

MEETINGS, CONGRESSES, AND RECEPTIONS.

The Museum is seldom able to arrange regular lecture courses, but it does diffuse much knowledge through the lectures and proceedings of the various governmental, scientific, and educational agencies using its meeting facilities. The auditorium and adjacent council rooms afforded accommodations during the year for about 150 meetings, covering a wide range of subjects.

The governmental agencies availing themselves of these opportunities included the State Department, the War Department, the Treasury Department, the Department of Agriculture, the Department of Labor, the Interdepartmental Social Hygiene Board, and the Federal Power Commission. The scientific and technical groups included the National Academy of Sciences, the National Research Council, the American Relief Administration, the International Association for Identification, the American Surgical Association, the American Federation of Arts, the Wild Flower Preservation Society of America, the National Association of Postmasters of the United States, the National Association of Office Managers, the Liberty Calendar Association of America, the George Washington Memorial Association, the Committee on the Baird Memorial, the Organizing Committee of the Nineteenth International Congress of Americanists, the Anthropological Society of Washington, the Archaeological Society of Washington, the Audubon Society of the District of Columbia, the Biological Society of Washington, the Chemical Society of Washington, the Entomological Society of Washington, the Federal Photographic Society, the Organization of Appointment Clerks, the Philosophical Society of Washington, the Shakespeare Society of Washington, and the Washington Academy of Sciences. The educational and miscellaneous agencies included the American University; the School of Foreign Service and the School of Medicine of the Georgetown University; the Federation of Citizens Associations; the General Federation of Women's Clubs; the Potomac Garden Club; the George Washington Post No. 1, American Legion; the Matrons and Patrons Association of 1922, Order Eastern Star; the Smithsonian branch of the Federal Employees Union No. 2; the

Smithsonian Auxiliary of the District of Columbia Chapter of the American Red Cross; and the Smithsonian Relief Association.

The Museum was the scene of several receptions, the first being probably the largest, the most elaborate, and the most successful affair of its kind ever held in the Museum. This was the reception on November 23, 1921, by the city of Washington, through the Commissioners of the District of Columbia and a committee of citizens, to the delegates to the International Conference for the Limitation of Armament, when some 5,000 persons representing the official, social, and business life of Washington showed respect to the delegates to that conference.

On the evening of February 18, 1922, an informal reception and private view of the collection of Chihuahua pottery, loaned to the Museum by the Archæological Society of Washington was held in the public exhibition halls on the first floor. This was preceded by a lecture in the hall below by Dr. Hamilton Bell, on the Sculpture of Japan, under the auspices of the Archæological Society.

Another reception, on April 24, formed part of the program of the annual meeting of the National Academy of Sciences. This was in honor of Dr. and Mrs. H. A. Lorentz, of Leiden, and followed a lecture in the auditorium by Doctor Lorentz on Problems of Modern Physics.

A function which brought to the Museum representatives of the diplomatic corps and others was the formal presentation to the American Nation, on March 1, of the Herbert Ward collection of sculptures and African ethnology. In the northeast corner, first story, of the Natural History Building, surrounded by the works of her gifted husband and his unrivaled collection illustrating the handicrafts of the native African, the presentation was made by Mrs. Ward, and the donation accepted by Vice President Coolidge as chancellor of the Institution.

MISCELLANEOUS.

The publications issued by the Museum comprised 9 volumes and 78 separate papers. The Museum distribution of volumes and separates to libraries and individuals aggregated 97,806 copies. This, however, by no means indicates the number of its publications put in circulation during the year, for one of the separates of the Proceedings, on the Mosquitoes of the United States, issued in June, proved so popular that the War and Navy Departments arranged through the Superintendent of Documents for liberal distributions of the paper, and the Bureau of Public Health reprinted it.

The library received 2,023 volumes and 4,185 pamphlets, mainly through gifts and exchanges, bringing the Museum collection up to

60,681 books and 95,594 pamphlets. Typewritten lists of original articles appearing in scientific periodicals reaching the Institution for the Smithsonian deposit at the Library of Congress have been circulated among the head curators of the Museum for their information and dissemination among the staff generally. There is a demand from other Government departments and research organizations for copies of these lists which the Museum is unable to supply, through lack of mechanical equipment and assistants.

The number of visitors to the Natural History Building was 441,604; to the Arts and Industries Building, 262,151; to the Smithsonian Building, 83,384; and to the Aircraft Building, 46,380. All the Museum exhibition halls are open free to the public every weekday in the year. In addition those in the Natural History Building are open every Sunday afternoon, and this year those in the Smithsonian Building were open on Sunday afternoons in April. All the Museum offices and exhibition halls were closed, however, on November 11, 1921, on account of the burial of America's unknown soldier.

Respectfully submitted.

W. DE C. RAVENEL,

Administrative Assistant to the Secretary, in charge

United States National Museum.

DR. CHARLES D. WALCOTT,

Secretary, Smithsonian Institution.

APPENDIX 2.

REPORT ON THE NATIONAL GALLERY OF ART.

SIR: I have the honor to submit the following report on the affairs of the National Gallery of Art for the year ending June 30, 1922.

The second year of the existence of the National Gallery as a separate administrative unit of the Smithsonian Institution closed with substantial reasons for satisfaction with the progress made, notwithstanding the fact that the accessions of art works fall short of the average for a number of previous years. The activities of the gallery continued in all essential respects in directions identical with those of the preceding year, the personnel being limited to a director and a secretary with clerical assistance, a guard, three watchmen, two laborers, and two charwomen.

Full information regarding the inception and growth of the gallery within the Institution and as a subsection of the department of anthropology of the National Museum may be found in the report of the secretary of the Institution for the preceding year, and more especially in an earlier publication (Bulletin 70, U. S. National Museum) prepared by former assistant secretary, Dr. Richard Rathbun.

Although art was recognized as a legitimate field of activity in the organization of the Institution, and on equal terms with science, and although numerous paintings and other works were acquired as the years passed, no special provision was made for their accommodation, space being assigned them in various places as the years passed, and no special provision was made for adding to the collection by purchase. Since the completion of the Natural History Building the collections have found space in that building, finally occupying the large central hall which was subdivided by screen partitions for their accommodation. This resource has, however, reached its limit, and additions accepted can find exhibition space only by storing the less important works previously acquired. This condition is most unfortunate since the inflow of gifts and bequests, upon which the gallery depends for accessions, is governed largely by the character of the accommodations afforded. The vital importance of this shortage of space will be appreciated when it is stated that the in-

crease of art works by means of gifts and bequests to the Institution for the 10 years since appropriate exhibition space became available in the new Natural History Building, ending June 30, 1921, and aside from the rich accessions of the Freer gift, has averaged in estimated money value upward of \$500,000 per year. The year just closed has fallen far short of that valuation, not exceeding \$10,000, a result due in part, at least, to a knowledge of the real conditions on the part of such owners of collections as have reached the stage where the future of their accumulations has become a matter of great concern.

The urgent need of a gallery building is thus strongly emphasized, for it is apparent that should 10 years elapse before a building for this purpose is erected, the loss due to delay will amount to several times the cost of a building. Another consideration of great importance is that the National Gallery is not limited in scope to painting and sculpture, but has confined its activities mainly to this narrow field because no space is available for assembling and displaying the full range of art products. It is thus most important that Americans should begin to realize, as have all other civilized nations, the great importance, the inestimable value, of art as an agency in the advancement to higher accomplishment in each and every branch of activity in which taste is an essential feature. We are the only civilized nation that has not risen to a realization of the real value of art and of the important functions of a National Gallery and that has not, save in the limited appropriations granted in 1921 and 1922 to the gallery fostered by the Smithsonian Institution, recognized art save as the handmaid of history or as an essential of architectural embellishment or landscape gardening. No important art work has, for art's sake pure and simple, ever been purchased with the approval of the United States Government. The Nation has received as gifts and bequests, art works amounting to more than ten millions in money value, and has expended on their acquirement and care possibly one two-hundredth part of that amount. The American people should at once arise to a realization of the fact that unless gallery space is provided for the accommodation of prospective additions, this inflow of art works must practically cease. This would be a national misfortune and a disaster to the Capital of the Nation.

ART WORKS ACQUIRED DURING THE YEAR.

GIFTS AND BEQUESTS.

Portrait of President Ulysses S. Grant (three-quarter length) by Thomas Le Clear, N. A. (1818-1882), painted in 1880 or 1881. Gift of Mrs. U. S. Grant, jr., of San Diego, Calif.

A large gravure reproduction of a portrait of Abraham Lincoln, taken from Douglas Volk's portrait of Lincoln painted from memory. Gift of Dr. Charles D. Walcott, Secretary of the Smithsonian Institution.

An oil painting entitled "The Signing of the Treaty of Ghent," by Sir A. Forestier, 1914. Presented to the Smithsonian Institution for the American people by the Sulgrave Institution of Great Britain and the United States, through Mr. Barron Collier, and accepted on behalf of the United States by Chief Justice William Howard Taft. Deposited by the Smithsonian Institution.

A painting by Daniel Garber, N. A., entitled "Tohickon," provided by the Henry Ward Ranger bequest through the council of the National Academy of Design, trustees of the fund.

Portrait of Edwin H. Harriman, being an artist's proof etching, one of 21 from the copper. Gift of Mrs. E. H. Harriman, New York City, through Dr. Charles D. Walcott.

Portrait bust (bronze) of Maj. Gen. George Owen Squier, Chief Signal Officer, United States Army, by M. W. Daikaar. Gift of General Squier.

LOANS.

Salutation (copy), by Albertinelli, and Holy Family (copy), by Andrea del Sarto, and an *erba* or painting in vegetable colors entitled "St. Anthony and the Lions," by an old monastic painter of the time of Fra Angelica and Fra Bartolommeo. Lent by the Rev. F. Ward Denys, of Washington, D. C. Doctor Denys lent also a Minton shield, two bronze reliefs of sacred subjects, and a small landscape in oil, which he withdrew before the close of the year.

Mother and Children (Early Morning), by A. W. Bougureau (1825-1905), and Sheep, by F. Brissot. Lent by Mr. and Mrs. Walter Tuckerman, Edgemoor, Md.

Deer, by J. A. Oertel, signed 1856. Lent by Mr. Charles Townsend Abercrombie Miller, of New York City.

Portrait of Abraham Lincoln, painted in 1865 by M. S. Nachtrieb (1835-1913). Lent by Mr. Anton Heitmuller, of Washington, D. C.

A series of 10 architectural drawings by Rossel Edward Mitchell, showing the artist's plan for furthering the International Historical Museum. Lent by Rossel Edward Mitchell, of Washington, D. C., and withdrawn at the close of the special exhibition during January, 1922.

Forty-six paintings, comprising kakemonos and framed pictures by Shunko Sugiura, of Tokyo, Japan. Lent by the artist and withdrawn at the close of the special exhibition, from January 18 to 27, 1922.

Series of 150 enlarged portraits in sepia, of Washington children, by Underwood & Underwood, of Washington, D. C. Lent by Underwood & Underwood and withdrawn at the close of the special exhibition, February 20 to March 5, 1922.

Plaster bas-relief portrait of Prof. Francis James Child, Scholar (1825-1896), of Cambridge, Mass., executed in 1891 by Miss Leila Usher. Lent by Miss Leila Usher, of Boston, Mass.

A collection of 100 etchings and water-color drawings by Francisco Gonzales Gamarra, of Lima, Peru, illustrating ancient Peruvian art, recent historical art, and current subjects. Lent by Mr. Gamarra and withdrawn at the close of the special exhibition which was open to the public during June, 1922.

Bronze bust of Enrico Caruso (1873-1921), by Joseph Anthony Atchison; presented to the city of Washington for the Washington Opera House. Lent by the sculptor on behalf of the Washington Opera House.

Two old masters, Baptism of Christ by J. B. Tiepolo and a small landscape by R. Wilson, were added to his loan collection by Mr. Ralph Cross Johnson, of Washington, D. C.

A Moment's Rest, a large painting by William E. Norton (1843-1916), a realistic rendering of a team of four horses in charge of two men and a boy resting a moment in the shadow of a boat's hull by the water's edge while one of the men lights his pipe. Lent by the artist's daughters, Miss Gertrude M. Norton and Miss Florence E. Norton, of New York City.

Twenty-two portraits in pastel, being a series of life-size groups of Union and Confederate veterans of the Civil War, painted from life by Walter Beck, of Brooklyn, N. Y., 50 years after the battle of Appomattox; lent to the Smithsonian Institution by the artist through Mr. Walter M. Grant, of New York City. Deposited by the Institution. They are as follows:

MOSBY TRIPTYCH.

1. Left panel:

1. Seated, left, Lieut. Fountain Beatty, Alexandria, Va.
2. Seated right, John Russel, scout, Berryville, Va.
3. Standing, Frank H. Rahm, Richmond, Va.

2. Central painting:

4. Left, Charles Grogan, Baltimore, Md.
5. Center, Col. John S. Mosby.
6. Right, Dr. W. L. Dunn, Glade Springs, Va.

3. Right panel:

7. Seated, Lieut. A. R. Richards, Louisville, Ky.
8. Standing, Dr. James G. Wiltshire, Baltimore, Md.

FEDERAL FORCES.

4. Fifty Years After the Battle. Fifth New York Volunteer Infantry, First Duryée Zouaves, known as "The Fighting Fifth."

Left to right—

1. Trumpeter Robert Fofar, Brooklyn, N. Y.
 2. Trumpeter Robert F. Daly (once the drummer boy), New York City.
 3. John F. Connell, New York City.
 4. Gilbert Boyd, Brooklyn, N. Y.
 5. John Hefferman, Flushing, Long Island.
5. Map of the Peninsular Campaign. Fifth New York Volunteer Infantry. First Duryée Zouaves, known as "The Fighting Fifth."
1. Left upper, John C. L. Hamilton, Elmsford, N. Y.
 2. Second, Edward Whiteside, Brooklyn, N. Y.
 3. Seated, left, James Collins (address not given).
 4. Seated, George F. Wilson, Mount Vernon, N. Y.
 5. Seated, George A. Mitchell (address not given).
 6. Standing, right, Samuel H. Tucker (with rifle), Ridgefield Park, N. J.
6. Sheathing the Sword.
1. Standing at left, Peter G. Wagner, New York City.
 2. Seated, Lieut. William H. Uekele, New York City.
 3. Second, standing, Alfred Atkins, Rosells Park, N. Y.
 4. With sword and gun, Harry Jones, Long Island City, N. Y.
 5. Extreme right, George H. Myers, New York City.
7. Comrades of the Fighting Fifth.
1. Left, Daniel J. Meagher, New York City.
 2. Right, Albert Shellworth, Jersey City, N. J.
8. Drummer Boy of the Fighting Fifth After Gaines Mills.

Robert F. Daly, New York City, was a drummer boy before he was 13 and had seen 17 battles. He endeared himself to his regiment, the First Duryée Zouaves, especially at Gaines Mills, where he carried water to the men fighting, from a spring more than a mile to the rear. On the 7-day retreat to the ships the men carried the boy on their shoulders. When the regiment returned to New York, the boy's father discovered him in line, snatched him from the march, and sent him back to school.

9. The Signal. After the Battle of Big Bethel. John Tregaskis, Brooklyn, N. Y., Fifth New York Volunteer Infantry, Duryée Zouaves.

After the Battle of Big Bethel the Union forces were marching by parallel roads in pursuit of the enemy. During the night at the crossroads they fired at each other. To avoid a repetition of the error they used the white of their turbans around their arm as a signal.

10. The First Sharps Rifle. Homer D. Jennings, St. Cloud, Fla.

The Sharps rifle was used for the first time before Gaines Mills, Va. It was a repeating rifle and was used by the Fifth New York Volunteer Infantry, Duryée Zouaves. There were just enough of the rifles to arm the end men of companies, but the effect upon the opposing forces was bewildering and disastrous. General Sykes was in command.

11. Adelaide Smith. One of the first Army nurses.

She volunteered at Brooklyn, was with Grant's army through the Peninsular campaign, especially during the last years of the Civil War.

The silver cup at her left is the cup which she carried all through the war and with which she gave water to thousands of wounded men.

The One hundred and sixty-fifth New York, or Second Duryée Zouaves, Volunteer Infantry.

12. The left panel, four figures with the flags.
13. Center panel, five figures, Capt. Mathias Johnston, leader.
14. Third, or right, panel, five figures, with guns.
15. Doctor Beyea, chaplain, and noted as a singer at camp fires, Lafayette Post, New York. Painted in 1914.
16. Fisher of the Fifth New York Volunteer Infantry, Duryée Zouaves.
17. The Beecher Regiment Returning Its Flag to Plymouth Church.
 1. Seated, left, William Pink, Brooklyn, N. Y.
 2. Standing, left, Henry Metcalf, Brooklyn, N. Y.
 3. Standing, Richard Conlon, Brooklyn, N. Y.
 4. Standing, Charles Balogh, Brooklyn, N. Y.
 5. Center, Capt. Miles O. Reilly, Brooklyn, N. Y.
 6. Standing, Maj. M. K. Mille, Westfield, N. Y.
 7. Standing, George O. Fowler, Whitestone, L. I.
 8. Seated, right, Gen. Louis M. Peck, Brooklyn, N. Y.

THE OLD GUARD OF NEW YORK.

18. Capt. H. Cole Smith, Eighth Connecticut Volunteer Infantry.
Willis White, Second Regiment New York Cavalry.
Capt. Frank Huntoon, Vermont Cavalry.
19. Judge Blanchard, Wisconsin Volunteer Infantry.
Col. G. K. Grismer, One hundred and ninety-second New York Volunteer Infantry.
Maj. Charles H. Heust's, Massachusetts Volunteer Infantry.
20. Col. A. E. Dick, Twenty-second New York Volunteer Infantry.
Admiral Charles D. Sigsbee, Fort Fisher, afterwards on the U. S. S. *Maine*, seated.
Capt. James F. Wenman, who brought the obelisk from Egypt to Central Park, New York City.
Brig. Gen. Albert F. Davis, Spanish War Veterans.
21. Capt. L. F. Barry, Seventy-first New York Volunteer Infantry.
O. M. Chace, Seventh New York Volunteer Infantry.
Maj. William R. Mitchell, Wisconsin Volunteer Infantry.
Capt. L. A. Newcome, Massachusetts Volunteer Infantry.
22. Capt. Arthur Jacobson, Seventy-first Regiment New York National Guard, and One hundred and seventy-sixth New York Volunteer Infantry.
T. A. O'Mara, drummer boy, Fifty-ninth New York Volunteer Infantry.

THE NATIONAL PORTRAIT COLLECTION.

As announced in last year's report, a number of influential citizens desiring to preserve some pictorial record of the World War, organized a National Portrait Committee and arranged with a number of our leading portrait painters to paint portraits of certain distinguished leaders of America and other allied nations in the war with

Germany. The members of the committee as organized are: Hon. Henry White (chairman), Herbert L. Pratt (secretary and treasurer), Mrs. W. H. Crocker, Robert W. de Forest, Abram Garfield, Mrs. E. H. Harriman, Arthur W. Meeker, J. Pierpont Morgan, Charles P. Taft, Charles D. Walcott, and Henry Frick (since deceased).

Under this arrangement 20 portraits were painted and assembled in the National Gallery during the month of May, 1921. Later these were turned over to the American Federation of Arts for purposes of public exhibition, and at the close of the year they had been shown in the following cities: Princeton, N. J.; New Haven, Conn.; Boston, Mass.; Rochester, N. Y.; Cleveland, Ohio; Williamstown, Mass.; Amherst, Mass.; Buffalo, N. Y.; Cincinnati, Ohio; Indianapolis, Ind.; Pittsburgh, Pa.; Detroit, Mich.; Youngstown, Ohio; and Memphis, Tenn.

The portrait of Herbert Clark Hoover, by Edmund C. Tarbell, has since been added to the number.

THE McFADDEN COLLECTION.

At the close of the year preliminary steps had been taken toward the acceptance by the gallery of the loan of the McFadden collection of British masterpieces, comprising 44 notable examples of the work of Richard Parkes Bonington; John Constable, R. A.; Davis Cox; John Crome; Thomas Gainsborough, R. A.; George Henry Harlow; William Hogarth; John Hoppner, R. A.; Sir Thomas Lawrence, P. R. A.; John Linnell, sr.; George Morland; Sir Henry Raeburn, R. A.; Sir Joshua Reynolds, P. R. A.; George Romney; James Stark; George Stubbs, R. A.; Sir John Watson Gordon, R. A.; J. M. W. Turner, R. A.; and Richard Wilson, R. A. These paintings were acquired by John H. McFadden, Esq., of Philadelphia, Pa., recently deceased, during his lifetime, and by his will left in trust to the city of Philadelphia and to be intrusted to its custodianship when the Municipal Museum now in course of construction is completed. Notwithstanding the fact that there is much shortage of storage space in the halls occupied by the national collections, the acceptance of this rich collection for a limited period is regarded with much favor.

DISTRIBUTIONS.

Loans have been withdrawn by owners as follows: Portrait of Arthur Spicer, and portrait of Mary Brockerbrough Spicer, his wife, by Sir Peter Lely, lent by Miss Lucy Stuart Fitzhugh, were with-

drawn by Mrs. Daisy Fitzhugh Ayers, executrix. *Genevra dei Benci*, attributed to Leonardo da Vinci, withdrawn by the Misses Janet R. and Mary Buttles. *Christ in the Temple*, by J. P. Tiepolo; *The Doctor's Visit*, by Jan Steen; *Dedham Vale*, by John Constable; and *A Young Dutch Girl*, by N. Drost, were withdrawn by Mr. Ralph Cross Johnson, but returned to the gallery before the close of the year with the exception of the last named. Five portraits: Col. Mark Hopkins in Continental Uniform (copy by Robert Hinckley); Dr. Mark Hopkins, Educator, by Sarony; Hon. Edward Everett, by Asher Brown Durand; Mrs. Edward Everett, by Gambardella; and Charlotte Brooks Everett, by George P. A. Healy; withdrawn by Mrs. Charlotte Everett Wise Hopkins (Mrs. Archibald Hopkins). *Clearing Up*, in the Berkshires, by James Henry Moser, was acquired by the Cosmos Club from Mrs. J. H. Moser, the owner, and withdrawn by the club. *The Finding of Moses*, attributed to the period of Paul Veronese, withdrawn by Mrs. F. S. Bloss. *Sea, Sand and Solitude*, by Edward Trenchard, withdrawn by the artist. Seven paintings: Portrait of Mr. Levi Woodbury, of New Hampshire; Portrait of Mrs. Levi Woodbury, of New Hampshire; Portrait of an Old Gentleman, and *St. Dominic and the Christ Child*, artists not given; *Landscape*, attributed to Berghem; *Parrot and Fruit*, and *Flowers*, attributed to Zuccarelli; from the collection lent by the Duchess de Arcos (Virginia Woodbury Lowery Brunetti), withdrawn by Mr. Woodbury Blair, attorney in fact for the duchess. Four paintings from the loan collection of the American Federation of Arts were distributed for the federation as follows: *Ducks on the Bank*, by Franz Grassel, sent to E. O. Summer at Brooklyn, N. Y.; *Memory of the Tyrol*, by J. P. Jungmanns, and *The Garden*, by Max Clarenbach, to the Art Institute of Chicago, Chicago, Ill.; and *Portrait of Mrs. Penelope Wheeler*, by George Sauter, to Messrs Budworth & Sons, New York City.

Caresse Infantine, a painting by Mary Cassatt, belonging to the Evans collection, the property of the gallery, was lent to the American Federation of Arts to be included in an exhibition of pictures of children under the auspices of the federation, to be shown in six southern cities: Louisville, Ky.; Roanoke, Va.; Savannah, Ga.; Charleston, S. C.; Richmond and Norfolk, Va. The work elicited much favorable comment, and was returned to its place in the gallery at the close of the exhibition.

THE HENRY WARD RANGER FUND.

The purchases made by the council of the National Academy of Design from the fund provided by the income from the Henry Ward

Ranger bequest, with the names of the institutions to which they have been assigned, are as follows:

Title.	Artist.	Date purchased.	Assigned.
11. Fall Round-Up.....	Carl Rungius, N. A....	Dec. 20, 1921	Corcoran Gallery of Art, Washington, D. C.
12. Repose of Evening...	Ben Foster, N. A.....	.....do.....	San Francisco Museum of Art (offered to).
13. Forest Primeval.....	Chas. S. Chapman, A. N. A.	.....do.....	Cleveland Museum of Art.
14. The Figurine.....	Wm. M. Paxton, A. N. A.	.....do.....	Wadsworth Atheneum and Morgan Memorial, Hartford, Conn.
15. Wiltou Hills.....	Roy Brown, A. N. A....	.....do.....	Hackley Gallery of Fine Arts, Muskegon, Mich.
16. Gleam on Hilltops....	Gardner Symons, N. A.	Apr. 18, 1922	Montclair Art Association, Montclair, N. J.
17. White and Silver....	Dines Carlsen.....	.....do.....	Portland Society of Art, of Portland, Me.
18. Tohickon.....	Daniel Garber, N. A....	.....do.....	National Gallery of Art, Washington, D. C.
19. East Coast, Dominica, British West Indies.	Fredk. J. Waugh, N. A.	.....do.....	Museum of History, Science, and Art, Los Angeles, Calif.

THE REV. BRUCE HUGHES ALCOVE.

Two publications have been purchased from the funds received from the income of the Rev. Bruce Hughes bequest, and placed in the gallery library as a separate unit thereof. They are:

Zoffany, R. A., John: His Life and Works. 1735-1810. By Lady Victoria Manners and Dr. G. C. Williamson. London: 1920. (No. 1.)

Life and Works of Ozias Humphrey, R. A. By George C. Williamson, Litt. D. London: 1918. (No. 2.)

LIST OF PUBLICATIONS.

Holmes, W. H. Report on the National Gallery of Art for the year ending June 30, 1921. From the Report of the Secretary of the Smithsonian Institution for 1921, pp. 45-55.

The report of the director for the first year of the gallery as a separate unit under the Smithsonian Institution, the art collections having been associated previously with the department of anthropology in the United States National Museum.

Rose, George B. The Ralph Cross Johnson collection in the National Gallery at Washington. Annual Report of the Smithsonian Institution for 1920 (1922), pp. 679-690, pls. 1-24. Reprinted from Art and Archaeology, Vol. X, No. 3, September, 1920. (Smithsonian Publication No. 2649).

A Catalogue of the Art Works of the Gallery embodying introductory matter and brief biographies of the painters and sculptors represented, with full-page illustrations of 25 of the works, was prepared and sent to the printer in October, 1921. At the end of the fiscal year, June 30, 1922, it has not appeared.

ILLUSTRATED LECTURE ON THE GALLERY.

As a means of promoting the development of the gallery by making its existence and collections known to the people, a lecture has been prepared by the director, the step being due largely to the urgent request of Mrs. Summers, wife of the Hon. J. W. Summers, Representative in Congress from Washington State, who has presented it a number of times in his home State. A brief introduction is followed by the presentation of 75 slides, mostly in color, representing the Smithsonian buildings and their surroundings and the more noteworthy works of painting and sculpture preserved in the gallery, with brief biographies of the artists. The lecture is to be placed at the disposal of such persons throughout the country as may desire to present it.

THE NATIONAL GALLERY OF ART COMMISSION.

The National Gallery Commission, organized in accordance with plans formulated by the Regents of the Smithsonian Institution, held its first or organizing meeting on June 25, 1921, and its first annual meeting on December 6 of that year. The proceedings of the organizing meeting are outlined in the annual report for that year, and the proceedings of the meeting of December 6 may be here briefly outlined.

The meeting was held in the Regents' Room of the Smithsonian Institution, members present being: Daniel Chester French (chairman), Herbert Adams, Edwin H. Blashfield, Joseph H. Gest, William H. Holmes (secretary ex-officio), John E. Lodge, Frank Jewett Mather, jr. (vice chairman), Gari Melchers, Charles Moore, James Parmelee, Herbert L. Pratt, Edward W. Redfield, Charles D. Walcott (ex-officio).

The report of the executive committee, which met at the Cosmos Club on the evening of the 5th of December, was submitted and reports of the 11 subcommittees were received. These committees are as follows:

1. American painting, Edward W. Redfield, chairman.
2. Modern European painting, Gari Melchers, chairman.
3. Ancient European painting, Frank Jewett Mather, jr., chairman.
4. Oriental art, John E. Lodge, chairman.
5. Sculpture, Herbert Adams, chairman.
6. Architecture, ———, chairman.
7. Mural painting, Edwin H. Blashfield, chairman.
8. Ceramics, Joseph H. Gest, chairman.
9. Textiles, ———, chairman.
10. Prints, James Parmelee, chairman.
11. Portrait gallery, Herbert L. Pratt, chairman.

The reports of the chairmen were received with interest, and numerous additions to the membership were made.

Consideration was given to the proposed exhibit of early American paintings and sculptures, to be held in the Louvre, Paris, in the near future, and the advisability of holding a special loan exhibit of American portraits in the National Gallery in Washington received attention.

The feasibility of arranging in Washington a plan for the further development of the art interests, corresponding with that existing between the Louvre and the Luxemburg Galleries, Paris, was considered and steps were taken to determine the attitude of other galleries with respect to the suggestion.

The urgent need of a National Gallery building to accommodate the collections now occupying the very limited space allowed them in the Natural History Museum, and for future accessions, was considered, and a resolution enumerating at some length the unfortunate conditions existing and appealing to Congress for the limited fund required for the preparation of plans for a building was adopted.

The very serious problems of the acceptance and rejection of profured works of art of all classes was discussed at length, and at the close of the meeting the advisory committee on acceptance of works took necessary action with regard to such offerings for the year as awaited consideration.

Respectfully submitted.

W. H. HOLMES.

Director, National Gallery of Art.

DR. CHARLES D. WALCOTT.

Secretary, Smithsonian Institution.

APPENDIX 3.

REPORT ON THE FREER GALLERY OF ART.

SIR: I have the honor to submit the second annual report on the Freer Gallery of Art for the year ending June 30, 1922.

THE COLLECTION.

Work carried on during the year includes the classification and cataloguing of Chinese, Japanese, and Tibetan paintings, Chinese tapestries, and Chinese and Japanese pottery; the preliminary classification of Korean pottery and Chinese and Japanese stone sculptures and jades; and the cataloguing of American paintings, drawings, and prints (inclusive of both etchings and lithographs). Important progress has been made also in the indispensable preservation work on oil paintings.

BUILDING AND INSTALLATION.

Owing to a temporary lack of applicable funds, work on the building and installation was discontinued in July and was not resumed until December. The work accomplished, however, includes the continuation—and in some instances the completion—of undertakings mentioned in the first annual report: The dais in gallery 18 has been rebuilt and stained, the walls of 15 galleries and 2 corridors have been recolored, all of the storage bags and 27 of the storage boxes for Japanese screens have been completed, the Chinese and Japanese panel storage has been finished and the panels themselves placed in their permanent storage racks. The more important items of the new work undertaken are as follows: The dais in gallery 8 has been removed, terrazzo floor has been laid in the areas thus exposed, and the walls have been covered with canvas. The two large Chinese stone slabs purchased during the previous fiscal year were set in the wall of gallery 9 and repaired, practically all of the Whistler oil painting frames have been repaired and regilded, and 16 storage racks for oil paintings have been constructed. The installation of fly screens has been effected, as has also the correction of defective doors and the reenforcing of the meeting rails of the double-hung windows throughout the basement floor. Bronze light standards have been erected outside of the north and south entrances, the offices have been carpeted and furnished, oiling of the gallery floors

has been begun, electric meters have been installed, cheesecloth screens have been provided for the ventilators in all the storage rooms, and necessary drains have been set in the lower floor at various places.

PERSONNEL.

Grace Dunham Guest was appointed assistant curator on January 1, 1922.

Ruth W. Helsley resigned, her resignation taking effect March 1, 1922.

Ruth L. Walker was appointed to fill Mrs. Helsley's post as stenographer on February 15, 1922.

Carl W. Bishop was appointed associate curator on April 9, 1922.

Miss Guest was given a two months' leave, and she sailed for Europe on June 24, 1922, to act as delegate from the Freer Gallery of Art to the double centennial meeting of the Société Asiatique de Paris, and also to study collections of oriental art—especially ceramics—in England, France, and Germany.

Respectfully submitted.

J. E. LODGE,

Curator, Freer Gallery of Art.

DR. CHARLES D. WALCOTT,

Secretary, Smithsonian Institution.

APPENDIX 4.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: In response to your request I have the honor to submit the following report on the field researches, office work, and other operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1922, conducted in accordance with the act of Congress approved March 4, 1921. The act referred to contains the following item:

American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archeologic remains, under the direction of the Smithsonian Institution, including the necessary employees and the purchase of necessary books and periodicals, \$46,000.

The Indians of the United States are undergoing cultural changes which will in a short time so modify their material culture that little will be left in that line for the ethnologist to study. It is imperative that the bureau exert itself in every way to record the material culture and cult objects before the final change occurs. The objects illustrating this culture are now mainly preserved as heirlooms in ceremonies, and it is particularly desirable that these be described and their meanings interpreted before they pass out of use completely.

In 1904 the bureau inaugurated at Casa Grande a method of archeological work which has now been adopted by most of the institutions working in the southwestern part of the United States. Previous to this time archeologists rarely paid attention to the preservation of walls of ruins, but sacrificed these in their zeal to make as large collections of artifacts as possible.

The bureau method of preserving the buildings for future students has now been adopted by other institutions, and work of this nature is being carried on at Pueblo Bonito, Chaco Canyon, by the National Geographic Society; at Chetro Kettle, in the same canyon, by the School of American Research, Santa Fe, N. Mex.; at Pecos, N. Mex., by the Phillips Academy, Andover, Mass.; and at Aztec by the American Museum of Natural History of New York. This method of archeological work has created a great interest in archeological problems, as indicated by the increased number of visitors to these ruins, and

has a great practical value as an asset to the communities in which these ruins are situated. It is the intention of the chief of the bureau to keep abreast of the other institutions in this regard.

In the past year the bureau has entered upon two new lines of work which it is believed will not only increase its scientific output by intensive research but also appeal strongly to the popular interest and to the diffusion of knowledge already acquired. For many years it has not been found practical to continue work on the Hawaiian Islands, which is mentioned as one of the important items of ethnological research in the above act of Congress. A meeting of the Pan Pacific Convention in Honolulu shows an increased interest in the study of the Polynesian islanders and their relation to the question of the peopling of America from the South Seas. Mr. Gerard Fowke, a collaborator of the bureau, was commissioned to attend this convention in the interest of the Smithsonian Institution, and he was instructed to gather whatever information he could in relation to the archeology of the people, if any, that preceded the Hawaiian race of the present day. Although his results were negative, it is gratifying that the bureau took part in this convention, as it opened up several lines of work in other islands which it may later be advantageous to follow. The Sandwich Islands lie practically on the periphery of the sphere of influence of the Polynesian culture, and local investigators have the Hawaiians well in hand. There is considerable to do in mapping the distribution of temples and ancient buildings, but this work is being rapidly done by local archeologists. It is desirable, however, that the bureau take up archeological work in Samoa or some island nearer the center of distribution of the race which has occupied almost all the land in the Pacific Ocean. The imperfect facilities for transportation from one island to another and the loss of time in transit is a serious handicap in this work.

A second line of research which promises even more to the scientific investigator and the tourist is a study of the material culture, especially the architecture, of the houses of the aborigines of Alaska. In the growth of the canning industry the Indians who formerly inhabited southern Alaska have been drawn away from their aboriginal villages, leaving them deserted and their totem poles and buildings to the mercy of fire and decay. The monuments are rapidly going to destruction, and it is very desirable that steps be immediately taken to preserve these buildings or a typical example of them before they are utterly destroyed.

One of these settlements, Kasaan, has already been made a national monument. Steps should be taken to preserve others.

Dr. T. T. Waterman was sent by the bureau to investigate the whole question—primarily to secure whatever vanishing ethnological data is still extant. He was instructed to gather information on the sym-

bolism of the totem poles, the character of the houses, distribution of clans, and whatever scientific data can be obtained from those still living who once inhabited these villages. This line of investigation appeals very strongly to the chief from his knowledge of the growth in interest of the Mesa Verde National Park. In 1908, when he began work on this park, only 25 tourists visited the Mesa Verde; this year, 1922, the number will reach 4,500. This shows a great growth of interest in the work being done there; and, as many tourists now seek Alaska in their summer vacation, one of these villages repaired would attract many visitors. It is proposed to continue this work next summer with an enlarged appropriation.

The work of the bureau in other lines has gone on with customary vigor. The chief has repeatedly emphasized the necessity of rescuing the linguistic and sociological data of those Indian stocks that are rapidly disappearing. It would be culpable if any of these languages should vanish completely without some record. Interest in the aborigines of this continent has greatly increased in the last years, especially on account of the stimulus of the movement called "See America First."

In addition to his purely administrative duties, considerable time has been devoted by the chief to researches in the field. This work was archeological in nature and a continuation of that of previous years, and was carried on in cooperation with the National Park Service of the Department of the Interior.

Two months were spent in the neighborhood of Far View House, the first pueblo discovered on the Mesa Verde National Park, six years ago. In the course of the work this fine ruin was thoroughly repaired and put in such condition that it will now resist the wear of the elements for several years. Ruins once repaired must be watched with care. On an average between 3,000 and 4,000 visitors, mainly tourists, visit the Mesa Verde National Park and examine the excavated ruins. Fifteen thousand visitors have already passed through Spruce-tree House and Cliff Palace, and the wear on the soft rock of which the ruins are made is beginning to show. Unless constant vigilance is exercised the walls will fall within a short time. Any deterioration ought to be repaired annually. Tourists are not now permitted to visit any of the ruins on this park without a guide, a regulation that has been strictly enforced during the past year.

Field work in May and June was devoted to excavating a ruin called Pipe Shrine House, situated to the south of Far View House. This was apparently a communal building, or one not inhabited, which was used by the people of the pueblo for sacred ceremonies. It would appear that Pipe Shrine House, so called, bears the same relationship to Far View House that the Lower House of the Yucca

National Monument does to the Upper. The great kiva at Aztec, in New Mexico, lately excavated, bears a somewhat similar relationship to the main ruin, and there are several of the Chaco Canyon ruins where similar conditions prevail.

The site of Pipe Shrine House when work began was a low mound covered with sagebrush with a saucerlike depression in the center, not unlike several others in the immediate vicinity of Far View House. The removal of vegetation and débris and an excavation of the rooms revealed a rectangular building 70 by 60 feet, with walls averaging one story high. It had indications of a lofty tower in the middle of the western side, which must have imparted to the building somewhat the appearance of a church steeple or the minaret of a mosque. The large room was situated in the center of the ruin, its floor being about 20 feet below that of the other rooms. This subterranean room is a kiva, but it differs from others of like type on the park in that it has no fireplace in the center of the floor, no ventilator or deflector, and has eight mural pilasters instead of six to support the roof. The fallen walls within showed indications of a great conflagration, the stones and adobe being turned red and the walls turned bright red by the great heat. On the floor of the kiva was an inclosure set off by a semicircular wall where the action of fire was particularly evident. In the inclosure were found many votive offerings, the most numerous of which were a dozen clay tobacco pipes of various shapes and sizes, one or two decorated on their exteriors. These pipes, which are the first ever found on the Mesa Verde, evidently had been smoked by the priests and then thrown into the shrine. Besides the pipes the shrine also contained several fine stone knives, small decorated clay platters, various fetishes, and other objects. Pipe Shrine House was entered on the south by two doorways, midway between which a large pictograph of a coiled serpent was incised on a large stone set in the wall. To the south of the building there was a plaza surrounded by a retaining wall and directly opposite one of the entrances there are aboriginal steps which lead to a rectangular shrine 4 feet in size, in which were found a number of water-worn stones surrounding a large stone image of the mountain lion. The contents of this shrine were replaced, the mountain lion left in his original position, and the inclosure covered with a netting to prevent the possible removing of the objects from their places. Other shrines and several stone idols of considerable size were found in the neighborhood. The idols found at Pipe Shrine House represent the snake, mountain lion, mountain sheep, and bird—an important discovery, as previously only one stone animal idol had been found at the Mesa Verde Park.

One of the most instructive experiences of the archeologist is to see a skeleton centuries old as it lies in the grave. One of the ancient people of Pipe Shrine House was left in a prepared chamber for tourists to inspect.

The cemetery lies on the southeast corner of this ruin, and in it were found several human burials from one of which a good skeleton was chosen to illustrate the manner of burial and the mortuary offerings. This skeleton was not removed from the grave but was surrounded by a stone wall forming a room, rectangular in shape, protected by a grating and a waterproof roof. Visitors may now see one of the skeletons of the race of cliff dwellers as he was placed in his grave more than 500 years ago; not a single bone has been moved from position. This is the first time in North American archeology that an effort has been made to protect an Indian skeleton in situ, and the success of the method is self-evident, judging from the comments of visitors.

The pipes found in the shrine of the kiva have suggested "Pipe Shrine House" as a name for the building. It seems to have been given up to the rites and ceremonies of the inhabitants of the neighboring Far View House.

The second ruin excavated at Mesa Verde was formerly the habitation of one clan or of one social unit composed of relatives on the mother's side, on which account this ruin was given the name "One Clan House." It is situated about one-eighth of a mile south of Pipe Shrine House and consists of a circular subterranean room or kiva of fine masonry surrounded by rooms for sleeping, others for grinding corn, and still others used as bins for corn or storage rooms. The kiva was the ceremonial or men's room.

One of the most instructive ruins excavated in 1922 is a round tower, 15 feet in diameter and 10 feet high, situated about 300 feet north of Far View House. In front of this tower were found three subterranean kivas under the fallen débris, in one of which were constructed walls of a square building, indicating secondary occupation, and erected after the abandonment of the kiva. This tower and accompanying kivas may be called Far View Tower, and the indications are that it was used for observations, particularly of the sun on the horizon at sunrise and sunset, in order to determine the time for planting and other dates important for an agricultural people. These towers were probably rooms for the worship of the sun and other sky gods.

Some distance north of Far View Tower there were discovered in the cedars a number of large stones arranged vertically in rows projecting 3 feet above the surface of the ground. Excavation showed that these megaliths were walls of buildings of anomalous character, indicating a new type of architecture on the Mesa Verde. This

ruin, "Megalithic House," was not completely excavated, but all the others were repaired, the tops of the walls being covered with cement to prevent future erosion.

An important collection made by the chief in the course of the summer's work contains many rare and unique specimens, an account of which will later be published in a report on the excavations.

During his work at the Mesa Verde the chief gave camp-fire talks in the special amphitheater constructed for that purpose by the superintendent of the park. The average attendance on these talks was about 40 each evening, and at times, as on a visit of a convention of teachers, there were 150 listeners. He also spent considerable time daily taking parties over the new work which he was doing in the neighborhood of Far View House.

Ever since 1917 the chief has been attempting to have the sites of three clusters of towers in Utah withdrawn from private ownership and made into a national monument, to be called Hovenweep National Monument. Various circumstances have made it impossible to bring this about. During the past summer, however, Mr. Hatze, a Land Office surveyor, determined the metes and bounds of these three clusters and later Doctor Fewkes visited them in order to determine their present condition. He found that a settler had filed claims on the neighboring land, the adjoining one-quarter mile section, and erected his cabin. Some of the cabins in the neighborhood have stones remarkably like those of the towers; in other words, the necessity for immediate action, if these towers are to be preserved for posterity, is apparent, and the land on which they are situated should be withdrawn from settlement and the buildings put under the care of proper authorities. The three groups are known as the Square Tower, the Ruin Canyon group; the Holly and Keeley Towers; and the large ruin at the head of the Cajon Mesa called Cool Spring House, on account of the fine water which is found in the cave back of the cliff house.

During the fiscal year Dr. John R. Swanton, ethnologist, was engaged in extracting the words from his Hitchiti texts and adding them to his dictionary on cards of the Hitchiti language, and in preparing a grammatical sketch of 75 pages based on this material and that collected by Dr. A. S. Gatschet.

Much time was devoted to transferring words to cards from his Alabama texts, and from material in Alabama secured through native informants, into an Alabama-English dictionary. The first 25 pages of a grammatical sketch of this language have also been completed.

A comparison has been made between the Natchez language on the one hand and Koasati and Hitchiti on the other, in order to establish the position of Natchez in the Muskhogean linguistic stock. This

has not yet been set down in full, but all of the essential points have been typewritten on cards.

A paper of 44 pages has been prepared in elaboration of some recent discoveries regarding the Siouan peoples, discoveries which have an especial bearing on the relationship of the various Siouan groups to one another.

A small amount of work has been done in continuance of Doctor Swanton's investigations into the economic basis of American Indian life, particularly a study of aboriginal trails and trade routes.

The work of collecting stories dealing with the old clan divisions of the Chickasaw Indians, undertaken by a Chickasaw at Doctor Swanton's suggestion, has met with gratifying success, 10 or 12 such stories having already been sent in.

During the fiscal year Mr. J. N. B. Hewitt, ethnologist, was engaged entirely in office work.

In his report for the fiscal year 1921 it was stated that a number of Chippewa and Ottawa texts had been obtained in 1900 from Mr. John Miscogoon, an Ottawa mixed blood, then in Washington, D. C., and that Mr. George Gabaoosa, a mixed-blood Chippewa, had been employed to amend and to supply the Chippewa versions of these texts. He also amplified the texts by substantial additions. This material covers 125 pages. Mr. Gabaoosa's fixed habit of writing his native language by means of the alphabet employed by the missionaries made it needful that these texts thus written be translated into the alphabet devised by Maj. J. W. Powell, founder of the Bureau of American Ethnology, for recording native Indian languages. This work of transliteration is one of considerable difficulty, because the aid of a native Chippewa speaker is not available in the office and Mr. Hewitt does not speak Chippewa.

In addition, Mr. Hewitt continued work in preparing the Muskegean material detailed in his last report.

Mr. Hewitt also continued his typing of the native Onondaga texts of the second part of the Iroquoian Cosmology, the first part having appeared in the twenty-first annual report of the bureau. There are now 255 pages of text material in final form.

As custodian of manuscripts Mr. Hewitt reports that no new linguistic records were added to the material permanently in his charge. Collaborators and others make temporary deposits of manuscripts upon which work is being done, and these are not catalogued as of permanent deposit.

Mr. Hewitt spent much time and study in the preparation of data for official replies to correspondents of the bureau and of the Indian Office also, the latter by reference only. The scope of the inquiries covers almost the entire range of human interest, often quite outside

of the specific researches properly coming within the activities of the Bureau of American Ethnology, but many are only requests for the derivation of some alleged native Indian place or proper name, often greatly Anglicized and mutilated. Some of these inquiries require more than a day's work to answer, as it is sometimes necessary to visit the Congressional Library in search of data. Data for more than 75 such inquiries were prepared.

Immediately following the death of the late Mr. James Mooney, Mr. Hewitt assisted Mrs. Mooney in assorting and separating the personal letters and papers of Mr. Mooney, some in advanced stages of preparation (the accumulation of more than 30 years' activity in an official capacity), from those which by their nature are official documents, and correspondence and photographs. More than a week was devoted to this work.

Before placing this material in the new store-room a rough classification was made of it. Five main groups were made, corresponding roughly with the five chief papers which Mr. Mooney had under way for a number of years before his demise, namely, (*a*) A Study of the Peyote and Its Accompanying Religious Cult; (*b*) A Monograph on the Population of the Indian Tribes When First Known; (*c*) A Paper on Cherokee Medical Formulas Recorded in the Sequoya Alphabet by Native Priests; (*d*) Kiowa Heraldry; and (*e*) A Study of the Cheyenne and Arapaho Shields. Owing to the peculiar chirography of Mr. Mooney and his excessive use of abbreviations peculiar to himself, this task proved to be a most tedious and difficult one.

Mr. Hewitt, who represents the Smithsonian Institution on the United States Geographic Board, attended all its regular meetings except one and all the special meetings of the board.

Mr. Francis La Flesche, ethnologist, continued during the fiscal year the task of assembling his notes for the second volume of his work on The Osage Tribe. The manuscript for the second volume, which embraces two versions of an ancient Osage ritual entitled, "Noⁿ-zhiⁿ-zhoⁿ Wa-thoⁿ," Songs of the Rite of Vigil, was completed and turned in to the bureau on February 25, 1922, where it awaits publication.

The first version of this ritual, which is counted as next in importance to the Hearing of the Sayings of the Ancient Men, published in the thirty-sixth annual report of the bureau, was given by Wa-xthí-zhi of the Puma gens of the Osage. This man had learned the ritual from his father, Wa-thú-ts'aga-zhi, who is said to have been one of the best informed Noⁿ'-hoⁿ-zhiⁿ-ga in the tribal rites. With some difficulty Mr. La Flesche managed to persuade Shoⁿ'-ge-moⁿ-iⁿ, of the Peacemaker gens, a more conservative man than Wa-xthí-zhi, to give the second version, which belongs to his gens. As this ritual pertains to war, old Shoⁿ'-ge-moⁿ-iⁿ desired it to be clearly

understood that his gens performed the ceremonies of the ritual as a mere matter of form rather than as an actual owner of the rite. The office of his gens, he explained, was one that was instituted for the conservation of life and the maintenance of peace within the tribe and with other tribes not related to the Osage.

On the completion of the manuscripts for the second volume, Mr. La Flesche began the task of assembling his notes for the third volume, which will embrace two tribal rituals, the first of which is entitled "Wa-xó-be A-wa-thoⁿ," Songs Relating to the Wa-xó-be. The Wa-xó-be is the sacred hawk, the symbol of the valor of the Osage warrior. The second ritual is entitled "Čá Tha-dse Ga-xe," literally, The Making of the Rush, but meaning the Making of the Woven Rush Shrine for the Wa-xó-be.

On July 1, 1921, Dr. Truman Michelson, ethnologist, was at Tama, Iowa, continuing his work among the Fox Indians of that State. He completed gathering data on Fox mortuary customs and beliefs and restored texts appertaining to these and worked out a vocabulary as far as possible in the field. On the completion of this he restored phonetically a text previously collected on the Fox society known as "Those who worship the little spotted buffalo." He also worked out, as far as practical, the vocabulary to this text. At the close of August he returned to Washington and elaborated the material collected in the field. During the fiscal year Dr. Michelson submitted two manuscripts for publication, namely, "Notes on Fox mortuary customs and beliefs" and "Notes on the Fox society known as 'Those who worship the little spotted buffalo.'"

On May 25 Doctor Michelson left for the West to conduct researches among the Algonquian Indians of Iowa, Kansas, and Oklahoma. He stopped at Columbus, Ohio, to consult with Prof. L. Bloomfield. As a result of this conference it became apparent that Menomini is very clearly more closely related to Cree than to any other Algonquian language. He found the work at Shawnee, Okla., very difficult and expensive, owing to the fact that the Algonquian Indians of that State are scattered and distances are very great. However, during his short stay he secured sufficient information to show definitely that not only the Sauk but also the Kickapoo share many mortuary customs and beliefs with the Fox of Iowa. He thinks that these correspondences are too detailed and too numerous to be of independent origin and must be due to dissemination. This point regarding the Sauk and Fox is not novel, but it is regarding the Kickapoo. There are, however, some differences in the mortuary customs of all neighboring tribes. This last fact is not so well known. A detailed study of all three neighboring tribes, Siouan as well as Algonquian, on these matters alone can clear up the history of the

borrowings. He expects to obtain data on these points regarding the Shawnee and Potawatomi also.

The beginning of the fiscal year found Mr. J. P. Harrington, ethnologist, engaged in completing his bulletin on the Kiowa language, in several respects one of the most remarkable of the American Indian tongues. Aside from the phonetic system, with its unusual frequency of long vowels and diphthongs, we may point to the noun, several declensions of which form the singular by adding the same suffixes which other declensions use for forming the plural. These singulars of plural form are doubtless conceived as collective, for a personal pronoun in apposition also has the plural form. Thus pronominal agreement arises many times more complicated than that in the three-gendered languages of Europe, and is further involved by subjective, objective, and indirective pronouns largely combining to form a single syllable—a very terse yet involved system of speech. A number of Kiowa and Tanoan songs were found to have the melody following in exaggerated form the intonation of the spoken language. Thus the song “agoyopovi navi ha, wimbo winda” has the high tones of its words also high pitched in the song. This has led to the important discovery that certain melodies in intoned languages may take their clue from the intonation of the words. The Kiowa vocabulary secured is quite complete and forms an interesting contribution to the study of the place names, animal names, and plant names adopted by a tribe when it leaves its old home and moves to a new region. Mr. Harrington proceeded at the close of July to California to continue his studies of the Indians of the Chumashan area of that State. This expedition proved fruitful in results beyond all expectation. Special emphasis was laid on the place names, material culture, and language. More than 300 photographs of Indian places and historic landmarks were secured, together with a wealth of highly interesting and important data. The collecting of Indian place names in the Eastern States was neglected until too late, so that we have only a few names in distorted spelling and of uncertain etymology. It is still possible to obtain full data in many parts of the West, and there is scarcely any work which the Bureau can undertake which is more important or urgent, either in popular interest or as a help to the future ethnologist, historian, or archeologist.

Linguistic study is peculiarly important in this area, since it resurrects past culture and records perishing material for comparison with remote languages. Thirty new Ventureño songs were obtained from one singer, all with native words. The technique of the split-stick accompaniment and the dance steps were faithfully studied and the words were exhaustively compared with the corresponding prose forms.

Mr. Harrington's opinion was confirmed that the southern California culture has many curious points of resemblance with that of the Southwest. Even the Pueblo plumed prayer stick, with sand paintings and the ceremonial use of meal and seeds, have been found also among the Californians.

Twice during the fiscal year Mr. Harrington was temporarily transferred to the Department of the Interior for special archive work. At the close of the fiscal year he returned to Washington.

SPECIAL RESEARCHES.

During the past fiscal year Miss Densmore has extended her study of Indian music by recording songs among the Yuma, Cocopa, and Yaqui tribes, making a total of nine tribes among whom this work has been done. Mohave songs were obtained from two members of that tribe living on the Yuma Reservation, and one Maya song was recorded in the Yaqui village. Four manuscripts on Indian music were submitted, the titles being "Songs Concerning Elder Brother and His People, and Other Papago Songs," "The Rain Ceremony of the Papago," "A Cocopa Legend and its Songs," and "Deer Dance Songs of the Yuma, Yaqui, and Maya Indians." In addition to her work on Indian music Miss Densmore has completed for publication two books on Chippewa culture with the titles "Uses of Plants by the Chippewa," and "Chippewa Arts and Customs." The former book contains descriptions of the uses of 168 plants in medicine, food, dye, charms, and general utility, the section on medicine being in tabulated form and showing the uses of the plant by other tribes, where such use is recorded, and its use by the white race, if such occurs. This tabulation shows the ailments for which a plant was used, the part of the plant utilized, the manner of its preparation, the dosage, and, in some instances, the time before an improvement in the condition of the patient was expected. The latter book contains sections on Chippewa nouns and their structure, on the various industries by which the tribe maintained itself, and on the care and training of little children. New material was submitted in the form of two manuscripts, Certain Customs of the Chippewa in Ontario, Canada, and Chippewa Nouns and Their Structure, these titles corresponding to the principal subjects under consideration. Three brief trips in Minnesota and Wisconsin were made for this work. Miss Densmore also read the page proof of her book on Northern Ute Music.

In February, 1922, Miss Densmore went to Yuma, Ariz., where she remained six weeks. During that time she made a brief trip to a Cocopa settlement located near the Colorado River and about 6 miles from the Mexican boundary. The older Cocopa living

at this point came from Mexico about 18 years ago and neither they nor their children had a status in the United States. At this time, however, they were enrolled under the Yuma Agency, Miss Densmore assisting in the enrollment by writing their Cocopa names in simple phonetic spelling. Forty Cocopa songs were recorded, comprising songs of two representative dances and of a cremation legend. For this work it was necessary to employ two interpreters.

It is the custom of both Cocopa and Yuma to cremate their dead, and Miss Densmore witnessed a Yuma cremation soon after her arrival. The dead man had been a leading singer at cremations and the ceremony was given with the elaborateness which would be accorded a chief. The songs were very old and are seldom used at the present time. Miss Densmore obtained phonographic records of these songs, as well as of the Kurok or Memorial ceremony which is held each summer for the more important persons who have died during the year. Images of the deceased persons are carried in the dances of the Kurok and publicly burned. The history of these ceremonies, with the songs, was obtained from the oldest man who is an authority on the subject. It is the belief of these people that the spirit departs from the body in the flame of the cremation.

A new musical form was found among the Yuma and Cocopa, consisting of a "song cycle" which required an entire night for its rendition and is commonly called a "story." Each of these stories has its designated accompaniment. Among the Yuma the accompanying instruments are a gourd rattle and an inverted basket struck with a bundle of arrow-weed, a willow stick, or the palm of the hand. Sometimes two bundles of arrow-weed or two willow sticks are used, being held in the same hand. Specimens of these instruments were obtained, also a bamboo flute and two bamboo flageolets. The music of the latter was phonographically recorded. The Yuma songs included those of the treatment of the sick, those of games, and three interesting lullabies.

The work among the Yaqui was conducted at Guadalupe village, near Tempe, Ariz. The older Yaqui in this village were born in Mexico. These Indians have received no favors from the United States Government and support themselves by manual labor. They seem happy and contented in their little desert village. Miss Densmore witnessed their deer dance and later recorded the songs from one of the leading singers, a native of Mexico. The occasion of the dance was the celebration of Easter eve. The songs were accompanied by playing upon four half gourds. The Yaqui have two distinct forms of music, one which appears to be entirely native and the other showing a Mexican or Spanish influence.

A large proportion of the songs transcribed and heard during the past year were accompanied by a gourd rattle, and are of unusual

musical value, both in pleasing melody and rhythmic interest. This suggests an inquiry as to whether the songs accompanied by the rattle are generally more musical than those accompanied by the drum. It is interesting to note that the songs of the Yuma and Cocopa resemble each other but differ entirely from the songs of the Papago who live adjoining them. The songs of the Yaqui, so far as observed, differ from both these tribes except in the frequent use of rests. The rhythm of the rattle in Yuma and Cocopa performances is more elaborate and contains more frequent changes than that of the accompanying instrument in any tribe thus far studied. A correspondence between the words of the song and the progressions of the melody is particularly evident in these songs.

Early in March, 1922, Dr. T. T. Waterman, ethnologist, proceeded to Alaska, under temporary appointment in the bureau, with instructions from the chief to scrutinize certain native towns in southeastern Alaska. His purpose was to ascertain how many totemic monuments exist there, and to get information concerning the carvings. The place of special interest was a former settlement of Alaskan Haida, known as Kasaan. It was possible during the three months that Doctor Waterman spent in Alaska to make a rapid survey not only of Kasaan but of the towns known as Village Island, Tongass, Cape Fox, Klinkwan, Howkan, Sukwan, Klawak, and Tuxekan. Some extremely interesting monuments, including many tall and imposing totem poles, were examined and photographed. Charts or sketch maps were brought back from the field, which show the number of monuments still standing in each town and their state of preservation. The observer was fairly successful in obtaining from the Indians an account of the meaning of the carvings on the poles, which have never been adequately described. In many cases the carvings refer to mythical tales, which are often of a very interesting type.

In addition to the work on the totemic monuments, the observer recorded a relatively complete list of the native place names in the southeastern part of Alaska. Many hundreds of these names were entered on the map of the region, and translations and explanations were obtained from the Indians. The work was fairly complete for the area covered.

Under further instructions from the chief, Doctor Waterman examined the coast line of the part of Alaska which he visited, with a view to discovering sites where archeological excavations might possibly be conducted. The results of this work were largely negative. As a matter of fact only one site was found where there seemed to be archeological remains. This hasty survey seemed to indicate that archeological remains in this part of Alaska are extremely scanty.

Returning to the bureau on June 15, Doctor Waterman began the preparation of a report on the Alaskan monuments.

In the fall of 1921, Mr. W. E. Myer investigated sites in South Dakota and western Missouri, known to have been occupied by the Omahas and Osages in early historic times, after they had come in contact with the whites but before they had been changed thereby to any considerable extent.

Especial attention was paid to any resemblance to the ancient cultures found in the valleys of the Ohio, Cumberland, and Tennessee Rivers. This line of research was suggested by certain traditions of both the Omahas and the Osages, and other branches of the great Siouan linguistic family, that they had at one time lived east of the Mississippi River, and after many wanderings, stopping here and there for years, finally reached their present homes in South Dakota and western Missouri.

Mr. Francis La Flesche reported that the traditions of his people, the Omahas, were that they had occupied two important villages on what the Omahas call "The Big Bend of the Xe," at some time in the seventeenth or eighteenth century.

Mr. Myer was enabled to locate these two ancient villages; one, Split Rock site on the Big Sioux River, at its junction with Split Rock River; the other where the Rock Island Railroad now crosses the Big Sioux River, about 10 miles southeast of Sioux Falls. It is here designated the Rock Island site.

Sometime in the seventeenth century the Omahas and Poncas removed from the Pipestone region in Minnesota and finally, after some further wanderings, built a fortified town on the Rock Island site. While living in this fortified place they were attacked and defeated by an enemy, most probably the Dakotas, and finally forced to leave the region. There is a tradition that they buried their dead from this fight in a mound. This tradition was confirmed by excavations made by Mr. A. G. Risty and Mr. F. W. Pettigrew, who report finding a considerable amount of human bones. Some glass beads and small copper bells of white man's make were also found in one of these mounds. There is evidence that this site was occupied somewhere between 1700 and 1725.

After leaving the Rock Island site, the Omahas and Poncas roved without long permanent settlements for several years, but finally returned to the Xe and built a permanent village at Split Rock at the junction of the Big Sioux and Split Rock Rivers.

Mr. Myer spent the month of October, 1921, in exploring this Split Rock site. Many interesting relics of the Omahas were here unearthed, which throw new light on the life of these people before they had been very much changed by contact with the whites.

The 30 mounds on the ridge between the two rivers mark the site of that portion of the old town occupied by the Omahas. On a hill one-half mile to the east was a group of 10 more mounds, occupied by the Poncas before they split away from the Omahas.

By following the clues furnished by the traditions, three low mounds were discovered on the tall ridge $1\frac{1}{2}$ miles to the west. These were said to have marked the lookouts for the main village; they command a view, ranging from 6 to 15 miles, on all sides. The mounds on the Split Rock site appear to have nearly all been used for burial.

The exploration of mound No. 1, on the Omaha section of the town, showed a beautiful little knoll on the edge of the steep, bluff-like bank of Split Rock River. In its soil the Indians dug a shallow pit, about 12 by 6 feet, and 2 feet deep. Here were placed bones belonging to five bodies, several of which appeared to have been buried after decay of the flesh. One body appeared to have been closely flexed before it was placed in the pit. The position of the skeleton of a horse with a crushed frontal bone showed that when this body bundle had been placed in the pit, a large horse, about seven years of age, had been led to the knoll, and there killed. Then, over all these, a low, round-topped mound, 60 feet across at the base and $5\frac{1}{2}$ feet in height, had been raised.

Mound No. 2, the largest of the group, was round topped, 110 feet across at the base, and 10 feet high. A rectangular charnel pit, 12 by 14 feet and 2 feet deep, had been dug in the surface of the soil near the center of the town. This pit was thoroughly lined or coated with a white layer about one-eighth inch in thickness, made from calcined bones. The bottom and sides of the pit were then probably covered with furs, now indicated by a thin layer of animal matter on the white coating. Bones representing about 50 human beings had been laid on the floor of this fur-lined pit.

Traces of the thin fur layer were also found on top of this solid mass of human bones. Over this fur covering a layer of bark was placed, and upon this bark earth had been spread to a depth of from 3 to 6 inches. The earth was then smoothed and pressed down, and on this surface a white coating, similar to that on the bottom and sides, had been spread. Only one small, cylindrical copper bead was found with all this mass of bones, and no object of white man's manufacture was found. There is evidence that this portion of the site was occupied by the Omahas somewhere between 1725 and 1775.

While the Omahas and their kindred, the Poncas, lived together at the Split Rock site some of the most important events in their history took place. The united Omahas and Poncas and their old enemies, the Cheyennes and Arikaras, here made a peace which was concluded with great ceremony. At the urgent request of the

Arikara the sacred chant and dance of the calumet was used to cement this union.

In Vernon and Bates Counties, western Missouri, near the junction of the Osage and Marmiton Rivers, Mr. Myer found several sites known to have been occupied by the Osage Indians in early historic times, shortly after they had come in contact with the whites.

The largest Osage village in Vernon County was situated at Old Town, on Old Town Creek, about $3\frac{1}{2}$ miles south of Pikes village of the Grand Osage. This site covers about 40 acres and is the best known of any of the Osage sites. It has yielded a large amount of iron axes, gun barrels, gunlocks, fragments of brass kettles, glass beads, and other articles of early white manufacture, as well as objects of purely aboriginal origin.

The most picturesque Indian site in this Osage region is Halleys Bluff, on the Osage River, about $1\frac{1}{2}$ miles downstream from where the Marmiton and Marais des Cygnes unite to form the Osage River. There is evidence showing occupancy of this bluff by Indians long before the coming of the white man and probably before the coming of the Osages.

During the month of October, 1921, Mr. David I. Bushnell, jr., visited Scott Field, east of Belleville, Ill., for the purpose of getting airplane pictures of the Cahokia mounds. The commanding officer of the field, Maj. Frank M. Kennedy, appreciating the interest and importance of the work, detailed Lieuts. Harold R. Wells and Ashley C. McKinley, of the Air Service, to make the pictures. They succeeded in making some very interesting photographs of mounds in the vicinity of Cahokia, as well as of the great mound itself, but unfortunately the photographic apparatus at that time available at Scott Field was not suitable, and although the pictures obtained were not very clear, nevertheless no better results could have been secured with the cameras which they were obliged to use. Four of the pictures made by Lieutenants Wells and McKinley were reproduced as Figures 101, 102, 103, and 104 in *Explorations and Field Work of the Smithsonian Institution in 1921* and should prove of special interest as the first photographs of American earthworks made from the air.

The article in which the four airplane pictures were used was prepared for the purpose of showing the great importance of the Cahokia group and of the other related groups to the north, west, and south of Cahokia. The southern group, although many of the units have been destroyed, is of special interest. It is situated near the left bank of the Mississippi, opposite Jefferson Barracks. Bits of pottery, chips of flint, and other traces of a settlement, together with stone-lined graves in the vicinity of the mounds, may indicate the position of a village of one of the Illinois tribes two centuries or more ago.

Mr. B. S. Guha's visit among the Utes and the Navaho at Towoac and Shiprock, respectively, during the summer of 1921 was undertaken primarily with the object of finding any legends or myths about the ancient Cliff Dwellers of Mesa Verde that might still survive among these people, and incidentally to collect as much material about their social institutions as possible.

Mr. Guha arrived at Towoac on July 14, 1921, and spent a couple of weeks visiting the different camps of the Utes. Among the Wiminuche Utes, unfortunately, there does not appear to survive any legends or myths about the Mesa Verde. All that could be gathered from the oldest living members of the tribe was that when their ancestors first came to the Ute Mountain from the north, the whole region from the La Plata to the Blue Mountains and from Dolores to the San Juan was full of ruins such as now may be seen. They were already abandoned, but there were signs of the cultivation of corn about them.

After leaving Towoac Mr. Guha went to Shiprock, N. Mex., and stayed there until September 5, 1921. Unlike the Utes, the Navaho seem to possess survivals of myths about the ancient Cliff Dwellers of Mesa Verde. How far these legends have any historical background it is difficult to say, but they at any rate suggest some earlier and closer relationship between them and the people who lived in the ruins so liberally strewn over the entire region.

In September, 1921, Mr. John L. Baer, acting curator of American archeology in the United States National Museum, made an investigation for the bureau of pictographic rocks in the Susquehanna River. In the middle of the river between Bald Friar and Conowingo, Md., are a number of huge boulders of serpentine or gabbro, bearing inscriptions, a few of which have been heretofore described in the Tenth Annual Report of the Bureau of American Ethnology and in Volume CCC (Lancaster County) Second Geological Survey of Pennsylvania. The largest and most important of these pictographic rocks were found to be on Miles' Island at the head of Gray Rock Falls. Large surfaces of these rocks seem to have been polished before the figures were pecked upon them. Pits, grooved lines indicating tally marks, circles with radiating spokes, concentric circles, faces, and fishlike outlines were the prevailing figures observed.

Other groups of rocks between this island and Conowingo showed equally interesting carvings, but not so profusely. A pyramid-shaped rock standing well out in the rough and dangerous rapids had several fish outlined near its apex. A slab which had been broken from its original position and which might have been used for a shad-dipping stand, was marked with outlines of two slender

fish and two tally marks. A number of interesting photographs and drawings of these pictographs were secured.

In connection with a reconnoitering trip among the prehistoric quarries and workshops along the Susquehanna in the spring of 1922, Mr. Baer again visited these pictographic rocks and secured additional drawings and a number of plaster casts of the more important figures. Prehistoric steatite quarries were traced from the west side of the river at this point to Deer Creek in Harford County, Md. Those showing most work and offering best opportunities for investigation are near Broad Creek in woodland owned by James McLaughlin, near Robinson's mill, and by W. C. Heaps, Mill Green, Harford County, Md.

At a workshop below Peach Bottom, Lancaster, Pa., a number of unfinished and broken banner stones of prochlorite were found. The source of the material was located a short distance east of Bald Friar, Md. A large number of unfinished banner stones of slate were found at the workshop on Mount Johnson Island above Peach Bottom where so many specimens had already been found. At Fishing Creek, Bare Island, and Henry Island evidences were found of considerable camp sites. At New Park, and Fawn Grove in York County, Pa., have been found large caches of rhyolite blades. At both of these places and also at Peach Bottom in the same county were many artifacts and indications of burial grounds. Interesting specimens were secured from most of these localities.

EDITORIAL WORK AND PUBLICATIONS.

The editing of the publications of the bureau was continued through the year by Mr. Stanley Searles, assisted by Mrs. Frances S. Nichols. The status of the publications is presented in the following summary:

PUBLICATIONS ISSUED.

- Thirty-fifth Annual Report. Accompanying paper: Ethnology of the Kwakiutl (Boas). Pts. 1 and 2. 1,481 pp.
- Thirty-sixth Annual Report. Accompanying paper: The Osage Tribe: Rite of the Chiefs; Sayings of the Ancient Men (LaFlesche). 604 pp., 23 pls.
- Bulletin 73. Early History of the Creek Indians and their Neighbors (Swanton). 492 pp., 10 pls.
- Bulletin 74. Excavation of a Site at Santiago Ahuizotla, D. F. Mexico (Tozzer). 56 pp., 19 pls.
- Bulletin 75. Northern Ute Music (Densmore). 213 pp., 16 pls.

PUBLICATIONS IN PRESS OR IN PREPARATION.

- Thirty-fourth Annual Report. Accompanying paper: A Prehistoric Island Culture Area of America (Fewkes).
- Thirty-seventh Annual Report. Accompanying paper: The Winnebago Tribe (Radin).

- Thirty-eighth Annual Report. Accompanying paper: An introductory Study of the Arts, Crafts, and Customs of the Guiana Indians (Roth).
- Thirty-ninth Annual Report. Accompanying paper: The Osage Tribe: The Rite of Vigil (LaFlesche).
- Bulletin 76. Archeological Investigations (Fowke).
- Bulletin 77. Villages of the Algonquian, Siouan, and Caddoan Tribes west of the Mississippi (Bushnell).
- Bulletin 78. Handbook of the Indians of California (Kroeber).
- Bulletin 79. Blood Revenge, War, and Victory Feasts among the Jibaro Indians of Eastern Ecuador (Karsten).
- Bulletin 80. Mandan and Hidatsa Music (Densmore).
- Bulletin 81. Excavations in the Chama Valley, New Mexico (Jeancon).

DISTRIBUTION OF PUBLICATIONS.

The distribution of publications has been continued under the immediate charge of Miss Helen Munroe, assisted by Miss Emma B. Powers. Publications were distributed as follows:

Annual reports and separates.....	7, 197
Bulletins and separates.....	6, 403
Contributions to North American Ethnology.....	39
Introductions.....	13
Miscellaneous publications.....	563
	14, 215

As compared with the previous year, there was an increase of 1,420 publications distributed. There was a decrease of 57 names in the mailing list.

ILLUSTRATIONS.

Mr. De Lancey Gill, illustrator, with the assistance of Mr. Albert E. Sweeney, continued the preparation of the illustrations of the bureau. A summary of this work follows:

Line and color drawings, including maps, diagrams, etc., intended for use as illustrations for publication.....	159
Illustrations, including photographs retouched, mounted, and made ready for engraving.....	1, 282
Illustration proof edited.....	1, 034
Lithographic proof examined at Government Printing Office.....	36, 000
Photographic work, negatives of ethnologic and archeologic subjects.....	242
Films developed from field exposures.....	138
Prints for distribution and office use.....	538
Photostat copies.....	1, 987

Mr. Sweeney was detailed for the month of June to prepare 100 or more negatives for the National Zoological Park.

LIBRARY.

The reference library continued in the immediate care of Miss Ella Leary, librarian, assisted by Miss Julia S. Atkins and Mr. Samuel H. Miller.

During the year 406 books were accessioned, of which 64 were acquired by purchase, 120 by binding of periodicals, and 142 by gift and exchange. The periodicals currently received number about 900, of which 33 are received by subscription, the remainder being received through exchange. The bureau has also received 159 pamphlets, giving at the close of the year a working library of 24,561 volumes, 14,936 pamphlets, and several thousand unbound periodicals.

In addition to the regular routine of library work, Miss Leary has been able, with the assistance of Miss Atkins, to make rapid progress toward the completion of the new subject catalogue, with the result that about 18,000 catalogue cards have been filed during the fiscal year.

The greatest need of the library is for more shelf room for its publications, due to its growth during the past few years. The library is greatly hampered by this need.

The posting of the monthly bulletin of new publications was continued throughout the year.

During the year many students not connected with the Smithsonian Institution found the library of service in seeking volumes not obtainable in other libraries of the city. The library was used also by the Library of Congress and officers of the executive departments, and out-of-town students have called upon the library for loans during the year. In addition to the use of its own library it was found necessary to draw on the Library of Congress from time to time for the loan of about 400 volumes.

There were bound during the year 200 books, pamphlets, and serial publications.

COLLECTIONS.

The following collections, acquired by members of the bureau or by those detailed in connection with its researches, have been transferred to the United States National Museum:

- 66880. Collection of Alaskan ethnologica made by the late Rev. Sheldon Jackson and purchased by the bureau from his daughter, Miss Leslie Jackson.
- 67105. Shell and pottery specimens from Ten Thousand Islands, Florida, collected during the spring of 1921 by Mr. William Dinwiddie, Metuchen, N. J.
- 67112. Four stone objects and two pottery fragments from "Bear" and "Lewis" mounds, near Portsmouth, Ky., collected by Mr. Gerard Fowke during the spring of 1921.
- 67225. Four pieces of pottery and eight pieces of flint, collected by Prof. J. E. Pearce, of Austin, Tex., in eastern Texas during the summer of 1919.
- 67258. Collection of shell objects presented to the bureau by Charles T. Earle, of Palma Sola, Fla., found near Shaws Point, Fla.
- 67274. Collection of archeological objects secured by Dr. J. Walter Fewkes from the Mesa Verde National Park, Colo., in the spring of 1920.
- 67398. Chunkey stone from Rowena, Ky.

67451. Archeological objects collected near Austin and at "Burnt Rock" mounds, Texas, by Prof. J. E. Pearce and Dr. J. Walter Fewkes.
67572. Collection of skeletal material secured by Mr. William E. Myer in the vicinity of the junction of Split Rock River and Big Sioux River, S. Dak.
67730. Archeological material collected in 1920 by Mr. W. E. Myer for the Bureau of American Ethnology in Williamson and Davidson Counties, Tenn.
68254. Collection of archeological objects from Rio Grande Valley, N. Mex., turned over to the bureau by Secretary Charles D. Walcott.
68255. Fragments of pottery from Indian burial on the Catawba River, N. C., sent to the bureau by J. Albert Holmes, Construction, N. C.
68256. Collection of Indian implements found on the terraces of Upatoi Creek, and Chattahoochee River, Muscogee County, Ga., sent to the bureau by Mr. A. T. Sweet, Columbus, Ga.

PROPERTY.

Furniture and office equipment were purchased to the amount of \$134.97.

MISCELLANEOUS.

Clerical.—The correspondence and other clerical work of the office has been conducted by Miss May S. Clark, clerk to the chief. Mrs. Frances S. Nichols assisted the editor. Mr. Anthony W. Wilding served as messenger and typist to the chief.

Personnel.—Miss Julia S. Atkins received a permanent appointment as stenographer March 1, 1922.

Dr. T. T. Waterman, who was appointed as temporary ethnologist March 1, 1922, was detached from the bureau roll July 1 for six weeks in order to lecture in the summer school of Columbia University, New York City.

Mr. Samuel H. Miller, messenger boy in the library, resigned June 23, 1922.

Mr. James Mooney, ethnologist, died December 22, 1921.

Respectfully submitted.

J. WALTER FEWKES,

Chief, Bureau of American Ethnology.

DR. CHARLES D. WALCOTT,

Secretary, Smithsonian Institution.

APPENDIX 5.

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, 1922:

The appropriation granted by Congress for the support of the service during the year was \$50,000, the same as the amount for the year 1921. The excess of these appropriations over those formerly allowed for the system of international exchanges was designed to meet the extraordinary expenses of forwarding, at the high ocean and other transportation rates, the accumulations of packages that were withheld awaiting the resumption of shipments to certain foreign countries. In addition to the above appropriation, the usual allotment of \$200 for printing and binding was allowed by Congress. The repayments from departmental and other establishments aggregated \$5,510.74, making the total resources available for carrying on the system of exchanges for the year, \$55,710.74.

During the year 1922 the total number of packages handled was 383,157, a decrease from the number for the preceding year of 68,314. These packages weighed a total of 592,600 pounds, a decrease of 12,712. While in consequence of the return to nearly normal conditions the figures just given show a falling off in the number and weight of packages passing through the service from those handled last year, the work during the fiscal year 1922 exceeded by 41,490 the number of packages handled in 1914, just prior to the World War, which indicates a steady increase in the work of the office.

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

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	133,363	.....	82,905	.....
Publications received in return for parliamentary documents..	.....	2,687	.....	7,782
United States departmental documents sent abroad.....	128,755	.....	191,502	.....
Publications received in return for departmental documents...	.....	7,111	.....	22,600
Miscellaneous scientific and literary publications sent abroad...	82,730	.....	222,741	.....
Miscellaneous scientific and literary publications received from abroad for distribution in the United States.....	.....	28,511	.....	65,070
Total.....	344,848	38,309	497,148	95,452
Grand total.....	383,157	.....	592,600	.....

It should be stated here that the disparity in the above figures between the number of packages sent and those received is accounted for in part by the fact that packages transmitted abroad often contain only one publication, while those received in return frequently comprise many volumes. In some instances, especially in the case of publications received in exchange for parliamentary documents, the term "package" is applied to large boxes containing many separate publications. Furthermore, many returns for publications sent abroad reach their destinations in this country through the mails and not through the exchange service.

I stated last year that the steps taken by the Institution looking to the reopening of exchanges with Rumania and the establishment of relations with the newly formed Government of Jugoslavia had not led to a successful result. The Governments of both those countries expressed a desire to have the shipment of international exchanges resumed as soon as conditions would permit, but nothing further was heard from either of them. An offer made during the latter part of the year by the Institutul Meteorologic Central, Bukharest, and the Académie Royale Serbe des Sciences et des Arts, Belgrade, to serve as agencies for their respective countries was therefore accepted by the Institution, and a shipment of 26 boxes was made to the former and 69 to the latter. The exchange agency in Rumania was formerly the Academia Romana and in Serbia the Ministère des Affaires Étrangères.

During the year exchange relations have been established with the newly formed Governments of Esthonia, Far Eastern Republic, Latvia, Lithuania, and Ukraina.

The conditions in Russia and Turkey have not yet improved sufficiently to warrant the Institution in taking steps to renew the exchange of publications between those countries and the United States.

The Institution requested several New York forwarding agents to submit rates for handling and forwarding exchange consignments abroad, the rates to take effect on July 1, 1922. The proposal submitted by the present agents, Messrs. Davies, Turner & Co., 39 Pearl Street, New York City, was found to be the lowest, and shipments will therefore continue to be sent to foreign countries through that firm.

There were shipped abroad during the year 3,215 boxes, being an increase of 463 over the number for the preceding 12 months. This is the largest number of boxes forwarded through the exchange service in one year and is due in great measure to the opening of exchange relations with Jugoslavia and several of the independent Russian States, the packages for those countries having accumulated at the Institution for several years. The number of boxes shipped was fur-

ther augmented by the forwarding to Austria of a large number of United States patent specifications that were held during the war.

Of the total number of boxes sent abroad 394 contained full sets of United States official documents for foreign depositories, and 2,821 included departmental and other publications for depositories of partial sets and for miscellaneous correspondents.

It is gratifying to state that during the year the office has been able to return to its regular schedule of shipments to foreign countries. Consignments are now being forwarded to Great Britain and Germany weekly, to France and Italy semimonthly, and to all other countries monthly.

The number of boxes sent to each country is given in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Country.	Number of boxes.
Argentina.....	119	Italy.....	121
Austria.....	203	Jamaica.....	3
Belgium.....	89	Japan.....	80
Bolivia.....	3	Latvia.....	12
Brazil.....	49	Netherlands.....	80
British Colonies.....	15	New South Wales.....	43
British Guiana.....	1	New Zealand.....	28
Bulgaria.....	9	Nicaragua.....	2
Canada.....	30	Norway.....	47
Chile.....	36	Paraguay.....	4
China.....	164	Peru.....	22
Chosen.....	1	Poland.....	49
Colombia.....	26	Portugal.....	22
Costa Rica.....	18	Queensland.....	17
Cuba.....	5	Rumania.....	32
Czechoslovakia.....	123	Salvador.....	4
Danzig.....	5	Siam.....	2
Denmark.....	41	South Australia.....	25
Ecuador.....	16	Spain.....	48
Egypt.....	11	Sweden.....	86
Esthonia.....	11	Switzerland.....	91
Far Eastern Republic.....	2	Syria.....	4
Finland.....	20	Tasmania.....	12
France.....	201	Ukraineia.....	2
Germany.....	523	Union of South Africa.....	30
Great Britain and Ireland.....	364	Uruguay.....	23
Greece.....	17	Venezuela.....	14
Guatemala.....	3	Victoria.....	50
Haiti.....	6	Western Australia.....	14
Honduras.....	2	Yugoslavia.....	69
Hungary.....	54		
India.....	7	Total.....	3,215

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

The number of sets of governmental documents forwarded abroad through the International Exchange Service to foreign depositories has been reduced during the year by one, the partial set formerly sent to Montenegro having been discontinued as that country is now a part of the Kingdom of the Serbs, Croats, and Slovenes, which receives a full set. The total number of sets of governmental documents distributed through the service is therefore 95, 57 full and 38 partial. The set sent to the Kingdom of the Serbs, Croats, and Slovenes is entered in the following list under Jugoslavia.

The name of the Austrian depository has been changed from the Statistische Zentral Kommission to the Bundesamt für Statistik.

A complete list of the depositories is given below :

DEPOSITORIES OF FULL SETS.

- ARGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.
 AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.
 AUSTRIA: Bundesamt für Statistik, Schwarzenbergstrasse 5, Vienna I.
 BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the State of Baden.)
 BAVARIA: Staats-Bibliothek, Munich.
 BELGIUM: Bibliothèque Royale, Brussels.
 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.
 CZECHOSLOVAKIA: Bibliothèque de l'Assemblée Nationale, Prague.
 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: Secrétaire d'Etat des Relations Extérieures, Port au Prince.
 HUNGARY: Hungarian House of Delegates, Budapest.
 INDIA: Imperial Library, 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: Bibliotheek van de Tweede Kamer der Staten-Generaal, The Hague.
- NEW SOUTH WALES: Public Library of New South Wales, Sydney.
- NEW ZEALAND: General Assembly Library, Wellington.
- NORWAY: Stortingets Bibliothek, Christiania.
- ONTARIO: Legislative Library, Toronto.
- PARIS: Préfecture de la Seine.
- PERU: Biblioteca Nacional, Lima.
- POLAND: Bibliothèque du Ministère des Affaires Etrangères, Warsaw.
- PORTUGAL: Bibliotheca Nacional, Lisbon.
- PRUSSIA: Preussische Staatsbibliothek, Berlin, N. W. 7.
- QUEBEC: Library of the Legislature of the Province of Quebec, Quebec.
- QUEENSLAND: Parliamentary Library, Brisbane.
- RUSSIA: Public Library, Petrograd.
- SAXONY: Oeffentliche Bibliothek, Dresden.
- SOUTH AUSTRALIA: Parliamentary Library, Adelaide.
- SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- SWEDEN: Kungliga Biblioteket, Stockholm.
- SWITZERLAND: Bibliothèque Fédérale Centrale, Berne.
- TASMANIA: Parliamentary Library, Hobart.
- TURKEY: Department of Public Instruction, Constantinople.
- UNION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
- URUGUAY: Oficina de Cambio Internacional de Publicaciones, Montevideo.
- VENEZUELA: Biblioteca Nacional, Caracas.
- VICTORIA: Public Library of Victoria, Melbourne.
- WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
- WURTEMBERG: Landesbibliothek, Stuttgart.
- YUGOSLAVIA: Ministère des Affaires Etrangères, Belgrade.

DEPOSITORIES OF PARTIAL SETS.

- ALBERTA: Provincial Library, Edmonton.
- ALSACE-LORRAINE: Bibliothèque Universitaire et Régionale de Strasbourg, Strasbourg.
- BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
- BRAZIL: Bibliotheca da Assembleia Legislativa do Estado do Rio de Janeiro, Niteroy.
- BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
- BRITISH COLUMBIA: Legislative Library, Victoria.
- BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
- BULGARIA: Ministère des Affaires Etrangères, Sofia.
- CEYLON: Colonial Secretary's Office (Record Department of the Library), Colombo.
- ECUADOR: Biblioteca Nacional, Quito.
- EGYPT: Bibliothèque Khédiviale, Cairo.
- FINLAND: Central Library of the State, Helsingfors.
- GUATEMALA: Secretary of the Government, Guatemala.
- HAMBURG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
- HESSE: Landesbibliothek, Darmstadt.
- HONDURAS: Secretary of the Government, Tegucigalpa.
- JAMAICA: Colonial Secretary, Kingston.
- LÁTVIA: Ministry of Foreign Affairs, Riga.

- 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, Veletta.
 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.
 RUMANIA: Academia Romana, Bukharest.
 SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
 SIAM: Department of Foreign Affairs, Bangkok.
 STRAITS SETTLEMENTS: Colonial Secretary, Singapore.
 SWITZERLAND: Library of the League of Nations, Palace of Nations, Quai de Lemán, Geneva.
 UNITED PROVINCES OF AGRA AND OUDH: Undersecretary to Government, Allahabad.
 VIENNA: Bürgermeister-Amt der Stadt Wien.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

The Library of the League of Nations, Geneva, Switzerland, and the Rügi Raamatukogu, Toompea, Reval, Esthonia, have been added to the list of those countries receiving the daily Congressional Record.

Mention was made in my last report of the fact that the Government of Poland had entered into the immediate exchange with the United States, although it had not signified its adherence to the Brussels convention providing for such exchange. During the year the Institution was advised through diplomatic channels that the Polish Government, in the exercise of the privilege granted to non-signatory States by Article 2 of Exchange Convention B of March 15, 1886, had declared its adherence to that diplomatic instrument.

Following is a complete list of the addresses to which the daily Congressional Record is now sent:

- ARGENTINA: Biblioteca del Congreso Nacional, Buenos Aires.
 AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.
 AUSTRIA: Bibliothek des Nationalrates, Wien I.
 BADEN: Universitäts-Bibliothek, Heidelberg.
 BELGIUM: Bibliothèque de la Chambre des Représentants, Brussels.
 BOLIVIA: Cámara de Diputados, Congreso Nacional, La Paz.
 BRAZIL: Bibliotheca do Congresso Nacional, Rio de Janeiro.
 BUENOS AIRES: Biblioteca del Senado de la Provincia de Buenos Aires, La Plata.
 CANADA:
 Library of Parliament, Ottawa.
 Clerk of the Senate, Houses of Parliament, Ottawa.

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

CUBA:

Biblioteca de la Cámara de Representantes, Habana.

Biblioteca del Senado, Habana.

CZECHOSLOVAKIA: Bibliothéque de l'Assemblée Nationale, Prague.

DENMARK: Rigsdagens Bureau, Kopenhagen.

ESTHONIA: Rügi Raamatukogu, Toompea, Reval.

FRANCE:

Bibliothéque de la Chambre des Députés, au Palais Bourbon, Paris.

Bibliothéque du Sénat, au Palais du Luxembourg, Paris.

GREAT BRITAIN: Library of the Foreign Office, Downing Street, London, S. W. 1.

GREECE: Library of Parliament, Athens.

GUATEMALA: Biblioteca de la Oficina Internacional Centro-Americana, 8a Calle Poniente No. 1, Ciudad de Guatemala.

HONDURAS: Biblioteca del Congreso Nacional, Tegucigalpa.

HUNGARY: Bibliothek des Abgeordnetenhauses, Budapest.

ITALY:

Biblioteca della Camera dei Deputati, Palazzo di Monte Citorio, Rome.

Biblioteca del Senato del Regno, Palazzo Madama, Rome.

LIBERIA: Department of State, Monrovia.

NEW SOUTH WALES: Library of Parliament, Sydney.

NEW ZEALAND: General Assembly Library, Wellington.

PERU: Cámara de Diputados, Congreso Nacional, Lima.

POLAND: Monsieur le Ministre des Affaires Etrangères, Warsaw.

PORTUGAL: Bibliotheca do Congresso da Republica, Lisbon.

PRUSSIA: Bibliothek des Abgeordnetenhauses, Prinz-Albrechtstrasse 5, Berlin, S. W. 11.

QUEENSLAND: The Chief Secretary's Office, Brisbane.

RUMANIA: Bibliothéque de la Chambre des Députés, Bukharest.

RUSSIA: Sendings temporarily suspended.

SPAIN:

Biblioteca del Congreso de los Diputados, Madrid.

Biblioteca del Senado, Madrid.

SWITZERLAND:

Bibliothéque de l'Assemblée Fédérale Suisse, Berne.

Library of the League of Nations, Geneva.

TRANSVAAL: State Library, Pretoria.

UNION OF SOUTH AFRICA: Library of Parliament, Cape Town.

URUGUAY: Bibliotheca de la Cámara de Representantes, Montevideo.

VENEZUELA: Cámara de Diputados, Congreso Nacional, Carácas.

WESTERN AUSTRALIA: Library of Parliament of Western Australia, Perth.

YUGOSLAVIA: Library of the Skupshtina, Belgrade.

The total number of copies of the daily Congressional Record set aside by law for exchange with foreign legislative bodies is 100. It will be seen from the above that this exchange is conducted with 44 establishments.

FOREIGN EXCHANGE AGENCIES.

It will be noted from the following list of exchange agencies that shipments are now being made to Esthonia, the Far Eastern Republic, Yugoslavia, Latvia, Lithuania, Rumania, and Ukraina.

The Teachers' College at Vladivostok is the agency for the Far Eastern Republic; the Ministry of Foreign Affairs at Riga, for Latvia; the Académie Royale Serbe des Sciences et des Arts at Belgrade, for Yugoslavia; and the Institutul Meteorologic Central in Bukharest, for Rumania. Only a few packages have thus far been received for Lithuania, and, for the present, transmissions to that country will be made through the mails. Shipments were made to the university libraries at Dorpat and at Odessa, with the request that those libraries distribute the consignments and also act as the agencies for Esthonia and Ukrainia, respectively. As these shipments were not made until near the close of the year, replies have not yet been received from those establishments. It is anticipated, however, that both will consent to serve as exchange agencies.

A complete list of the foreign exchange agencies or bureaus is given below:

ALGERIA, *via* France.

ANGOLA, *via* Portugal.

ARGENTINA: Comisión Protectora de Bibliotecas Populares, Calle Cordoba 931, Buenos Aires.

AUSTRIA: Bundesamt für Statistik, Schwarzenbergstrasse 5, Vienna I.

AZORES, *via* Portugal.

BELGIUM: Service Belge des Echanges 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.

CHOSON: Government General, Keijo.

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

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

CZECHOSLOVAKIA: Service Tchecoslovaque des Echanges Internationaux, Bibliothèque de l'Assemblée Nationale, Prague 1-79.

DANZIG: Stadtbibliothek, Danzig.

DENMARK: Kongelige Danske Videnskabernes Selskab, Copenhagen.

DUTCH GUIANA: Surinaamsche Koloniale Bibliotheek, Paramaribo.

ECUADOR: Ministerio de Relaciones Exteriores, Quito.

EGYPT: Government Publications Office, Printing Department, Bulaq, Cairo.

ESTHONIA: Negotiations to establish an agency now pending.

FAR EASTERN REPUBLIC: Teachers' College of the Far Eastern Republic, Vladivostok.

FINLAND: Delegation of the Scientific Societies of Finland, Helsingfors.

- FRANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.
- GERMANY: Amerika-Institut, Universitätstrasse 8, Berlin, N. W. 7.
- GREAT BRITAIN AND IRELAND: Messrs. Wheldon & Wesley, 2, 3, and 4 Arthur St., New Oxford St., London, W. C. 2.
- GREECE: Bibliothéque Nationale, Athens.
- GREENLAND, *via* Denmark.
- GUADELOUPE, *via* France.
- GUATEMALA: Instituto Nacional de Varones, Guatemala.
- GUINEA, *via* Portugal.
- HAÏTI: Secrétaire d'Etat des Relations Extérieures, Port au Prince.
- HONDURAS: Biblioteca Nacional, Tegucigalpa.
- HUNGARY: Dr. Julius Pikler, Fővárosi Telekértéknnylvántartó Hivatal (City Land Valuation Office), Központi Városház, Budapest III.
- ICELAND, *via* Denmark.
- INDIA: Superintendent of Stationery, Bombay.
- ITALY: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.
- JAMAICA: Institute of Jamaica, Kingston.
- JAPAN: Imperial Library of Japan, Tokyo.
- JAVA, *via* Netherlands.
- LATVIA: Ministry of Foreign Affairs, Riga.
- LIBERIA: Bureau of Exchanges, Department of State, Monrovia.
- LITHUANIA: Sent by mail.
- LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
- LUXEMBURG, *via* Germany.
- MADAGASCAR, *via* France.
- MADEIRA, *via* Portugal.
- MOZAMBIQUE, *via* Portugal.
- NETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothéque de l'Académie technique, Delft.
- 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.
- PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
- POLAND: Bibliothéque du Ministère des Affaires Etrangères, Warsaw.
- PORTUGAL: Sección de Trocas Internacionais, Bibliotheca Nacional, Lisbon.
- QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.
- RUMANIA: Institutul Meteorologic Central, Ministerul Agriculturii, Bukharest.
- RUSSIA: Shipments temporarily suspended.
- SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
- 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: American University of Beirut.

TASMANIA: Secretary to the Premier, Hobart.

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

TUNIS, via France.

TURKEY: Shipments temporarily suspended.

UKRAINIA: Negotiations to establish an agency now pending.

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.

YUGOSLAVIA: Académie Royal Serbe des Sciences et des Arts, Belgrade.

RULES GOVERNING THE TRANSMISSION OF EXCHANGES.

A revised edition of the circular containing a brief description of the service and the rules under which packages are accepted for distribution, was published at the close of the year and is here reproduced for the information of any who may desire to make use of the service in the forwarding of publications.

In effecting the distribution of its first publications abroad, the Smithsonian Institution established relations with many foreign scientific societies and libraries, by means of which it was enabled to materially assist institutions and individuals of this country in the transmission of their publications abroad, and also foreign societies and individuals in distributing their publications in the United States.

In more recent years the Smithsonian Institution has been charged with the duty of conducting the official exchange bureau of the United States Government, through which the publications authorized by Congress are exchanged for those of other Governments; and by a formal treaty it acts as intermediary between the learned bodies and scientific and literary societies of this and other countries for the reception and transmission of their publications.

Attention is called to the fact that this is an international and not a domestic exchange service, and that it is designed to facilitate exchanges between the United States and other countries only. As publications from domestic sources for addresses in Hawaii, the Philippine Islands, Porto Rico, and other territory subject to the jurisdiction of the United States do not come within the designation "international," they are not accepted by the Institution for transmission through the service.

Packages prepared in accordance with the rules enumerated below will be received by the Smithsonian Institution from individuals or institutions of learning in the United States and forwarded to their destinations abroad through the various exchange bureaus or agencies in other countries. Many of these bureaus and agencies will likewise receive from correspondents in their countries such publications for addresses in the United States and its dependencies as may be delivered to them under rules similar to those prescribed herein, and will forward them to Washington, after which the Institution will transmit them to their destinations by mail free of cost to the recipients.

On the receipt of a consignment from a domestic source it is assigned a "record number," which number is, for identification purposes, placed on each package contained therein. After the packages have been recorded they are packed in boxes with consignments from other senders and are forwarded by freight to the bureaus or agencies abroad which have undertaken to distribute exchanges in those countries. To Great Britain and Germany shipments are made weekly, to France and Italy semimonthly, and to all other countries consignments are forwarded at intervals not exceeding one month.

The Institution assumes no responsibility in the transmission of packages intrusted to its care, but at all times uses its best endeavors to forward exchanges to their destinations safely and as promptly as possible. Especial attention should be called in this connection to the time ordinarily required for packages sent through the exchange service to reach their destinations. To Great Britain and Germany, for example, where weekly shipments are made, the average time for a package to reach its destination is about six weeks. In some instances the period is much shorter and in no case should it be longer unless there is some unavoidable delay at the ports of embarkation or debarkation. To those countries to which shipments are made at semimonthly and monthly intervals, the time of delivery is of course somewhat longer, depending on the distance and also whether packages are received at the Institution immediately before or after a shipment. If, therefore, advance notices are mailed by senders, mention should be made of the above facts in order that consignees may expect some delay between the receipt of notices and the arrival of packages. In cases where greater dispatch is desired, publications should be forwarded by the senders to their foreign destinations direct by mail.

RULES.

The rules governing the Smithsonian International Exchange Service are as follows:

1. Consignments from correspondents in the United States containing packages for transmission abroad should be addressed—"Smithsonian Institution, International Exchanges, Washington, D. C.," and forwarded with carriage charges to Washington prepaid.

2. In forwarding a consignment the sender should mail a letter to the Institution, stating by what route it is being shipped, and the number of boxes or parcels which it comprises. A list giving the name and address of each consignee should also be furnished. This request should invariably be complied with for record.

3. Packages should be legibly and fully addressed, using, when practicable, the language of the country to which they are to be forwarded. In order to avoid any possible dispute as to ownership, names of individuals should be omitted from packages intended for societies and other establishments.

4. Packages should be securely wrapped and cardboard used if necessary to protect plates from crumpling.

5. Letters are not permitted in exchange packages.

6. If donors desire acknowledgments, packages may contain receipt forms to be signed and returned by the establishment or individual addressed. Should publications be desired in exchange, a request to that effect may be printed on the receipt form or on the package.

7. The work carried on by the International Exchange Service is not in any sense of a commercial nature, but is restricted to the transmission of pub-

lications sent as exchanges or donations. Books sold or ordered through the trade are, therefore, necessarily excluded.

8. Specimens are not accepted for distribution, except when permission has been obtained from the Institution.

Respectfully submitted.

C. G. ABBOT,
Assistant Secretary,
In Charge of Library and Exchanges.

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

APPENDIX 6.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to present the following report on the operations of the National Zoological Park for the fiscal year ending June 30, 1922:

The appropriation allowed by Congress in the sundry civil act approved March 4, 1921, for the regular maintenance of the park was the same as for the preceding year, \$125,000, with the usual additional allotment of \$200 for printing and binding. The sum of \$2,500, together with an unobligated balance of \$2,403.66 left from the appropriation for alteration of boundaries, 1921, was also made available, as a continuing appropriation, for the purchase of land to correct the eastern boundary line near the Adams Mill Road entrance.

The year has been one of the most successful in the history of the park. A number of minor permanent improvements have been completed, progress has been made on some larger undertakings, and the grounds have been maintained in a condition gratifying to all who are interested in the great natural beauty of the reservation. At the close of the year the collection is larger, and of more importance, than ever before; more different species are on exhibition, and the actual number of animals is greater than in any previous year; there are more than the usual number of rare and valuable specimens; the births have been numerous; and the death rate has been kept at a low mark. For the third successive year the attendance has exceeded 2,000,000.

ACCESSIONS.

Gifts.—No less than 217 animals, an unusual number, were added to the collection as gifts, or were placed by friends of the park on indefinite deposit. Special mention in this connection should be made of two important collections from South America.

The collections of living animals made by Dr. William M. Mann on the Mulford Biological Exploration of the Amazon Basin reached the park on April 15, 1922. Included were 15 mammals, 50 birds, and 17 reptiles that arrived in perfect condition, and a very few others lost from the effects of travel. These were all generously presented to the park by the H. K. Mulford Co., of Philadelphia.

Doctor Mann is to be congratulated on his success in bringing to the country live representatives of several species from Bolivia and western Brazil that have never before been shown. The red-faced spider monkey, black-headed woolly monkey, pale capuchin, choliba screech owl, Bolivian penelope, short-tailed parrot, Maximilian's parrot, blue-headed parrot, Cassin's macaw, golden-crowned paroquet, Weddell's paroquet, orange-winged paroquet, and golden-winged paroquet are new to the collection. These and other rarities are mostly from the Rio Beni, Bolivia, and the upper Rio Madeira, Brazil, localities from which animals seldom find their way into collections. Other species, including such rare birds as the festive parrot, Amazonian caique, and white-backed trumpeter, while not new to the park records, are unusual. There were also some showy birds and small mammals from the lower Amazon as well as an excellent collection of living reptiles. On account of the great proportion of rare species it contained and the unusually good condition of the specimens on arrival, the Mulford Explorations collection easily ranks as the most important accession received from tropical America in some years.

Mr. W. J. La Varre, jr., continuing his donations from personal exploration of out-of-the-way parts of South America, presented 28 birds and mammals from the interior of British Guiana. Conspicuous among these are a cock of the rock, a Hahn's macaw, and two dusky parrots, all new to the collection. Mr. La Varre also succeeded in landing a young red howler monkey. The cock of the rock, a young bird in immature plumage on arrival, has now developed into full color and is one of the most showy and attractive exhibits in the bird house.

Mr. Victor J. Evans, of Washington, D. C., long a regular contributor to the collection, purchased and placed on indefinite deposit a Cape great-eared fox and two yellow-billed hornbills, both species new to the records of the park. The long-eared fox, received from South Africa, is doubtless the first representative of its species ever exhibited alive in America.

Sixty-eight individual donors contributed to the collection during the year. The complete list is as follows:

- Mrs. Benjamin E. Abbott, Washington, D. C., Virginia opossum.
- Dr. Arthur A. Allen, Ithaca, N. Y., 10 greater scaup ducks.
- American Express Co., Washington, D. C., 4 chipmunks.
- Mrs. R. P. Andrews, Washington, D. C., Cuban parrot.
- Mr. Carl Bandrexler, Washington, D. C., copperhead.
- Mr. Murrell Barkley, Washington, D. C., 2 tovi paroquets.
- Mrs. A. H. Baum, Washington, D. C., alligator.
- Mrs. William R. Bedell, Washington, D. C., blue-fronted parrot.
- Mr. John M. Blanton, Washington, D. C., Texas red wolf.
- Mrs. Grace Boone, New Midway, Md., American coot.

- Mr. M. G. Butler, Dillwyn, Va., great horned owl.
 Mr. Thomas F. Callahan, Washington, D. C., great horned owl.
 Canadian Government, through Hon. J. B. Harkin, yak.
 Mr. Madison Clark, Washington, D. C., great horned owl.
 Mrs. John L. Clem, Washington, D. C., zebra finch.
 Mr. M. Cochrane, La Plata, Md., American barn owl.
 Mr. N. B. Davis, Washington, D. C., alligator.
 Mr. Harrison H. Dodge, Mount Vernon, Va., red and blue and yellow macaw.
 Miss Josephine Duffey, Alexandria, Va., crab-eating macaque.
 Mr. J. H. Evans, Washington, D. C., skunk.
 Mr. Victor J. Evans, Washington, D. C., great-eared fox and two yellow-billed hornbills.
 Commander Frank Jack Fletcher, United States Navy, Washington, D. C., grass paroquet.
 Mrs. Kenneth L. Frye, Chevy Chase, Md., sulphur-crested cockatoo.
 Mr. H. C. Fuller, Washington, D. C., brown capuchin.
 Mrs. E. W. Gibb, Washington, D. C., raccoon.
 Gude Bros. Co., Washington, D. C., alligator.
 Miss Emma T. Hahn, Washington, D. C., 4 canaries.
 Hon. Warren G. Harding, White House, Washington, D. C., coyote.
 Mr. Mitchell Harrison, Nokesville, Va., raccoon.
 Mr. Caleb R. Hathaway, Chevy Chase, Md., Virginia opossum.
 Mr. Odis B. Hinnant, Washington, D. C., banded rattlesnake.
 Mr. Allen Hoover, Washington, D. C., two alligators.
 Mr. M. A. Horner, Seward, Alaska, Alaskan bald eagle.
 Mr. S. F. Howland, Silver Springs, Md., barred owl.
 Kazim Temple, A. A. O. N. M. S., Roanoke, Va., bald eagle.
 Mr. R. A. Kishpaugh, Fredericksburg, Va., two alligators.
 Mr. S. Seibert Knode, Boonsboro, Md., red-tailed hawk and two American barn owls.
 Mr. W. J. La Varre, jr., Washington, D. C., red howler monkey, cock of the rock, Hahn's macaw, 2 dusky parrots, 3 orange-winged parrots, and 20 blue-winged parrotlets.
 Mr. Harry L. Light, Washington, D. C., festive parrot.
 Mr. Edward Lucas, Silver Springs, Md., jumping mouse.
 Dr. C. L. Marlatt, Washington, D. C., yellow-headed parrot.
 Dr. C. B. Masson, Washington, D. C., one black snake and five copperheads.
 Mr. Richard McCann, Washington, D. C., woodchuck.
 Mr. Edward B. McLean, Washington, D. C., kinkajou and brown pelican.
 Miss Sara G. Meetze, Washington, D. C., red fox.
 Mrs. Charles Middleton, Silver Hill, Md., bald eagle.
 Mulford Biological Exploration of the Amazon Basin, through Dr. William M. Mann, red-faced spider monkey, douroucoulis, titi monkey, 2 woolly monkeys, 2 pale capuchins, 2 agoutis, 6 tamarins, toucan, choliha screech owl, guan, penelope, 2 razor-billed curassows, 2 white-backed trumpeters, short-tailed parrot, Maximilian's parrot, mealy parrot, 3 blue-headed parrots, 4 festive parrots, Cassin's macaw, white-eyed paroquet, 4 golden-crowned paroquets, 4 Weddell's paroquets, 7 orange-winged paroquets, 8 golden-winged paroquets, 7 Amazonian caiques, spectacled cayman, and 16 South American turtles.
 Mr. C. Bland Payne, Richmond, Va., sparrow hawk.
 Miss Dorothy Pickells, Washington, D. C., brown capuchin.
 Mr. Marshall Pickett, Brentwood, Md., screech owl.
 Mr. Jack Polkinhorn, Washington, D. C., painted turtle.
 Mr. J. S. Ritz, Altoona, Pa., two sparrow hawks.

Commander John David Robnett, United States Navy, Washington, D. C., two Santo Domingo parrots.

Mr. Richard J. Scharf, Washington, D. C., two alligators.

Mr. Edward S. Schmid, Washington, D. C., jackdaw, Canadian porcupine, and two Virginia opossums.

Mr. Harry Seamon, Takoma Park, Md., barred owl.

Mrs. Albert Semler, Hagerstown, Md., two American barn owls.

Dr. R. W. Shufeldt, Washington, D. C., glass-snake.

Mr. Robert Stabler, Washington, D. C., black snake.

State Game, Fish and Forest Fire Department, Lansing, Mich., through Hon. John Baird, four coyotes.

Mrs. Anna P. Stewart, Chevy Chase, Md., two canaries.

Mrs. Lucy N. Towson, Washington, D. C., canary.

Mr. J. E. Tyler, Washington, D. C., three moccasins.

Mr. Edward White, Washington, D. C., albino squirrel.

Hon. Arthur H. Wight, Port of Spain, Trinidad, British West Indies, capybara.

Mr. J. Warren Wood, Silver Springs, Md., weasel.

Mrs. Lena D. Woodard, South Washington, Va., barred owl.

Mr. L. T. Zbinden, Washington, D. C., yellow-headed parrot.

Births.—During the year 58 mammals and 28 reptiles were born, and 64 birds were hatched in the park. These records include only such as are reared to a reasonable age, no account being made in these published statistics of young that live only a few days. Mammals born include: Manchurian tiger, 4; dingo, 6; Florida otter, 3; raccoon, 2; gray wolf, 1; hippopotamus, 1; Rocky Mountain sheep, 1; tahr, 1; East African eland, 1; American bison, 1; llama, 1; Indian antelope, 1; Virginia deer, 3; hog deer, 2; Japanese deer, 5; fallow deer, 2; red deer, 5; barasingha, 1; brush-tailed rock wallaby, 2; rufous-bellied wallaby, 3; black-tailed wallaby, 1; great red kangaroo, 5; wallaroo, 1; Trinidad agouti, 2; rhesus monkey, 2; green guenon, 1. Reptiles: Ground rattlesnake, 1; copperhead, 27. Birds hatched were of the following species: Greater snow goose, Canada goose, wood duck, pintail, black duck, mallard, American coot, black-crowned night heron, peafowl, ring-necked pheasant, and European wood pigeon.

The young Manchurian tigers were born August 19, 1921, and at the close of the year were fine, thrifty animals, of good growth. The hippopotamus, born April 27, 1922, is the third young successfully reared in the gardens from the same pair of animals. The success in rearing a young mountain sheep ram last year makes it seem probable that the lamb born this spring will also develop into a perfect animal.

Exchanges.—A number of valuable animals were received in exchange for surplus stock. The accessions include 19 mammals, 166 birds, and 8 reptiles. Special mention should be made of a panda, three yellow-footed rock wallabies, an aard-wolf, and a Hagenbeck's mangabey, none of which have before been on exhibition in the

gardens. The panda is the only Old World representative of the raccoon family and is an animal of striking appearance. It comes from the high Himalaya Mountains of northern India. The aardwolf of South Africa has probably never before been shown alive in America. It is related to the hyenas but is chiefly insectivorous in its habits and lacks the powerful dental equipment of most of the carnivores. Other mammals received in exchange are a lioness, aoudad, great anteater, cape bushbuck, sable antelope, two Malay tapirs, a wombat, brown woolly monkey, anubis baboon, vervet guenon, and two Japanese monkeys.

Among the birds received in exchange special mention should be made of the following species: Hawaiian goose, bean goose, European pochard, tufted duck, European lapwing, greater vasa parrot, and African black vulture.

A regal python, 25 feet long, was received in exchange. This is the largest snake ever exhibited in the park.

Purchases.—A brindled gnu from South Africa, and a young male American elk, were purchased during the year. In addition to these a few small common mammals and birds were purchased at low cost.

Transfers.—An especially fine collection of ostriches, 12 birds in all, were transferred to the park from the United States poultry experiment station, Bureau of Animal Industry, Glendale, Ariz. The lot includes selected representatives of the Somaliland, Nubian, and South African species, and comprises probably the finest show of ostriches in America.

Through the Biological Survey, Department of Agriculture, were received a number of animals collected by field agents of the bureau. These include a badger from Mr. R. E. Bateman, Billings, Mont.; 2 gray wolves from Mr. Charles J. Bayer, Cheyenne, Wyo.; 7 beavers from Mr. Vernon Bailey, chief field naturalist; a wood duck and a cardinal from Mr. George A. Lawyer, chief game warden; a desert tortoise from Mr. M. E. Musgrave, Phoenix, Ariz.; and 12 Florida gopher tortoises from the survey laboratories.

The Bureau of Fisheries, Department of Commerce, contributed 5 specimens of the snapping turtle.

REMOVALS.

Surplus animals to the number of 44 were sent away during the year in exchange for other stock. Among these were the following mammals that had been born and reared in the park: Indian water buffalo, 1; American bison, 1; Rocky Mountain sheep, 1; Indian antelope, 1; llama, 2; guanaco, 1; red deer, 7; Japanese deer, 3;

barasingha, 1; dingo, 2; gray wolf, 1; European brown bear, 4; red kangaroo, 2; and rufous-bellied wallaby, 2.

A number of animals on deposit were returned to owners.

While the death rate has been kept low for the collection as a whole, there have been some serious losses of animals long in the park. The records of some of these, interesting because of longevity in captivity, are as follows: A black vulture (*Coragyps urubu*) received as a bird of the year November 26, 1900, was killed by its cage mate, a bird of the same species, December 28, 1921, 21 years, 1 month, and 2 days after arrival. A female South American tapir, received from Demerara August 28, 1901, then about 4 years of age, died September 7, 1921, after 20 years and 10 days of life in the National Zoological Park. Nine young were born to this animal during this period, seven of which were reared. The immediate cause of death was tuberculosis. A male gray wolf (*Canis nubilus*), born in the park March 29, 1905, died at an age of 16 years, 3 months, and 5 days, on July 4, 1921. A male llama, born in the park April 28, 1907, died of pyemia at an age of 14 years, 10 months, and 7 days, on March 7, 1922. A female California sea lion received May 25, 1907, died 14 years, 2 months, and 5 days after arrival on July 30, 1921. A carriama (*Cariama cristata*) received from Dr. Clemente Onelli, director of the Municipal Zoological Gardens, Buenos Aires, March 14, 1908, died 13 years, 4 months, and 1 day later, on July 15, 1921. A grizzly bear, male, received from the Yellowstone National Park July 29, 1908, died March 27, 1922. This bear was about 3½ years old on arrival, lived in the park 13 years, 7 months, and 28 days, and its death was clearly due to advanced age. The female harbor seal (*Phoca vitulina*), received January 19, 1910, died of enteritis on March 9, 1922, after 12 years, 1 month, and 18 days of life in the park. A female wart hog, presented by Mr. W. N. McMillan, which reached the park December 19, 1909, died July 29, 1921, 11 years, 7 months, and 10 days after arrival. A female kinkajou (*Potos flavus*), received from Panama June 17, 1910, died after 11 years, 1 month, and 5 days of life in the park, on July 22, 1921. A female Woodhouse's wolf (*Canis frustror*), born in the park April 17, 1911, died January 7, 1922, at an age of 10 years, 8 months, and 21 days. A female gray coatimundi (*Nasua narica*) received April 2, 1913, died February 22, 1922, after 8 years, 10 months, and 20 days in the park. The European badger (*Meles meles*) received from the London Zoological Gardens May 1, 1915, died 6 years, 6 months, and 11 days later, on November 12, 1921.

Other serious losses include the Florida manatee from septic peritonitis, July 16, 1921; Mongolian wild horse (*Equus przewal-*

skii) from inflammation of bladder, November 27, 1921; an Arabian camel, hemorrhagic cystitis, April 3, 1922; a female Rocky Mountain sheep from metroperitonitis, June 6, 1922; two Count Raggi's birds of paradise, enteritis, February 7 and 9, 1922; and the last trumpeter swan, the property of Mr. R. M. Barnes, Lacon, Ill., which had been on deposit since April 15, 1917. The swan died of tuberculosis of the liver on June 14, 1922.

Post-mortem examinations were made, in most cases, by the pathological division of the Bureau of Animal Industry. Two examinations were made by Dr. Adolph H. Schultz, of the Carnegie Institution, Laboratory of Embryology, and one by Dr. C. W. Stiles at the Hygienic Laboratory, Bureau of Public Health Service. The following list shows the results of autopsies, the cases being arranged by groups:

CAUSES OF DEATH.

MAMMALS.

Marsupialia: Congestion of lungs, 1; pleurisy and pneumonia, 1; enteritis, 2; septicemia, 1; accident, 1; old age, 1.

Carnivora: Pneumonia, 1; tuberculosis, 2; enteritis, 1; gastroenteritis, 3; old age, 1; no cause found, 1.

Rodentia: Tuberculosis, 1; septic pleuropneumonia, 1; enteritis, 2.

Primates: Bronchopneumonia, 1; tuberculosis, 1; enteritis, 1; gastroenteritis, 1; colitis, 2; parasitic peritonitis, 2.

Artiodactyla: Pneumonia, 1; verminous bronchopneumonia, 2; pleurisy, 1; tuberculosis, 1; enteritis, 1; metroperitonitis, 1; hemorrhagic cystitis, 1; pyemia, 1; anemia, 1; accident, 1; no cause found, 1.

Perissodactyla: Tuberculosis, 1; prolapse of rectum, 1.

Sirenia: Peritonitis, 1.

BIRDS.

Ratitæ: Pleurisy and peritonitis, 1.

Ciconiiformes: Aspergillosis, 1; enteritis, 1; anemia, 3; no cause found, 5.

Anseriformes: Tuberculosis, 6; aspergillosis, 1; enteritis, 1; abscess of intestine, 1; no cause found, 4.

Falconiformes: Anemia, 1; no cause found, 1.

Galliformes: Enteritis, 4; anemia, 1.

Gruiformes: No cause found, 1.

Charadriiformes: Pneumonia, 2; aspergillosis, 1; no cause found, 2.

Coraciiformes: No cause found, 1.

Passeriformes: Aspergillosis, 1; enteritis, 4; abscess of lung, 1.

REPTILES.

Serpentes: No cause found, 1.

A total of 68 specimens—26 mammals, 25 birds, and 17 reptiles—of special scientific importance, were transferred after death to the United States National Museum. Four dead mammals were de-

livered for scientific investigations to the Carnegie Laboratory of Embryology, Johns Hopkins Medical School, Baltimore; two to the American Museum of Natural History, New York City; and one to the Hygienic Laboratory, Public Health Service, Washington, D. C. Four skins of birds were added to the reference collection of "dealers' cage birds" in the office of the National Zoological Park.

ANIMALS IN THE COLLECTION JUNE 30, 1922.

MAMMALS.

MARSUPIALIA.

Virginia opossum (<i>Didelphis virginiana</i>)	4
Tasmanian devil (<i>Sarcophilus harrisi</i>)	1
Australian opossum (<i>Trichosurus vulpecula</i>)	2
Flying phalanger (<i>Petaurus breviceps</i>)	8
Brush-tailed rock wallaby (<i>Petrogale penicillata</i>)	3
Yellow-footed rock wallaby (<i>Petrogale xanthopus</i>)	3
Rufous-bellied wallaby (<i>Macropus bilardieri</i>)	7
Black-tailed wallaby (<i>Macropus bicolor</i>)	3
Black-faced kangaroo (<i>Macropus melanops</i>)	2
Wallaroo (<i>Macropus robustus</i>)	2
Red kangaroo (<i>Macropus rufus</i>)	11
Wombat (<i>Phascolomys mitchelli</i>)	1

CARNIVORA.

Kadiak bear (<i>Ursus middendorffi</i>)	2
Alaska Peninsula bear (<i>Ursus gyas</i>)	2
Yakutat bear (<i>Ursus dalli</i>)	1
Kidder's bear (<i>Ursus kielderi</i>)	2
European bear (<i>Ursus arctos</i>)	2
Grizzly bear (<i>Ursus horribilis</i>)	1
Apache grizzly (<i>Ursus apache</i>)	1
Himalayan bear (<i>Ursus thibetanus</i>)	1
Black bear (<i>Ursus americanus</i>)	1
Cinnamon bear (<i>Ursus americanus cinnamomum</i>)	2
Florida bear (<i>Ursus floridanus</i>)	1
Glacier bear (<i>Ursus emmonsii</i>)	1
Sun bear (<i>Helarctos malayanus</i>)	1
Sloth bear (<i>Melursus ursinus</i>)	1
Polar bear (<i>Thalarctos maritimus</i>)	2
Dingo (<i>Canis dingo</i>)	3
Esquimo dog (<i>Canis familiaris</i>)	2
Gray wolf (<i>Canis nubilus</i>)	9
Southern wolf (<i>Canis floridanus</i>)	1
Woodhouse's wolf (<i>Canis frustror</i>)	1
Texas red wolf (<i>Canis rufus</i>)	1

CARNIVORA—continued.

Coyote (<i>Canis latrans</i>)	4
Plains coyote (<i>Canis nebracensis</i>)	1
Red fox (<i>Vulpes fulva</i>)	6
Great-eared fox (<i>Otocyon megalotis</i>)	1
Gray fox (<i>Urocyon cinereoargenteus</i>)	4
Cacomistle (<i>Bassariscus astutus</i>)	1
Panda (<i>Ailurus fulgens</i>)	1
Raccoon (<i>Procyon lotor</i>)	18
Gray coatimundi (<i>Nasua narica</i>)	1
Kinkajou (<i>Potos flavus</i>)	2
Mexican kinkajou (<i>Potos flavus aztecus</i>)	1
Weasel (<i>Mustela noveboracensis</i>)	1
Tayra (<i>Tayra barbara</i>)	1
Skunk (<i>Mephitis nigra</i>)	2
Florida otter (<i>Lutra canadensis vaga</i>)	3
Palm civet (<i>Paradoxurus hermaphroditus</i>)	2
Wahlberg's mongoose (<i>Helogale parvula</i>)	1
Aard-wolf (<i>Proteles cristatus</i>)	1
Spotted hyena (<i>Crocuta crocuta</i>)	1
Striped hyena (<i>Hyæna hyæna</i>)	1
African cheetah (<i>Acinonyx jubatus</i>)	2
Lion (<i>Felis leo</i>)	3
Bengal tiger (<i>Felis tigris</i>)	1
Manchurian tiger (<i>Felis tigris longipilis</i>)	6
Leopard (<i>Felis pardus</i>)	1
East African leopard (<i>Felis pardus suahelica</i>)	1
Jaguar (<i>Felis onca</i>)	1
Brazilian ocelot (<i>Felis pardalis brasiliensis</i>)	1
Snow leopard (<i>Felis uncia</i>)	1
Mexican puma (<i>Felis arteca</i>)	2
Mountain lion (<i>Felis hippolestes</i>)	3
Canada lynx (<i>Lynx canadensis</i>)	1
Northern wild cat (<i>Lynx uinta</i>)	3
Bay lynx (<i>Lynx rufus</i>)	2

PINNIPEDIA.

California sea-lion (<i>Zalophus californianus</i>)	1
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ANIMALS IN THE COLLECTION JUNE 30, 1922—Continued.

MAMMALS—continued.

RODENTIA.		PRIMATES—continued.	
Woodchuck (<i>Marmota monax</i>)-----	2	White-throated capuchin (<i>Cebus capucinus</i>)-----	4
Dusky marmot (<i>Marmota flaviventris obscura</i>)-----	1	Pale capuchin (<i>Cebus unicolor</i>)-----	2
Prairie-dog (<i>Cynomys ludovicianus</i>)--	5	Brown capuchin (<i>Cebus fatuellus</i>)----	3
White-tailed prairie dog (<i>Cynomys gunnisoni</i>)-----	1	Azara's capuchin (<i>Cebus azaræ</i>)-----	1
Antelope squirrel (<i>Ammospermophilus leucurus</i>)-----	1	Titi monkey (<i>Saimiri sciureus</i>)-----	1
Arizona antelope squirrel (<i>Ammospermophilus harristi</i>)-----	1	Negro tamarin (<i>Cercopithecus ursulus</i>)--	1
Chipmunk (<i>Eutamias neglectus</i>)-----	3	Chacma (<i>Papio porcarius</i>)-----	1
Albino squirrel (<i>Sciurus carolinensis</i>)--	3	Anubis baboon (<i>Papio cynocephalus</i>)--	1
Baird's pocket mouse (<i>Perognathus flavus</i>)-----	1	Hamadryas baboon (<i>Papio hamadryas</i>)--	1
Bailey's pocket mouse (<i>Perognathus baileyi</i>)-----	2	East African baboon (<i>Papio ibeanus</i>)--	1
Jumping mouse (<i>Zapus hudsonius</i>)----	1	Mandrill (<i>Papio sphinx</i>)-----	1
Montana white-footed mouse (<i>Peromyscus leucopus aridulus</i>)-----	1	Drill (<i>Papio leucophæus</i>)-----	1
Nebraska white-footed mouse (<i>Peromyscus maniculatus osgoodi</i>)-----	2	Moor macaque (<i>Cynopithecus maurus</i>)--	1
African porcupine (<i>Hystrix africæustralis</i>)-----	1	Barbary ape (<i>Simia sylvanus</i>)-----	2
Malay porcupine (<i>Acanthion brachyurum</i>)-----	2	Brown macaque (<i>Macaca speciosa</i>)----	1
Coypu (<i>Myocastor coypus</i>)-----	3	Japanese macaque (<i>Macaca fuscata</i>)--	2
Central American paca (<i>Cuniculus paca virgatus</i>)-----	1	Pig-tailed monkey (<i>Macaca nemestrina</i>)-----	1
Mexican agouti (<i>Dasyprocta mexicana</i>)-----	1	Burmese macaque (<i>Macaca andamanensis</i>)-----	1
Sooty agouti (<i>Dasyprocta fuliginosa</i>)--	1	Rhesus monkey (<i>Macaca rhesus</i>)-----	23
Speckled agouti (<i>Dasyprocta punctata</i>)-----	2	Bonnet monkey (<i>Macaca sinica</i>)-----	1
Panama agouti (<i>Dasyprocta punctata isthmica</i>)-----	1	Crab-eating macaque (<i>Macaca irus</i>)----	1
Azara's agouti (<i>Dasyprocta azaræ</i>)----	2	Javan macaque (<i>Macaca mordax</i>)-----	4
Trinidad agouti (<i>Dasyprocta rubrata</i>)--	4	Black mangabey (<i>Cercocebus aterrimus</i>)-----	1
Crested agouti (<i>Dasyprocta cristata</i>)--	2	Sooty mangabey (<i>Cercocebus fuliginosus</i>)-----	2
Yellow-rumped agouti (<i>Dasyprocta lucifer cayennæ</i>)-----	1	Hagenbeck's mangabey (<i>Cercocebus hagenbecki</i>)-----	1
Peruvian guinea pig (<i>Cavia tschudii pallidor</i>)-----	1	White-collared mangabey (<i>Cercocebus torquatus</i>)-----	1
Guinea pig (<i>Cavia porcellus</i>)-----	8	Green guenon (<i>Lasiopyga callitrichus</i>)--	3
Capybara (<i>Hydrochærus hydrochæris</i>)--	1	Vervet guenon (<i>Lasiopyga pygerythra</i>)-----	2
		Mona (<i>Lasiopyga mona</i>)-----	4
		Roloway guenon (<i>Lasiopyga roloway</i>)--	1
		Patas monkey (<i>Erythrocebus patas</i>)--	1
		Chimpanzee (<i>Pan satyrus</i>)-----	1
		Orang-utan (<i>Pongo pygmaeus</i>)-----	1
		ARTIODACTYLA.	
		Wild boar (<i>Sus scrofa</i>)-----	1
		Wart-hog (<i>Phacochoerus æthiopicus</i>)--	1
		Collared peccary (<i>Pecari angulatus</i>)----	1
		Hippopotamus (<i>Hippopotamus amphibius</i>)-----	3
		Bactrian camel (<i>Camelus bactrianus</i>)--	2
		Arabian camel (<i>Camelus dromedarius</i>)--	1
		Guanaco (<i>Lama guanicoe</i>)-----	3
		Llama (<i>Lama glama</i>)-----	5
		Alpaca (<i>Lama pacos</i>)-----	1
		Fallow deer (<i>Dama dama</i>)-----	7
		Axis deer (<i>Axis axis</i>)-----	3
		Hog deer (<i>Hyelaphus porcinus</i>)-----	8
		Sambar (<i>Rusa unicolor</i>)-----	2
		Barasingha (<i>Rucervus duvaucellii</i>)-----	9
		Burmese deer (<i>Rucervus eldii</i>)-----	1
		Japanese deer (<i>Sika nippon</i>)-----	13
		Red deer (<i>Cervus elaphus</i>)-----	13
LAGOMORPHA.			
Domestic rabbit (<i>Oryctolagus cuniculus</i>)-----	18		
EDENTATA.			
Great anteater (<i>Myrmecophaga tridactyla</i>)-----	1		
PRIMATES.			
Red-faced spider monkey (<i>Ateles paniscus</i>)-----	1		
Feline douroucoulli (<i>Aotus infulatus</i>)--	1		
Brown woolly monkey (<i>Lagothrix infumata</i>)-----	1		
Black-headed woolly monkey (<i>Lagothrix ubericola</i>)-----	1		

ANIMALS IN THE COLLECTION JUNE 30, 1922—Continued.

MAMMALS—continued.

ARTIODACTYLA—continued.	
Kashmir deer (<i>Cervus hanglu</i>)-----	2
Bedford deer (<i>Cervus xanthopygus</i>)---	6
American elk (<i>Cervus canadensis</i>)---	5
Virginia deer (<i>Odocoileus virginianus</i>)--	10
Panama deer (<i>Odocoileus chiriquensis</i>)--	1
Mule deer (<i>Odocoileus hemionus</i>)-----	2
Black-tailed deer (<i>Odocoileus columbianus</i>)-----	1
Trinidad brocket (<i>Mazama simplicicornis</i>)-----	1
Blesbok (<i>Damaliscus albifrons</i>)-----	2
White-tailed gnu (<i>Connochætes gnou</i>)--	1
Brindled gnu (<i>Connochætes taurinus</i>)--	1
Lechwe (<i>Onotragus leche</i>)-----	1
Sable antelope (<i>Egocerus niger</i>)-----	1
Indian antelope (<i>Antilope cervicapra</i>)--	4
Nilgai (<i>Boselaphus tragocamelus</i>)-----	2
East African eland (<i>Taurotragus oryx livingstonii</i>)-----	3
Cape bushbuck (<i>Tragelaphus sylvaticus</i>)-----	1
Tahr (<i>Hemitragus jemlahicus</i>)-----	4
Mountain goat (<i>Oreamnos americanus</i>)--	3
Aoudad (<i>Ammotragus lervia</i>)-----	2

ARTIODACTYLA—continued.	
Rocky Mountain sheep (<i>Ovis canadensis</i>)-----	5
Arizona mountain sheep (<i>Ovis canadensis gaillardi</i>)-----	1
Barbados sheep (<i>Ovis aries</i>)-----	2
Zebu (<i>Bos indicus</i>)-----	1
Yak (<i>Poëphagus grunniens</i>)-----	5
American bison (<i>Bison bison</i>)-----	13
Indian buffalo (<i>Bubalus bubalis</i>)-----	2

PERISSODACTYLA.	
Malay tapir (<i>Tapirus indicus</i>)-----	1
Brazilian tapir (<i>Tapirus terrestris</i>)--	1
Grant's zebra (<i>Equus quagga granti</i>)--	1
Grevy's zebra (<i>Equus grevyi</i>)-----	1
Zebra-horse hybrid (<i>Equus grevyi-caballus</i>)-----	1
Zebra-ass hybrid (<i>Equus grevyi-asi-nus</i>)-----	1

PROBOSCIDEA.	
Abyssinian elephant (<i>Loxodonta africana oxyotis</i>)-----	1
Sumatran elephant (<i>Elephas sumatranus</i>)-----	2

BIRDS.

RATITÆ.	
South African ostrich (<i>Struthio australis</i>)-----	6
Somaliland ostrich (<i>Struthio molybdoplaneus</i>)-----	2
Nubian ostrich (<i>Struthio camelus</i>)---	5
Rhea (<i>Rhea americana</i>)-----	2
Slater's cassowary (<i>Casuarus philipi</i>)-----	1
Emu (<i>Dromæus novæhollandiæ</i>)-----	2

CICONIIFORMES.	
American white pelican (<i>Pelecanus erythrorhynchos</i>)-----	7
European white pelican (<i>Pelecanus onocrotalus</i>)-----	2
Roseate pelican (<i>Pelecanus roseus</i>)---	2
Australian pelican (<i>Pelecanus conspicillatus</i>)-----	2
Brown pelican (<i>Pelecanus occidentalis</i>)-----	10
Florida cormorant (<i>Phalacrocorax auritus floridanus</i>)-----	5
Great white heron (<i>Ardea occidentalis</i>)-----	2
Goliath heron (<i>Ardea goliath</i>)-----	1
American egret (<i>Casmerodius egretta</i>)--	3
Snowy egret (<i>Egretta candidissima</i>)--	3
Black-crowned night heron (<i>Nycticorax nycticorax nævius</i>)-----	33
Boatbill (<i>Cochlearius cochlearius</i>)---	2
White stork (<i>Ciconia ciconia</i>)-----	2
Black stork (<i>Ciconia nigra</i>)-----	1
Indian jabiru (<i>Xenorhynchus asiaticus</i>)-----	1

CICONIIFORMES—continued.	
Straw-necked ibis (<i>Carphibis spinicollis</i>)-----	1
Sacred ibis (<i>Threskiornis æthiopicus</i>)--	3
Australian ibis (<i>Threskiornis strictipennis</i>)-----	2
White ibis (<i>Guara alba</i>)-----	12
Scarlet ibis (<i>Guara rubra</i>)-----	4
Roseate spoonbill (<i>Ajaia ajaja</i>)-----	2
European flamingo (<i>Phenicopterus roseus</i>)-----	1

ANSERIFORMES.	
Mallard (<i>Anas platyrhynchos</i>)-----	15
Black duck (<i>Anas rubripes</i>)-----	34
Australian black duck (<i>Anas superciliosa</i>)-----	2
Gadwall (<i>Chaulelasmus streperus</i>)---	3
European widgeon (<i>Mareca penelope</i>)--	7
Baldpate (<i>Mareca americana</i>)-----	6
Green-winged teal (<i>Nettion carolinense</i>)-----	15
European teal (<i>Nettion crecca</i>)-----	10
Baikal teal (<i>Nettion formosum</i>)-----	6
Blue-winged teal (<i>Querquedula discors</i>)-----	9
Garganey (<i>Querquedula querquedula</i>)--	6
Cinnamon teal (<i>Querquedula cyanoptera</i>)-----	1
Shoveller (<i>Spatula clypeata</i>)-----	4
Pintail (<i>Dafila acuta</i>)-----	12
Wood duck (<i>Aix sponsa</i>)-----	13
Mandarin duck (<i>Dendronessa galericulata</i>)-----	14
Canvasback (<i>Marila valisineria</i>)-----	4

ANIMALS IN THE COLLECTION JUNE 30, 1922—Continued.

BIRDS—continued.

ANSERIFORMES—continued.

European pochard (<i>Marila ferina</i>)----	4
Redhead (<i>Marila americana</i>)-----	9
Ring-necked duck (<i>Marila collaris</i>)----	1
Tufted duck (<i>Marila fuligula</i>)-----	4
Lesser scaup duck (<i>Marila affinis</i>)----	5
Greater scaup duck (<i>Marila marila</i>)--	11
White-eyed duck (<i>Marila nyroca</i>)-----	1
Rosy-billed pochard (<i>Metopiana pepo-</i> <i>saca</i>)-----	4
Egyptian goose (<i>Chenalopex aegyptia-</i> <i>cus</i>)-----	4
Upland goose (<i>Chloëphaga leucop-</i> <i>tera</i>)-----	1
Hawaiian goose (<i>Nesochen sandvicens-</i> <i>sis</i>)-----	2
Snow goose (<i>Chen hyperboreus</i>)-----	2
Greater snow goose (<i>Chen hyperboreus</i> <i>nivalis</i>)-----	7
Blue goose (<i>Chen caerulescens</i>)-----	7
White-fronted goose (<i>Anser albifrons</i>)--	4
American white-fronted goose (<i>Anser</i> <i>albifrons gambeli</i>)-----	3
Bean goose (<i>Anser fabalis</i>)-----	2
Bar-headed goose (<i>Eulabeia indica</i>)----	3
Canada goose (<i>Branta canadensis</i>)----	10
Hutchins's goose (<i>Branta canadensis</i> <i>hutchinsii</i>)-----	8
Cackling goose (<i>Branta canadensis</i> <i>minima</i>)-----	2
Brant (<i>Branta bernicla glaucogastra</i>)--	13
Barnacle goose (<i>Branta leucopsis</i>)----	7
Spur-winged goose (<i>Plectropterus gam-</i> <i>bensis</i>)-----	2
Pied goose (<i>Anseranas semipalmata</i>)--	2
Black-bellied tree duck (<i>Dendrocygna</i> <i>autumnalis</i>)-----	6
Eyton's tree duck (<i>Dendrocygna ey-</i> <i>toni</i>)-----	4
White-faced tree duck (<i>Dendrocygna</i> <i>viduata</i>)-----	2
Mute swan (<i>Cygnus gibbus</i>)-----	2
Whistling swan (<i>Olor columbianus</i>)----	1
Black swan (<i>Chenopsis atrata</i>)-----	2

FALCONIFORMES.

South American condor (<i>Vultur gry-</i> <i>phus</i>)-----	1
California condor (<i>Gymnogyps cali-</i> <i>fornianus</i>)-----	3
Turkey vulture (<i>Cathartes aura</i>)-----	3
Black vulture (<i>Coragyps urubu</i>)-----	1
King vulture (<i>Sarcoramphus papa</i>)----	2
Secretary bird (<i>Sagittarius serpen-</i> <i>tarius</i>)-----	1
Griffon vulture (<i>Gyps fulvus</i>)-----	1
African black vulture (<i>Torgos trache-</i> <i>liotus</i>)-----	1
Cinereous vulture (<i>Aegyptius mona-</i> <i>chus</i>)-----	2
Caracara (<i>Polyborus cheriway</i>)-----	2
Wedge-tailed eagle (<i>Uroaëtus audax</i>)--	2
Golden eagle (<i>Aquila chrysaëtus</i>)----	4
White-bellied sea eagle (<i>Cuncuma leu-</i> <i>cogaster</i>)-----	2

FALCONIFORMES—continued.

Bald eagle (<i>Haliaeetus leucocephalus</i>)--	13
Alaskan bald eagle (<i>Haliaeetus leuco-</i> <i>cephalus alascanus</i>)-----	3
Broad-winged hawk (<i>Buteo platypte-</i> <i>rus</i>)-----	1
Red-tailed hawk (<i>Buteo borealis</i>)-----	5
Sparrow hawk (<i>Falco sparverius</i>)-----	7

GALLIFORMES.

Razor-billed curassow (<i>Mitu mitu</i>)----	2
Penelope (<i>Penelope boliviana</i>)-----	1
Guan (<i>Ortalis albiventris</i>)-----	1
Chachalaca (<i>Ortalis vetula</i>)-----	1
Peafowl (<i>Pavo cristatus</i>)-----	34
Peacock pheasant (<i>Polyplectron bical-</i> <i>caratum</i>)-----	1
Silver pheasant (<i>Gennæus nycthem-</i> <i>erus</i>)-----	1
Ring-necked pheasant (<i>Phasianus tor-</i> <i>quatus</i>)-----	12
Bobwhite (<i>Colinus virginianus</i>)-----	1
Gambel's quail (<i>Lophortyx gambelii</i>)--	2
Valley quail (<i>Lophortyx californica</i> <i>vallicola</i>)-----	1
Scaled quail (<i>Callipepla squamata</i>)----	1

GRUIFORMES.

East Indian gallinule (<i>Porphyrio</i> <i>calurus</i>)-----	5
American coot (<i>Fulica americana</i>)----	5
South Island weka rail (<i>Ocydromus</i> <i>australis</i>)-----	3
Short-winged weka (<i>Ocydromus brac-</i> <i>hypterus</i>)-----	2
Earl's weka (<i>Ocydromus earli</i>)-----	1
Whooping crane (<i>Grus americana</i>)----	1
Sandhill crane (<i>Grus mexicana</i>)-----	2
Little brown crane (<i>Grus canadensis</i>)--	6
White-necked crane (<i>Grus leucauchen</i>)--	1
Indian white crane (<i>Grus leucogera-</i> <i>nus</i>)-----	1
Lilford's crane (<i>Grus lilfordi</i>)-----	2
Sarus crane (<i>Grus collaris</i>)-----	1
Australian crane (<i>Grus rubicunda</i>)----	2
Demoiselle crane (<i>Anthropoides virgo</i>)--	4
Crowned crane (<i>Balearica pavonina</i>)----	1
White-backed trumpeter (<i>Psophia leu-</i> <i>coptera</i>)-----	3
Kagu (<i>Rhynochetos jubatus</i>)-----	1

CHARADRIIFORMES.

Lapwing (<i>Vanellus vanellus</i>)-----	3
Yellow-wattled lapwing (<i>Lobivanellus</i> <i>indicus</i>)-----	1
Pacific gull (<i>Gabianus pacificus</i>)-----	2
Great black-backed gull (<i>Larus ma-</i> <i>rinus</i>)-----	1
Herring gull (<i>Larus argentatus</i>)-----	3
Laughing gull (<i>Larus atricilla</i>)-----	2
Australian crested pigeon (<i>Ocyphaps</i> <i>lophotes</i>)-----	5
Bronze-wing pigeon (<i>Phaps chalcop-</i> <i>tera</i>)-----	3

ANIMALS IN THE COLLECTION JUNE 30, 1922—Continued.

BIRDS—continued.

CHARADRIIFORMES—continued.

Wonga-wonga pigeon (<i>Leucosarcia picata</i>)-----	4
Wood pigeon (<i>Columba palumbus</i>)-----	9
Mourning dove (<i>Zenaidura macroura</i>)--	2
Necklaced dove (<i>Spilopelia tigrina</i>)----	4
Zebra dove (<i>Geopelia striata</i>)-----	3
Bar-shouldered dove (<i>Geopelia humeralis</i>)-----	2
Inca dove (<i>Scardafella inca</i>)-----	2
Cuban ground dove (<i>Chamepelia passerina aflavida</i>)-----	1
Green-winged dove (<i>Chalcophaps indica</i>)-----	2
New Guinea green dove (<i>Chalcophaps chrysochlora</i>)-----	5
Ringed turtle-dove (<i>Streptopelia risoria</i>)-----	1

PSITTACIFORMES.

Kea (<i>Nestor notabilis</i>)-----	4
Cockateel (<i>Calopsitta novæhollandiæ</i>)--	1
Roseate cockatoo (<i>Kakatoe roseicapilla</i>)-----	17
Bare-eyed cockatoo (<i>Kakatoe gymnopsis</i>)-----	3
Leadbeater's cockatoo (<i>Kakatoe leadbeateri</i>)-----	4
White cockatoo (<i>Kakatoe alba</i>)-----	2
Sulphur-crested cockatoo (<i>Kakatoe galerita</i>)-----	8
Great red-crested cockatoo (<i>Kakatoe moluccensis</i>)-----	1
Cassin's macaw (<i>Ara auricollis</i>)-----	1
Mexican green macaw (<i>Ara mexicana</i>)-----	2
Blue-and-yellow macaw (<i>Ara ararauna</i>)-----	2
Red-and-blue-and-yellow macaw (<i>Ara macao</i>)-----	8
Hahn's macaw (<i>Diopsittaca hahni</i>)----	1
White-eyed paroquet (<i>Aratinga leucophthalmus</i>)-----	1
Golden-crowned paroquet (<i>Eupsittula aurea</i>)-----	3
Weddell's paroquet (<i>Eupsittula weddellii</i>)-----	4
Blue-winged parrotlet (<i>Psittacula passerina</i>)-----	11
Yellow-winged paroquet (<i>Thraupis virescens</i>)-----	1
Tui paroquet (<i>Brotogeris sthommæ</i>)----	2
Golden paroquet (<i>Brotogeris chrysosema</i>)-----	8
Tovi paroquet (<i>Brotogeris jugularis</i>)--	4
Orange-winged paroquet (<i>Brotogeris chiriri</i>)-----	6
Yellow-naped parrot (<i>Amazona auro-palliata</i>)-----	3
Yellow-cheeked parrot (<i>Amazona autumnalis</i>)-----	1
Mealy parrot (<i>Amazona farinosa</i>)-----	1
Orange-winged parrot (<i>Amazona amazonica</i>)-----	4

PSITTACIFORMES—continued.

Blue-fronted parrot (<i>Amazona aestiva</i>)--	1
Red-crowned parrot (<i>Amazona viridigenalis</i>)-----	6
Double yellow-head parrot (<i>Amazona oratrix</i>)-----	7
Yellow-headed parrot (<i>Amazona ochrocephala</i>)-----	5
Festive parrot (<i>Amazona festiva</i>)-----	6
Santo Domingo parrot (<i>Amazona ventralis</i>)-----	2
Cuban parrot (<i>Amazona leucocephala</i>)--	1
Maximilian's parrot (<i>Pionus maximiliani</i>)-----	1
Blue-headed parrot (<i>Pionus menstruus</i>)-----	3
Amazonian caique (<i>Pionites wanthomeria</i>)-----	7
Short-tailed parrot (<i>Graydidascalus brachyurus</i>)-----	1
Lesser vasa parrot (<i>Coracopsis nigra</i>)--	1
Greater vasa parrot (<i>Coracopsis vasa</i>)-----	1
Pennant's paroquet (<i>Platyercus elegans</i>)-----	1
Rosella paroquet (<i>Platyercus eximius</i>)-----	1
Black-tailed paroquet (<i>Polytelis melanura</i>)-----	2
King paroquet (<i>Aprosmictus cyanopygius</i>)-----	3
Ring-necked paroquet (<i>Conurus torquatus</i>)-----	1
Nepalese paroquet (<i>Conurus nepalensis</i>)-----	1
Grass paroquet (<i>Melopsittacus undulatus</i>)-----	61

CORACIIFORMES.

Giant kingfisher (<i>Dacelo gigas</i>)-----	2
Yellow-billed hornbill (<i>Lophoceros leucomelas</i>)-----	2
Barred owl (<i>Strix varia</i>)-----	7
Snowy owl (<i>Nyctea nyctea</i>)-----	1
Screech owl (<i>Otus asio</i>)-----	3
Choliba screech owl (<i>Otus choliba</i>)----	1
Great horned owl (<i>Bubo virginianus</i>)--	13
American barn owl (<i>Tyto perlata praticola</i>)-----	7
Ariel toucan (<i>Ramphastos ariel</i>)-----	1

PASSERIFORMES.

Cock of the rock (<i>Rupicola rupicola</i>)--	1
Silver-eared hill-tit (<i>Mesita argentatauris</i>)-----	3
Red-billed hill-tit (<i>Liothrix luteus</i>)----	8
Black-gorgeted laughing-thrush (<i>Garrulax pectoralis</i>)-----	2
White-eared bulbul (<i>Otocompsa leucotis</i>)-----	3
European blackbird (<i>Turdus merula</i>)----	2
Piping crow-shrike (<i>Gymnorhina tibicen</i>)-----	4
Satin bower-bird (<i>Ptilonorhynchus violaceus</i>)-----	1
European raven (<i>Corvus corax</i>)-----	1

ANIMALS IN THE COLLECTION. JUNE 30, 1922—Continued.

BIRDS—continued.

PASSERIFORMES—continued.		PASSERIFORMES—continued.	
Australian crow (<i>Corvus coronoides</i>)	1	Diamond finch (<i>Steganopleura guttata</i>)	6
Jackdaw (<i>Corvus monedula</i>)	1	Zebra finch (<i>Taeniopygia castanotis</i>)	5
Yucatan jay (<i>Cissilophya yucatanica</i>)	1	Cut-throat finch (<i>Amadina fasciata</i>)	3
Blue jay (<i>Cyanocitta cristata</i>)	3	Vera Cruz red-wing (<i>Agelaius phoeniceus richmondi</i>)	1
Green jay (<i>Xanthoura luxuosa</i>)	1	Purple grackle (<i>Quiscalus quiscula</i>)	4
Australian gray jumper (<i>Struthidea cinerea</i>)	1	Yellow-backed cacique (<i>Cacicus cela</i>)	1
Starling (<i>Sturnus vulgaris</i>)	9	Bullfinch (<i>Pyrrhula pyrrhula</i>)	7
Crimson tanager (<i>Ramphocelus dimidiatus</i>)	1	Greenfinch (<i>Chloris chloris</i>)	3
Blue tanager (<i>Thraupis cana</i>)	2	Yellowhammer (<i>Emberiza citrinella</i>)	1
Pin-tailed whydah (<i>Vidua principalis</i>)	1	European goldfinch (<i>Carduelis carduelis</i>)	7
Paradise whydah (<i>Steganura paradisea</i>)	3	Bramblefinch (<i>Fringilla montifringilla</i>)	6
Shaft-tailed whydah (<i>Tetrænura regia</i>)	2	European siskin (<i>Spinus spinus</i>)	1
Napolean weaver (<i>Pyromelana afra</i>)	1	Mexican goldfinch (<i>Astragalinus psaltria mexicanus</i>)	1
Red-billed weaver (<i>Quelea quelea</i>)	1	House finch (<i>Carpodacus mexicanus frontalis</i>)	2
Madagascar weaver (<i>Foudia madagascariensis</i>)	3	Purple finch (<i>Carpodacus purpureus</i>)	1
Fire finch (<i>Lagonosticta senegala</i>)	2	Canary (<i>Serinus canarius</i>)	9
Strawberry finch (<i>Amandava amandava</i>)	6	Green singing finch (<i>Serinus icterus</i>)	1
Cordon bleu (<i>Estrilda phenicotis</i>)	1	Slate-colored junco (<i>Junco hyemalis</i>)	2
Nutmeg finch (<i>Munia punctulata</i>)	6	Tree sparrow (<i>Spizella monticola</i>)	1
White-headed nun (<i>Munia maja</i>)	4	White-throated sparrow (<i>Zonotrichia albicollis</i>)	4
Black-headed nun (<i>Munia atricapilla</i>)	2	Song sparrow (<i>Melospiza melodia</i>)	1
Java finch (<i>Munia oryzivora</i>)	4	San Diego song sparrow (<i>Melospiza melodia cooperi</i>)	3
White Java finch (<i>Munia oryzivora</i>)	3	Fox sparrow (<i>Passerella iliaca</i>)	1
Fawn-and-white bengalee (<i>Uroloncha flavomaculata</i>)	3	California towhee (<i>Pipilo crissalis</i>)	2
Brown-and-white bengalee (<i>Uroloncha griseomaculata</i>)	1	Saffron finch (<i>Sicalis flaveola</i>)	1
Masked grassfinch (<i>Poëphila personata</i>)	9	Seed-eater (<i>Sporophila gutturalis</i>)	2
Black-faced Gouldian finch (<i>Poëphila gouldiae</i>)	8	Nonpareil (<i>Passerina ciris</i>)	5
Red-faced Gouldian finch (<i>Poëphila mirabilis</i>)	8	Blue grosbeak (<i>Guiraca caerulea</i>)	1

REPTILES.

Spectacled cayman (<i>Caiman sclerops</i>)	1	Wood turtle (<i>Olemmys insculpta</i>)	1
Alligator (<i>Alligator mississippiensis</i>)	41	Amazon terrapin (<i>Podocnemis expansa</i>)	1
Gila monster (<i>Heloderma suspectum</i>)	6	South American mud turtle (<i>Kinosternon scorpionoides</i>)	6
Giant zonure (<i>Zonurus giganteus</i>)	6	South American terrapin (<i>Nicoria punctularia</i>)	1
Rock python (<i>Python molurus</i>)	2	Painted turtle (<i>Chrysemys picta</i>)	2
Regal python (<i>Python reticulatus</i>)	1	Cooter (<i>Pseudemys scripta</i>)	1
Anaconda (<i>Eunectes murinus</i>)	2	Central American cooter (<i>Pseudemys ornata</i>)	1
Boa constrictor (<i>Constrictor constrictor</i>)	3	Box-tortoise (<i>Terrapene carolina</i>)	1
Blacksnake (<i>Coluber constrictor</i>)	2	Gopher tortoise (<i>Gopherus polyphemus</i>)	13
Chicken snake (<i>Elaphe quadrivittata</i>)	1	Desert tortoise (<i>Gopherus agassizii</i>)	1
Gopher snake (<i>Drymarchon corais couperi</i>)	1	Duncan Island tortoise (<i>Testudo ephippium</i>)	1
Garter snake (<i>Thamnophis sirtalis</i>)	2	Indefatigable Island tortoise (<i>Testudo porteri</i>)	1
Moccasin (<i>Agkistrodon piscivorus</i>)	3	Albemarle Island tortoise (<i>Testudo vicina</i>)	2
Copperhead (<i>Agkistrodon mokasen</i>)	1	South American tortoise (<i>Testudo dentata</i>)	8
Western diamond rattler (<i>Crotalus atrox</i>)	1		
Banded rattlesnake (<i>Crotalus horridus</i>)	1		
Ground rattler (<i>Sistrurus miliarius</i>)	1		
Snapping turtle (<i>Chelydra serpentina</i>)	6		
Rossignon's snapping turtle (<i>Chelydra rossignoni</i>)	1		

STATEMENT OF THE COLLECTION.

Accessions during the year.

	Mam- mals.	Birds.	Reptiles.	Total.
Presented.....	46	131	40	217
Born and hatched in National Zoological Park.....	58	64	28	150
Received in exchange.....	19	166	8	193
Purchased.....	5	39		44
Transferred from other Government departments.....	10	14	18	42
Captured.....	1			1
Deposited.....	3	5	1	9
Total.....	142	419	95	656

SUMMARY.

Animals on hand July 1, 1921.....	1,545
Accessions during the year.....	656
Total animals handled.....	2,201
Deduct loss (by exchange, death, and return of animals on deposit).....	520
Animals on hand June 30, 1922.....	1,681

Class.	Species.	Ind. viduals.
Mammals.....	187	490
Birds.....	262	1,069
Reptiles.....	33	122
Total June 30, 1922.....	482	1,681

The collection is now larger than ever before. The number of species on exhibition on June 30 is 4 more, and the total number of animals is 130 more than in any previous year.

VISITORS.

The total number of visitors to the park, for the fiscal year, as determined by count and estimate, was 2,164,254. This is the third year that the attendance has exceeded 2,000,000. The greatest attendance in any one month was 394,703 in April, 1922, an average per day of 13,156.

The attendance by months was as follows:

1921.		1922.	
July.....	167,650	January.....	51,676
August.....	172,500	February.....	77,541
September.....	197,700	March.....	181,039
October.....	258,000	April.....	394,703
November.....	123,325	May.....	278,550
December.....	79,570	June.....	180,000

Schools, classes, and other organizations visiting the park during the year numbered 205, with a total of 13,585 individuals.

IMPROVEMENTS.

The work of grading in the west central part of the park, commenced six years ago but discontinued during the war, was again taken up and the major part of the leveling and filling, as originally planned, was completed during the year. A large area of ground is now available for comparatively level paddocks for the exhibition of hoofed animals, and the way is opened up for decided improvements in the main roadway traversing the park. Many trees removed during this work were cut into logs and, during the winter, sawed into lumber of suitable grades for regular use.

The entire western wall of the antelope house, involving the cages and yards, long in a bad state of repair, was entirely rebuilt. The lower part was extended out, with concrete walls and new roof. The platform and approach to the eastern entrance were also remodeled. The building has been greatly improved in appearance and the animals have been given much more satisfactory quarters.

The older bear dens near the Harvard Street entrance were thoroughly repaired, provided with new concrete floor, tank, and gutter, and the ironwork painted.

Three large outdoor cages for hawks, owls, and Australian grass paroquets were constructed; the Henderson outdoor parrot cage was covered with new wire and painted; the inside quarters for hippopotamuses and tapirs repaired and enlarged; a concrete storehouse for paints and oils was built near the machine shop; the tennis courts were improved; repairs were made to the heating service in the monkey and lion houses; an electric pump and motor was installed at the pelican pond so that water from the creek can be used; and the gap in the boundary fence along the southern border of the park was closed by a new wire fence.

At the close of the year considerable progress had been made in a complete rebuilding of the old wolf yards and fox dens below the sea-lion pool.

ALTERATIONS OF BOUNDARIES.

There is available for the purchase of a narrow strip of land near the Adams Mill Road entrance, between the present park boundary and Adams Mill Road, \$4,903.66. On March 24, 1921, the attention of the Secretary of the Treasury was called to the provisions of the sundry civil act relating to the purchase of this land. The matter was referred to the United States attorney's office, and, the owners having declined to sell within the limits set by the act for purchase by agreement, steps were taken toward the institution of proceedings of condemnation. During the past year no further progress has been reported.

IMPORTANT NEEDS.

Restaurant.—A suitable restaurant building remains the most urgent need of the park. As pointed out in previous reports the old refreshment stand, originally constructed when the attendance was very small, is in a bad condition and is wholly inadequate to serve the needs of the public. Following the acquisition by the park of a large quantity of valuable chestnut and oak timbers and lumber, as mentioned in the report for last year, and in consideration of the fact that much of the work of construction can now be done by regular park employees, the estimated necessary appropriation for such a structure as is needed has been reduced to \$20,000. The old refreshment stand at the Connecticut Avenue entrance, on land recently transferred to the Government as an addition to the park, should also be replaced by a new and more sightly booth. The increased income from rental of these two concessions will well repay for the construction of buildings adequate for the service of the constantly increasing number of visitors.

Bird house.—Estimates for a new bird house were submitted for several years prior to the war, but were never favorably acted upon by Congress. The need for a new building for the exhibition of birds is now greater than ever before. The old building was constructed of the cheapest materials many years ago, as a temporary relief, and it is now in a very bad state of repair. It also provides far too little space for the collection and far too little room for visitors; on days of large attendance the public aisles are greatly overcrowded. The collection of birds is one of great importance, containing as it does numerous rare, interesting, and beautiful species; and new arrangements for its care and exhibition to the public should not much longer be delayed.

Respectfully submitted.

N. HOLLISTER,
Superintendent.

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

APPENDIX 7.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: The Astrophysical Observatory was conducted under the following passage of the sundry civil act, approved March 4, 1921:

Astrophysical Observatory: For maintenance of the Astrophysical Observatory, under the direction of the Smithsonian Institution, including assistants, purchase of necessary books and periodicals, apparatus, making necessary observations in high altitudes, repairs and alterations of buildings, and miscellaneous expenses, \$15,500.

The observatory occupies a number of frame structures within an inclosure of about 16,000 square feet south of the Smithsonian administration building at Washington, and also a cement observing station and frame cottage for observers on a plot of 10,000 square feet leased from the Carnegie Solar Observatory on Mount Wilson, Calif.

A new solar observing station on Mount Harqua Hala, Ariz., was erected in July, 1920, at the expense of funds donated for the purpose by Mr. John A. Roebing, of Bernardsville, N. J., and this station has been occupied as a solar radiation observing station by the Astrophysical Observatory since October, 1920.

The present value of the buildings and equipment for the Astrophysical Observatory, owned by the Government, is estimated at \$50,000. This estimate contemplates the cost required to replace the outfit for the purposes of the investigation.

WORK OF THE YEAR.

At Washington.—The director, with Mr. Fowle and Mrs. Bond, was engaged much of the year on the preparation and proof reading of Volume IV of the Annals of the Observatory. This quarto volume of 390 pages, including 60 illustrations and 118 pages of numerical tables, covers the work of the years 1912 to 1920, and was published in June, 1922. New apparatus and methods of observing are described and illustrated, and a large mass of solar observations is presented and discussed. Evidence is given of many kinds which indicates the solar variability. Reference is made to applications of the results which have been made by several meteorologists.

In preparation for work proposed for the expedition to Mount Wilson in the summer of 1922, Mr. Aldrich, in consultation with

the director, prepared the sensitive parts of a galvanometer and a vacuum bolometer of usual types for solar work, and also of a vacuum galvanometer and vacuum bolometer of very unusual design suited to observing the energy distribution in the spectra of the stars. These extremely delicate and sensitive instruments required extraordinary skill and patience for their construction and testing. Acknowledgments are due the Director of the Bureau of Standards, the Director of the Nela Research Laboratory, and also Dr. Elihu Thomson, of Lynn, for aiding these preparations.

The instrument making for these new pieces and others required in the expedition to Mount Wilson, including a special spectrometer, plate carrier, and other apparatus, was done by the instrument maker, Mr. A. Kramer.

A great many of the "solar constant" observations made at Mount Harqua Hala, Ariz., were reduced by Mr. Fowle and Mrs. Bond in consultation with the director. Despite our long experience in solar-radiation work, new problems and difficulties still crop up. The publication of the Mount Harqua Hala results has hitherto been withheld so that a comprehensive discussion of them might be made to reveal and correct any systematic errors.

Expedition to Chile.—It became necessary for the director to undertake a visit to Chile to inspect the observing station at Montezuma maintained by the Hodgkins fund for the study of the solar variations, in cooperation with the stations in California and Arizona. Leaving Washington near the end of October, 1921, he spent the month, November 15 to December 15, at the station and returned to Washington early in January, 1922. During the month at Montezuma he revised all the adjustments of apparatus and some of the methods employed there, besides assisting in the daily observations and reductions on 26 days. Silver disk pyrheliometer S. I. No. 5, loaned by the Department of Agriculture for the purpose, was compared with instruments at Montezuma, and before and afterwards with instruments at Washington. No change in the scale of pyrheliometry was disclosed by these comparisons.

Expedition to Mount Wilson.—In June an expedition, including the director and Mr. L. B. Aldrich, went out to Mount Wilson. Four objects were in view. First, to inspect the station at Mount Harqua Hala and compare pyrheliometers there with silver disk pyrheliometer S. I. No. 5, above mentioned, so as to connect the fundamental scales of pyrheliometry in Arizona and Chile. Second, to repeat with all possible precautions and variations of method the determination of the form of the solar spectrum energy curve outside the atmosphere. Third, to undertake preliminary measurements of the distribution of energy in the spectra of the brighter stars.

Fourth, to try further experiments with the collection and storage of solar heat for cooking purposes.

The station on Mount Harqua Hala was visited by the director and found in a highly improved condition owing to the zeal of Mr. Moore, in charge there. The laboratory has been sheathed outside with metal to protect the adobe walls from rain, and painted and embellished within, lightning rods have been installed, a small shop built, wireless telephonic apparatus erected, a garage built at the foot of the mountain trail, and regular weekly mail and supply trips arranged. Solar-constant observations have been made on upward of 70 per cent of the days of the year, and much computing and testing attended to. Comparisons made during and after the director's visit show no change in the scale of pyrheliometry, so that as far as this is concerned the results at Harqua Hala are comparable with those at Montezuma. But from lack of sensitiveness of the galvanometer the energy curves show less detail at Harqua Hala, and this it was decided must be corrected as early as possible to put the two stations on parallel footings.

In conversation with Mr. Moore, the director devised a new improvement of the "short method" which, it was agreed, would promote accuracy while greatly abridging computation. This will be introduced at both stations as soon as the new determination of the form of the solar energy curve outside the atmosphere is worked out.

At Mount Wilson, the time before the end of the fiscal year, June 30, only sufficed for a partial installation of new "solar constant" apparatus replacing that which in 1920 was removed to Harqua Hala. But it may be said by anticipation that later results were secured on the distribution of energy in the spectra of 11 of the brighter stars by bolometric work in connection with the 100-inch telescope, and also that the solar energy curve was traced bolometrically with both glass and rock-salt prisms. With the latter, experiments were made at wave lengths from far down in the ultra-violet to an infra-red wave length of 14 microns, with allowance for stray light and for atmospheric and instrumental transmission.

Unfortunately the cover of the oil reservoir of the solar cooking apparatus had been blown off in a very high wind, and snow having gotten in, much water had leaked into the oil reservoir. After a long time of fruitlessly attempting to boil out this water, the oil and water were at length removed, but not in time to undertake the proposed new experiments before the return of the expedition to Washington in September.

OPINIONS OF THE SOLAR RADIATION WORK.

As the Institution is making great efforts to continue and to improve its solar-radiation measurements, the director felt concerned to invite the opinions of competent critics, in order to know if these

labors seemed quite justified by their probable outcome. Accordingly, in a report to the American representatives of the International Astronomical Union he wrote as follows:

It is the intention of the Smithsonian Institution to continue daily observations at Mount Harqua Hala and Montezuma certainly until July, 1923, at which time it is proposed to consider the state of the work and the results reached with a view to deciding whether it is worth while to continue daily observations of the variability of the sun indefinitely or whether the usefulness of that work is unequal to the trouble and expense involved.

An expression of opinion on the part of those interested in the subject would be of great value to the Smithsonian Institution in making this decision.

In their meeting at Washington, April 3 and 4, 1922, the assembled American representatives, including meteorologists, physicists, and astronomers, passed unanimously, after earnest supporting speeches, the following resolution:

Solar radiation.—Moved: That it is the sense of the American section of the International Astronomical Union that the continuation of the solar-radiation work under the auspices of the Smithsonian Institution in at least two stations is highly desirable, both from an astronomical and a meteorological point of view. Adopted.

Later, in the Congress at Rome, May 2, 1922, the international representatives indorsed this opinion with equal unanimity and earnestness, passing the following resolution:

The section of meteorology of the International Geodetic and Geophysical Union records its appreciation of the excellent work done by the Astrophysical Observatory of the Smithsonian Institution of Washington in determining with a high degree of accuracy the intensity of solar radiation outside the earth's atmosphere. It is of the opinion that the daily values now being obtained at Mount Montezuma, Chile, and Mount Harqua Hala, Ariz., will prove of great value in the solution of certain meteorological problems. It therefore expresses the hope that these determinations may be continued for a considerable period of years.

PROPOSED SOLAR RADIATION STATIONS.

In view of these impartial expert opinions, it is a pleasure to add that Mr. John A. Roebling has made it possible to assure the continuation of the solar-constant stations at Harqua Hala and Montezuma until July, 1925. By that time sufficient data will doubtless be secured to prove whether they ought to be continued longer.

A movement is being made in Australia, led by Rev. E. F. Pigot, of Riverview College, to provide a solar-constant observing station similar to those maintained by the Smithsonian Institution. Funds have been raised there, and a portion of the apparatus has been purchased from the Institution. Also the Meteorological Service of Argentina is proposing to equip its station at La Quiaca for similar observations, in order the more directly to support the regular weekly long-range forecasts which it bases on solar radiation

results. In order to aid these enterprises, the director has designed a full set of solar-constant apparatus, and it is expected that within the next fiscal year two sets will be prepared by contract for the Australian and Argentine stations.

PERSONNEL.

Mr. A. F. Moore, field director at Mount Harqua Hala, was added to the staff of the Astrophysical Observatory on July 1, 1921.

SUMMARY.

The outstanding event of the fiscal year was the publication in June, 1922, of Volume IV of the Annals of the Astrophysical Observatory, covering results from 1912 to 1920. New apparatus and methods are described, a critical survey of the work is given, and long tabular summaries of all solar observations made are included. From these results it is indicated in numerous ways that the sun's output of radiation varies, that the march of its variations depends on the sun's rotation, and that it produces effects of several kinds on terrestrial physics and meteorology. Much progress has been made at the new station on Mount Harqua Hala. Solar-constant observations were made there on over 70 per cent of the days, but are withheld from publication until completely discussed for evidences as to systematic errors. Expeditions were made to Chile and to Mount Wilson.

Respectfully submitted.

C. G. ABBOT,
Director.

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

APPENDIX 8.

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, 1922.

Although the financial conditions of this enterprise were, in common with all other international interests, practically crippled in the beginning of the war, almost all of the regional bureaus have continued to collect and prepare for future publication this index of the world's scientific literature. The activities of this regional bureau have been continued as usual and the data relating to American scientific literature is regularly being prepared ready to forward to the London Central Bureau whenever it is found possible to resume publication.

An international convention is to be held in Brussels beginning July 22, 1922, to determine the future of the catalogue, and the Smithsonian Institution has prepared and will submit to the delegates then present the following statement of its position:

PROPOSALS OF THE SMITHSONIAN INSTITUTION REGARDING THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

It is the belief of the Smithsonian Institution:

1. That a classified subject and author index to the literature of science is needed.

2. That no better means exists of attaining the end sought than by carrying out the original plan of the International Catalogue based on international cooperation guided by uniform rules and schedules modified to meet changes in the several sciences and, when possible, broadened in scope to include the allied technical branches of these sciences.

3. That every effort should be made to cooperate with all similar enterprises, including abstracting agencies, existing or projected, not only to prevent duplication of labor but also to better serve the demands of those in need of bibliographic aid.

4. That on account of abnormal conditions still controlling publishing costs and monetary exchange it is probable that actual publication can not be at present resumed unless financial aid is had from some source outside the present organization; however, it is believed:

5. That the international organization should be kept in being through mutual agreement to continue the work of the regional bureaus until such time as it may be economically possible to resume publication. When that

time arrives the stock of complete sets already published should be advertised for sale at a price within the reach of the smaller libraries and institutions, many of whom, although desiring this unique reference work, were prevented from subscribing on account of the high original cost.

Were the price reduced even to one-fourth of the original, stock on hand at that figure represents a sufficient sum to meet all outstanding obligations and leave a surplus for working capital.

The intention in preparing this statement was to take into consideration all existing conditions, and it is believed that if the suggestions are indorsed by the convention, the organization may be kept in being through the continued activities of the various regional bureaus and that when international conditions become more stable the central bureau will be able to meet its financial obligations and resume publication.

When in 1896, 1898, and 1900, the representatives of practically all the civilized nations and foremost scientific institutions met in London to consider and formulate organic rules making possible cooperation between all nations recording scientific investigations, it was their intention not only to produce a catalogue and index of published records as an aid to investigators and bibliographers, but also to establish international cooperation to aid in developing and making available to all those in any way concerned in scientific matters the world's output of scientific records. The material for the 17 annual volumes of the International Catalogue of Scientific Literature issued for the years 1901 to 1914, inclusive, was collected by some 33 regional bureaus and published by the central bureau in London. This unique international cooperative organization, in the main, still exists and although actual publication has, for financial reasons, been suspended pending a more nearly normal condition in international finance and politics, the work of collecting and preparing for publication the records of scientific research is still going on. It would now seem advisable to consider how, until the catalogue can be again published, these records may be made available and to plan for the future improvement and extension of the catalogue service.

The principal methods of furnishing information of the published records of scientific investigations are: Card indexes and periodical bibliographies; abstract journals; year books, cumulative catalogues, and indexes.

To prepare any of these, a complete list of journals is needed but unfortunately no such complete current list now exists. One of the first needs of the catalogue organization, when publication is resumed, will be to bring its own list of journals up to date, the last supplement to the original list having been published in 1904, making the total number of journals listed at that time, 5,627. Since

there is, aside from its use in connection with the catalogue, a decided need and demand for such a list, this bureau is considering the advisability of undertaking the preparation of a revised list of journals, and of soliciting to that end the cooperation of the existing regional bureaus, who would be requested, through the central bureau, to furnish lists of the periodicals published in their several regions.

It is thought that when this material is collected arrangements for publication may be made without cost to the catalogue organization and even that, through such a published list, some financial benefit to the International Catalogue may be derived, but failing in this the labor involved would be justified on account of the need for the current list by the catalogue organization as soon as publication is resumed.

In whatever form bibliographic aid is furnished the method of preparation is the same. In all cases the original publications must be first collected whether they are to be catalogued, indexed, classified, or abstracted, and regular and systematic means must exist to gather all publications, not only periodicals but also single issues. The regional bureaus collectively have advantages in this respect never before available to bibliographers and practically all of the world's scientific literature is through them available. As the catalogue organization was at the London conference of 1920 directed to cooperate with abstracting journals and other similar agencies, it is felt that, although the organization has been disappointed in not yet being able to resume publication, it would be justified in extending its aid to other publishing agencies by furnishing citations to scientific publications being catalogued by the regional bureaus. In return for such aid the catalogue would be benefited by having available abstracts prepared by experts, thus simplifying the work of classification. A final ideal combined organization would, through international cooperation, produce all bibliographic publications of whatever type, and it is felt that when close cooperation is once established between all agencies having kindred aims it will prove essential for their mutual benefit to merge these enterprises into one organization. This plan should aim to eventually include not only the literature of science but also that of related technical industries whose existence and advance depend on the progress made in pure science.

It is realized that to carry out these plans a very extensive organization would be necessary, but when the many great interests involved and their evident unfilled needs are taken into consideration it becomes apparent that some definite effort should be made to

consolidate the numerous independent agencies to the end that all may be benefited. By combined effort much duplication of labor and cost would be saved, and most important of all, bibliographers, students, and industrial agencies would be furnished with prompt and authoritative information regarding the literature of the subjects relating to their several interests.

Very respectfully yours,

LEONARD C. GUNNELL,
Assistant in Charge.

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

APPENDIX 9.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on the activities of the library of the Smithsonian Institution for the fiscal year ended June 30, 1922.

Possessing more than a million volumes, pamphlets, manuscripts, and charts, acquired chiefly in exchange, the library has continued its steady, ever-increasing growth. There are now, according to the records, 888,128 publications deposited at the Library of Congress and 156,275 belonging to the United States National Museum. Books belonging to other branches of the Institution have been estimated at 35,000.

Its volumes are being constantly borrowed and consulted within the buildings. Interlibrary loans to accredited libraries, where distance permits, are being continued, and in a number of instances arrangements have been made for the photostating of pages from rare volumes not permitted to leave the buildings.

Each day typewritten lists of original scientific articles appearing in periodicals received for the Smithsonian deposit in the Library of Congress are prepared and sent to heads of scientific bureaus under the Institution for their information and for circulation. These daily bibliographical lists, begun last November at the request of the secretary, Dr. Charles D. Walcott, have been well received from the start. Requests from other Government bureaus and research organizations have been made for copies, which it has not been possible to supply.

The facilities of the library have been taxed to the utmost since the beginning of the war for information on various technical subjects. Especially has this been so in connection with aeronautics. In this one subject alone it is safe to say that the Institution, as one of the sources, has been the means of saving the United States Government many thousands of dollars which would have had to be paid if the information relating to the prior art had not been analyzed and available.

SMITHSONIAN MAIN LIBRARY.

As most noteworthy among the accessions of the main library might be mentioned copies of the *Göttingische Gelehrte Anzeigen* for 1758, 1760, 1808, 1813, and 1814, the gift of the Gesellschaft für

Wissenschaften zu Göttingen, and the Transactions of the Royal Dublin Society for 1803 to 1810, the gift of that society.

Material published in oriental languages, while it is not yet received in large quantities as compared with European publications, is continuing to increase, and it is hoped that in the future the Institution may have in the collections at the Library of Congress the most representative collection of this material that can be brought together in this country. The furnishing of English transliterations by the donors, as is done by the Vajiranaña National Library, Bangkok, is of great assistance.

In order that material received for the library may be made available to the public at the earliest possible moment, publications have been transmitted daily, as in years past, to the Smithsonian deposit in the Library of Congress. The number of publications so transmitted during the year was 8,907, consisting of 7,502 complete volumes, 800 parts of volumes, 376 pamphlets, and 229 charts. The accession numbers extended from 537,230 to 539,988. The number of publications transmitted without being entered or accessioned, including Government documents, was 7,213.

Cataloguing.—While the record for volumes catalogued has again been surpassed, it has not been possible during the year to catalogue the remainder of the large accumulation of theses sent during the war from European universities. Following are the year's records:

Volumes catalogued	6,502
Volumes recatalogued	55
Charts catalogued	160
Cards typewritten	4,243
Library of Congress cards filed	592
New titles added	1,614

Exchanges.—The securing of publications in exchange for the completion of sets in the library has been continued, with the following results:

	Wanted.		Secured.	
	Volumes.	Parts.	Volumes.	Parts.
Library of Congress:				
Smithsonian division	1,620	1,184	520	584
Periodical division	35	129	11	28
Order division	30		38	1
United States National Museum	81	83	25	40
	2,766	1,396	594	653

OFFICE LIBRARY.

The growth and increasing value of the office library is perhaps not fully realized. The total number of its accessions as reached this year now numbers 27,100, of which 394 volumes were added during the year. It consists of the following collections: Aeronautical, art room, De Peyster, deposited collections, employees' library, periodicals (back numbers), reading room, reference room.

The aeronautical collection, founded by Samuel Pierpont Langley while Secretary of the Smithsonian Institution, has been since augmented by gifts from Alexander Graham Bell, James Means, Charles D. Walcott, the Aero Club of America, and other individuals and organizations that have had an important part in the development of aeronautics during its pioneer stage. During the present year some 45 volumes were added from the estate of James Means, by gift of his sons Dr. James H. Means and Philip Ainsworth Means.

By the transfer of the employees' library to the east stacks in the main hall of the Smithsonian building, it has been rendered more readily accessible to employees, and additional space for its expansion has been provided. The collection of back numbers of periodicals has been moved to the west stacks.

While the office library is primarily a reference library and books are more often consulted than borrowed, many of the volumes are available for loan purposes, and many employees of the Institution avail themselves of its privileges. The total number of loans for the year was 3,330.

ASTROPHYSICAL OBSERVATORY LIBRARY.

Loans from the Astrophysical Observatory Library are made through the office library, and are included in the records of loans from that library. During the year 79 volumes, 26 parts, and 40 pamphlets were added, and 53 volumes sent to the bindery. The library is primarily a reference library for the use of the staff of the Astrophysical Observatory.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY.

The report of operations of the library of the Bureau of Ethnology will be found in the report of the chief of that bureau. It is administered directly under his care.

UNITED STATES NATIONAL MUSEUM LIBRARY.

The facilities of the Museum Library have been taxed as never before. The number of books loaned was 10,886, and as many more were consulted without being taken from the library.

Valuable material has been donated as in preceding years by friends and members of the staff of the United States National Museum. Among the donors are Messrs. H. S. Barber, August Busck, Austin H. Clark, W. H. Dall, H. G. Dyar, O. P. Hay, Walter Hough, W. R. Maxon, E. G. Mitchell, C. W. Richmond, J. H. Riley, S. A. Rohwer, W. S. Schaus, B. H. Swales, and Dr. and Mrs. Charles D. Walcott. Especially noteworthy are the gifts of Doctor Walcott to the geological and paleontological collections, and the gifts of Dr. William H. Dall to the section of the division of mollusks, numbering 233 titles.

Many of these collections have been received and they have an intimate relation to the library in that the donors were connected with the Museum and brought the collection together during the progress of their researches. The list of donors in the foregoing paragraph will give some idea of the number of collections of this kind that have been added. Special attention should be called to the Iddings and Walcott collections, given during the previous year. These required assorting, arranging, and checking with other publications of the same kind on the shelves, in order to prevent duplication, for which there is not enough room at the present time.

SECTIONAL LIBRARIES.

In order that the volumes and publications of the Museum Library may be readily accessible to the members of the administrative and scientific staff of the Museum, 35 sectional libraries are maintained, namely:

Administration.	Minerals.
Administrative assistant's office.	Mineral technology.
American archeology.	Mollusks.
Anthropology.	Old-world archeology.
Birds.	Paleobotany.
Botany.	Photography.
Editor's office.	Physical anthropology.
Fishes.	Property clerk's office.
Foods.	Registrar's office.
Geology.	Reptiles and batrachians.
Graphic arts.	Superintendent's office.
History.	Taxidermy.
Invertebrate paleontology.	Textiles.
Mammals.	Vertebrate paleontology.
Marine invertebrates.	War library.
Medicine.	Wood technology.
Mechanical technology.	

The following statistics have been submitted by Mr. N. P. Scudder, in charge of the library:

Books in the Museum Library:

Volumes -----	60,681
Pamphlets -----	95,594
Total -----	<u>156,275</u>

Increase:

Volumes -----	2,023
Pamphlets -----	4,185
Total -----	<u>6,208</u>

Periodicals:

Parts entered -----	13,827
Section cards -----	2,714
Entry cards for new periodicals -----	271

Cataloguing (not including periodicals):

Books -----	860
Pamphlets -----	4,178
Cards typewritten -----	6,183
Accession cards -----	5,214
Section cards -----	3,655
Books bound -----	398
Loans (of which 7,012 went to the sections) -----	10,886
Library of Congress books borrowed -----	1,583
Library of Congress books returned -----	1,886
Borrowed from other libraries -----	106
Returned to other libraries -----	132

The general library of the Museum is located in the Natural History Building. In order that reference facilities may be readily available to divisions of the Museum located in other buildings, the technological library is maintained in the Arts and Industries Building, and the office library in the Smithsonian Building is at the disposal of Museum divisions located there.

TECHNOLOGICAL LIBRARY.

The technological library, located in the old Museum Building, is continuing the reorganization and rearrangement of its material. The number of loans made during the fiscal year ended was 220. Statistics of the scientific depository catalogue are not at present available, owing to repairs and remodeling now in progress in the library's quarters.

NATIONAL GALLERY OF ART LIBRARY.

Records of the library of the National Gallery of Art are at present kept in the Natural History Library of the Museum, and periodicals entered upon the records and included in periodical statistics of that library. Accessions for the fiscal year, exclusive of periodicals, covered 32 volumes and 36 pamphlets.

FREER GALLERY OF ART LIBRARY.

Additions to the library of the Freer Gallery of Art during the year numbered 14 volumes. The number of volumes now in the library, exclusive of deposited books, is 127. A number of volumes relating to art have been deposited by the Smithsonian Institution in the Freer Building for use in connection with the collections, among them the set of Serindia, by Sir Aurel Stein, comprising five large quarto volumes with plates in color, presented by the Secretary of State for India.

NATIONAL ZOOLOGICAL PARK LIBRARY.

Since the establishment of a library at the National Zoological Park in 1905, there have been 378 accessions. The number during the fiscal year ended was 15, comprising reports of kindred zoological gardens and parks, and leading zoological works issued during the year.

SUMMARY OF ACCESSIONS.

The accessions for the year, including parts to complete sets, with the exception of additions to the library of the Bureau of American Ethnology, may be summarized as follows:

Branch.	Volumes.	Other publications.	Total.
Astrophysical Observatory.....	79	66	145
Freer Gallery of Art.....	14		14
National Gallery of Art.....	32	36	68
National Zoological Park.....	15		15
Smithsonian deposit, Library of Congress.....	7,502	1,405	8,907
Smithsonian office.....	394	45	439
United States National Museum.....	2,023	4,185	6,208
Total.....	10,059	5,737	15,796

Respectfully submitted.

PAUL BROCKETT,
Assistant Librarian.

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

APPENDIX 10.

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, 1922:

The Institution proper published during the year 9 papers in the series of Miscellaneous Collections, 2 annual reports and pamphlet copies of 55 articles in the appendixes to the reports, a reprint of the Smithsonian Physical Tables, and 5 special publications. The Bureau of American Ethnology published 3 bulletins and 2 annual reports. The United States National Museum issued 1 annual report, 3 volumes of proceedings, 72 separates from the proceedings, 5 bulletins, 2 separate parts of bulletins, and 4 parts of volumes in the series Contributions from the United States National Herbarium.

The total number of publications distributed by the Smithsonian and its branches was 165,196, which includes 251 volumes and separates of the Smithsonian Contributions to Knowledge, 20,777 volumes and separates of the Smithsonian Miscellaneous Collections, 27,263 volumes and separates of the Smithsonian annual reports, 97,806 volumes and separates of the National Museum publications, 14,215 publications of the Bureau of American Ethnology, 3,159 special publications, 706 volumes of the Annals of the Astrophysical Observatory, 64 reports on the Harriman Alaska expedition, 812 reports of the American Historical Association, and 143 publications presented to but not issued by the Smithsonian Institution.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

Of the Smithsonian Miscellaneous Collections, volume 67, 1 paper was issued; volume 72, 7 papers; volume 73, 1 paper; in all, 9 papers as follows:

VOLUME 67.

No. 7. Cambrian Geology and Paleontology. IV, No. 7. Notes on Structure of Neolenus. By Charles D. Walcott. December 20, 1921. Pp. 365-456, pls. 91-105. (Publ. 2584.)

VOLUME 72.

No. 8. A Review of the Interrelationships of the Cetacea. By Herluf Winge. July 30, 1921. 97 pp. (Publ. 2650.)
No. 10. The Circulatory System in Bone. By J. S. Foote. August 20, 1921. 20 pp., 6 pls. (Publ. 2652.)

- No. 11. The Echinoderms as Aberrant Arthropods. By Austin H. Clark. July 20, 1921. 20 pp., 24 figs. (Publ. 2653.)
- No. 12. A Study of the Body Temperature of Birds. By Alexander Wetmore. December 30, 1921. 52 pp. (Publ. 2658.)
- No. 13. The Melikeron, an Approximately Black-Body Pyranometer. By L. B. Aldrich. January 25, 1922. 11 pp., 5 figs. (Publ. 2662.)
- No. 14. A New Sauropod Dinosaur from Ojo Alamo Formation of New Mexico. By Charles W. Gilmore. January 31, 1922. 9 pp., 2 pls. (Publ. 2663.)
- No. 15. Explorations and Field Work of the Smithsonian Institution in 1921. May 26, 1922. 128 pp., 132 figs. (Publ. 2669.)

VOLUME 73.

- No. 1. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 68 to 77. January 31, 1922. 73 pp. (Publ. 2657.)

SMITHSONIAN ANNUAL REPORTS.

REPORT FOR 1919.

The complete volume of the Annual Report of the Board of Regents for 1919, together with the pamphlet copies of the papers in the general appendix, was received from the printer during the year.

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, 1919. xii+557 pp., 135 pls., 24 text figs. (Publ. 2590.)

The appendix contained the following papers:

- Modern theories of the spiral nebulae, by Heber D. Curtis.
- A determination of the deflection of light by the sun's gravitational field, from observations made at the total eclipse of May 29, 1919, by Sir F. W. Dyson, A. S. Eddington, and C. Davidson.
- Wireless telephony, by N. H. Slaughter.
- Radium and the electron, by Sir Ernest Rutherford.
- The "HD-4." A 70-miler with remarkable possibilities developed at Dr. Graham Bell's laboratories on the Bras d'Or Lakes, by William Washburn Nutting.
- Natural resources in their relation to military supplies, by Arthur D. Little.
- Glass and some of its problems, by Sir Herbert Jackson.
- The functions and ideals of a national geological survey, by F. L. Ransome.
- The influence of cold in stimulating the growth of plants, by Frederick V. Coville.
- Floral aspects of British Guinea, by A. S. Hitchcock.
- Milpa agriculture, a primitive tropical system, by O. F. Cook.
- On the extinction of the mammoth, by H. Neuville.
- A preliminary study of the relation between geographical distribution and migration, with special reference to the Palaearctic region, by R. Meinertzhagen.
- The necessity of State action for the protection of wild birds, by Walter E. Collinge.
- Glimpses of desert bird life in the Great Basin, by Harry C. Oberholser.
- The Division of Insects in the United States National Museum, by J. M. Aldrich.

- The seventeen-year locust, by R. E. Snodgrass.
 Entomology and the war, by L. O. Howard.
 Two types of southwestern cliff houses, by J. Walter Fewkes.
 On the race history and facial characteristics of the aboriginal Americans, by W. H. Holmes.
 The opportunity for American archeological research in Palestine, by James A. Montgomery.
 The differentiation of mankind into racial types, by Arthur Keith.
 The exploration of Manchuria, by Arthur de C. Sowerby.
 The origin and beginnings of the Czechoslovak people, by Jindřich Matiegka.
 Geographic education in America, by Albert Perry Brigham.
 Progress in national land reclamation in the United States, by C. A. Bissell.
 Richard Rathbun, by Marcus Benjamin.
 A great chemist: Sir William Ramsay, by Ch. Moureu.

REPORT FOR 1920.

The complete volume of the Annual Report of the Regents for 1920 was received from the Public Printer in May, 1922.

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, 1920. 704 pp., 230 pls., 105 text figs. (Publ. 2622.)

The appendix contained the following papers:

- :Studying the sun's heat on mountain peaks in desert lands, by C. G. Abbot.
 The habitability of Venus, Mars, and other worlds, by C. G. Abbot.
 Giant suns, by H. H. Turner.
 A bundle of meteorological paradoxes, by W. J. Humphreys.
 The determination of the structure of crystals, by Ralph W. G. Wyckoff.
 Dr. Aston's experiments on the mass spectra of the chemical elements, with introduction by C. G. Abbot.
 Vitamins, by W. D. Halliburton.
 Soil acidity—its nature, measurement, and relation to plant distribution, by Edgar T. Wherry.
 The chemistry of the earth's crust, by Henry S. Washington.
 Major causes of land and sea oscillations, by E. O. Ulrich.
 The Bryozoa, or moss animals, by R. S. Bassler.
 The horned dinosaurs, by Charles W. Gilmore.
 Rhythm in nature, by F. W. Flattely.
 Parasitism and symbiosis in their relation to the problem of evolution, by Maurice Caullery.
 Local suppression of agricultural pests by birds, by W. L. McAtee.
 The occult senses in birds, by Herbert H. Beck.
 Adventures in the life of a fiddler crab, by O. W. Hyman.
 The senses of insects, by N. E. McIndoo.
 The resplendent shield-bearer and the ribbed cocoon-maker: Two insect inhabitants of the orchard, by R. E. Snodgrass.
 The origin of insect societies, by Auguste Lameere.
 The botanical gardens of Jamaica, by William R. Maxon.
 Daturas of the old world and new: An account of their narcotic properties and their use in oracular and initiatory ceremonies, by William E. Safford.
 Effect of the relative length of day and night on flowering and fruiting of plants, by W. W. Garner and H. A. Allard.
 Fire worship of the Hopi Indians, by J. Walter Fewkes.

Racial groups and figures in the Natural History Building of the United States National Museum, by Walter Hough.

Notes on the dances, music, and songs of the ancient and modern Mexicans, by Auguste Genin.

The Ralph Cross Johnson collection in the National Gallery at Washington, D. C., by George B. Rose.

REPORT FOR 1921.

The report of the executive committee and proceedings of the Board of Regents of the Institution, and the report of the secretary, both forming part of the annual report of the Board of Regents to Congress, were issued in pamphlet form in November, 1921.

Report of the executive committee and proceedings of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1921. 18 pp. (Publ. 2660.)

Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1921. 119 pp. (Publ. 2659.)

The general appendix to this report, which was in press at the close of the year, contains the following papers:

The daily influence of astronomy, by W. W. Campbell.

Cosmogony and stellar evolution, by J. H. Jeans.

The diameters of the stars, by A. Danjon.

Isotopes and atomic weights, by F. W. Aston.

Modifying our ideas of nature: The Einstein theory of relativity, by Henry Norris Russell.

The alkali problem in irrigation, by Carl S. Scofield.

An outline of geophysical-chemical problems, by Robert B. Sosman.

The yielding of the earth's crust, by William Bowie.

The age of the earth, by the Right Hon. Lord Rayleigh, W. J. Sollas, J. W. Gregory, and Harold Jeffreys.

The department of geology of the U. S. National Museum, by George P. Merrill.

Some observations on the natural history of Costa Rica, by Robert Ridgway.

The historic development of the evolutionary idea, by Branislav Petronievics.

The heredity of acquired characters, by L. Cuénot.

Breeding habits, development, and birth of the opossum, by Carl Hartman.

Some preliminary remarks on the velocity of migratory flight among birds, with special reference to the Palaearctic region, by R. Meinertzhagen.

A botanical reconnaissance in southeastern Asia, by A. S. Hitchcock.

Ant acacias and acacia ants of Mexico and Central America, by W. E. Safford.

The fall webworm, by R. E. Snodgrass.

Collecting insects on Mount Rainier, by A. L. Melander.

The science of man: Its needs and prospects, by Karl Pearson.

Pigmentation in the old Americans, with notes on graying and loss of hair, by Aleš Hrdlička.

Ancestor worship of the Hopi Indians, by J. Walter Fewkes.

The Indian in literature, by Herman F. C. Ten Kate.

Leopard-men in the Naga Hills, by J. H. Hutton.

A new era in Palestine exploration, by Elihu Grant.

The alimentary education of children, by Marcel Labbé.

A fifty-year sketch history of medical entomology, by L. O. Howard.

Laid and wove, by Dard Hunter.

Lead, by Carl W. Mitman.

William Crawford Gorgas, by Robert E. Noble.

SPECIAL PUBLICATIONS.

The following special publications were issued during the year:

- Catalogue of the Herbert Ward African Collection. 8 pp., 12 figs. (Publ. "AT.")
- Classified List of Smithsonian Publications Available April 15, 1922. Compiled by Helen Munroe. May 1, 1922. 30 pp. (Publ. 2670.)
- Title page and contents of volume 69, Smithsonian Miscellaneous Collections. (Publ. 2654.)
- Title page and contents of volume 70, Smithsonian Miscellaneous Collections. (Publ. 2655.)
- Title page and contents of volume 71, Smithsonian Miscellaneous Collections. (Publ. 2656.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report, (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 ending June 30, 1922, the Museum published 1 annual report, 3 volumes of proceedings, 5 complete bulletins, 2 parts of bulletins, 4 parts of volumes in the series Contributions from the United States National Herbarium, and 72 separates from the proceedings.

The issues of the bulletin were as follows:

- Bulletin 100, volume 4. Contributions to the Biology of the Philippine Archipelago and Adjacent Regions. Volume 4: Foraminifera of the Philippine and Adjacent Seas. By Joseph A. Cushman.
- Bulletin 113. Life Histories of North American Gulls and Terns. Order Longipennes. By Arthur Cleveland Bent.
- Bulletin 114. A revision of the King Snakes: Genus *Lampropeltis*. By Frank N. Blanchard.
- Bulletin 118. Handbook and Descriptive Catalogue of the Collections of Gems and Precious Stones in the United States National Museum. By George P. Merrill, assisted by Margaret W. Moodey and Edgar T. Wherry.
- Bulletin 119. Catalogue of the Mechanical Engineering Collection in the United States National Museum. Motors, Locomotives, and Self-propelled Vehicles. By Carl W. Mitman.

Of the separate papers of bulletins, the following were issued:

- Bulletin 82. A Monograph of the Existing Crinoids. Volume 1.—The Comatulids. Part 2. By Austin Hobart Clark.
- Bulletin 104. The Foraminifera of the Atlantic Ocean. Part 3. Textulariidae. By Joseph Augustine Cushman.

Of the separate papers of the Contributions from the United States National Herbarium, the following were issued:

- Volume 20, part 11. The Identification of *Berberis Aquifolium* and *Berberis repens*. By Charles V. Piper.

Volume 20, part 12. New or Noteworthy Plants from Colombia and Central America—8. By Henry Pittier.

Volume 22, part 6. Grasses of British Guiana. By A. S. Hitchcock.

Volume 24, part 1. New Plants from Guatemala and Honduras. By S. F. Blake.

Of the separates from the proceedings, 25 were from volume 59, 26 from volume 60, and 21 from volume 61.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are described in detail in Appendix 4 of this report. The editorial work of the bureau is under the direction of Mr. Stanley Searles, editor.

During the past year two annual reports, the thirty-fifth and the thirty-sixth, and three bulletins were published, as follows:

Thirty-fifth Annual Report. Accompanying paper: Ethnology of the Kwakiutl (Boas). Pts. 1 and 2. 1,481 pp.

Thirty-sixth Annual Report. Accompanying paper: The Osage Tribe: Rite of the Chiefs; Saying of the Ancient Men (La Flesche). 604 pp., 23 pls.

Bulletin 73. Early History of the Creek Indians and Their Neighbors (Swanton). 492 pp., 10 pls.

Bulletin 74. Excavation of a Site at Santiago Ahuitzotla, D. F. Mexico (Tozzer). 56 pp., 19 pls.

Bulletin 75. Northern Ute Music (Densmore). 213 pp., 16 pls.

There were in press or in preparation at the close of the year four annual reports and six bulletins, as follows:

Thirty-fourth Annual Report. Accompanying paper: A Prehistoric Island Culture Area of America (Fewkes).

Thirty-seventh Annual Report. Accompanying paper: The Winnebago Tribe (Radin).

Thirty-eighth Annual Report. Accompanying paper: An Introductory Study of the Arts, Crafts, and Customs of the Guinea Indians (Roth).

Thirty-ninth Annual Report. Accompanying paper: The Osage Tribe: The Rite of Vigil (La Flesche).

Bulletin 76. Archeological Investigations (Fowke).

Bulletin 77. Villages of the Algonquian, Siouan, and Caddoan Tribes west of the Mississippi (Bushnell).

Bulletin 78. Handbook of the Indians of California (Kroeber).

Bulletin 79. Blood Revenge, War, and Victory Feasts among the Jibaro Indians of Eastern Ecuador (Karsten).

Bulletin 80. Mandan and Hidatsa Music (Densmore).

Bulletin 81. Excavations in the Chama Valley, N. Mex. (Jeancon).

PUBLICATIONS OF THE ASTROPHYSICAL OBSERVATORY.

The fourth volume of the annals of the Astrophysical Observatory, covering the work of the observatory from 1913 to 1920, was issued in June, 1922.

Volume IV. Annals of the Astrophysical Observatory, by C. G. Abbot, F. E. Fowle, and L. B. Aldrich. June 24, 1922. 390 pp., 2 pls. (Publ. 2661.)

REPORT 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 provisions of the act of incorporation of the association.

The annual report for 1917 and the annual report for 1918, volumes 1 and 2, together with the supplemental volume to this report entitled "Writings on American History," were published during the year.

The annual report for 1919, volumes 1 and 2, and the supplemental volumes to the reports for 1919 and 1920 were in press at the close of the year.

REPORT OF THE NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Twenty-fourth Annual Report of the National Society of the Daughters of the American Revolution was transmitted to Congress according to law on January 4, 1922.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

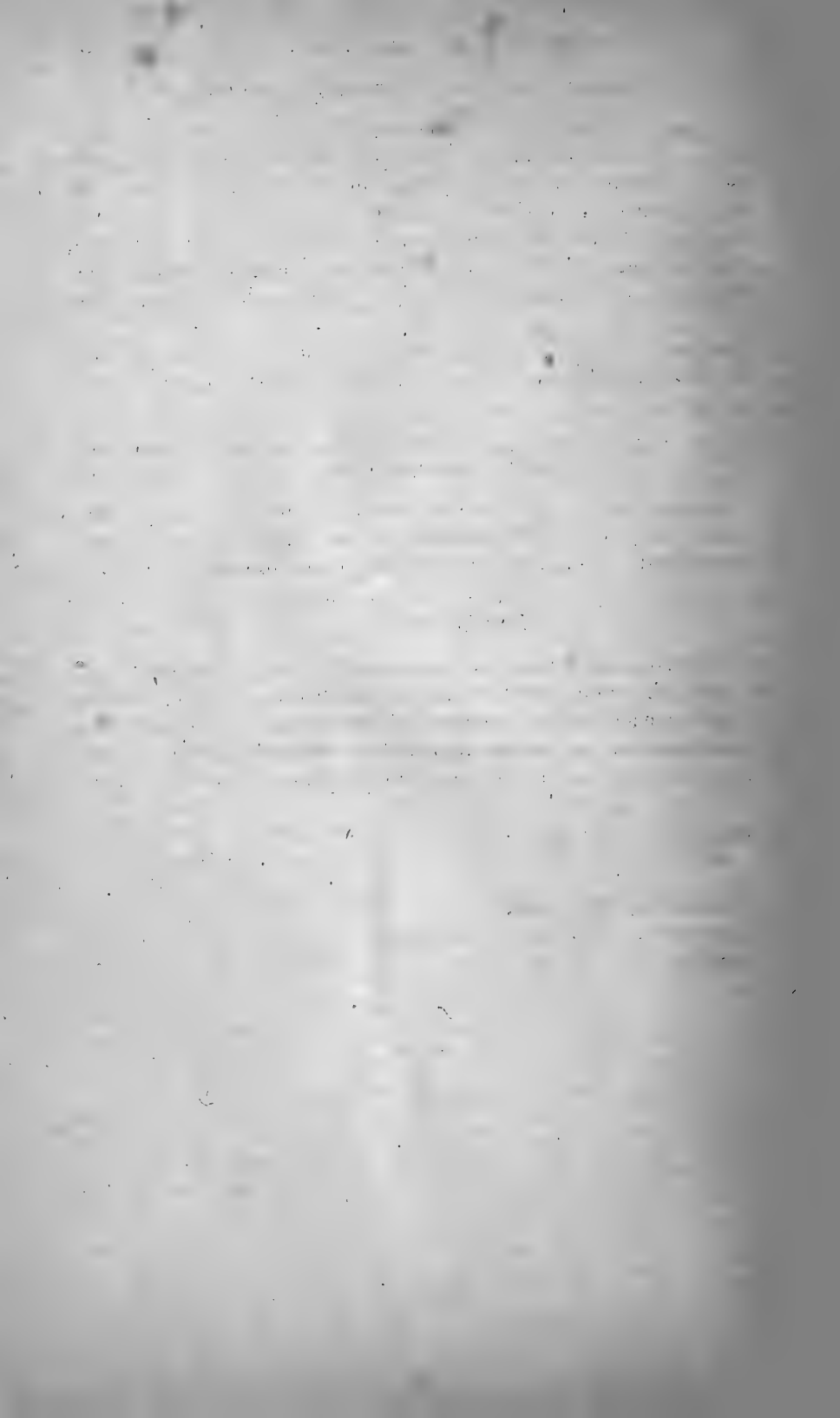
The Smithsonian advisory committee on printing and publication passes upon all manuscripts offered for publication by the Institution or its branches and considers all forms of routine, blanks, and such other matters as pertain to printing and publication. Eight meetings were held during the year and 100 manuscripts were acted upon.

Respectfully submitted.

W. P. TRUE,
Editor.

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







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